Response of the Open Spectrum Alliance to the consultation document "Digital Dividend in the UHF frequency band (470-862 MHz)" of the Dutch Ministry of Economic Affairs.

The Open Spectrum Alliance (OSA) commends the Dutch Ministry for conducting the consultation on an important policy proposal and welcomes this first opportunity to engage with the Ministry on spectrum matters.

1. Abstract

OSA supports the clearing of the Upper band. However, what is missing is an allocation for Wireless Access Systems including RLANs. This is a method that along with a license exempt scheme has brought broadband to both urban and rural areas forcing competition and affordable pricing to people.

The Wi-Fi case has proven beyond doubt that the user community can install networks without high investments. Manufacturers need moderate investments to change the RF parts, but need swift assurance by early regulatory allocation for obtaining funding and global harmonization to reach economies of scale.

2. About the organization

Founded in Vienna in May 2009,

> "The Open Spectrum Alliance is a coalition of companies, organizations, and individuals working to unlock the potential benefits of bandwidth for all."
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> "Current methods of spectrum regulation are based upon the assumption of scarcity reflecting the technologies of the early 20th Century. 'Smart' radio technologies support far more efficient and productive methods of spectrum management."
>
> "The Open Spectrum Alliance is united by the goal of realizing the potential social and economic benefits of this underutilized natural resource by promoting innovative public policies."[1]

[1] Open Spectrum Alliance mission statement - http://www.openspectrum.eu

A list of the founding members, individual members and partners and supporters of the Alliance is given at the end of this document.

3. General comments

The benefits of license exemption are increasingly recognized, yet underestimated. Consider the unprecedented success of technologies like Wi-Fi and Bluetooth: their versatility and proven ability to stimulate innovation – with new applications appearing constantly in health care, public safety, recreation, robotics, telephony, environmental sensing, building management, geo-location, etc. – make it impossible to put an upper limit on their benefits to society.

In comparison, the benefits produced by the traditional spectrum management tool of licensing may be easier to estimate, but they are often overstated because opportunity costs are ignored. Exclusive access to the radio spectrum is one way to support quality of service. However, the price is underutilised bandwidth, since regulators must plan for the moments of heaviest demand and accept the fact that channels lie fallow at other times.

Traditional licensing also creates an "artificial scarcity" of spectrum for other potential users. Given the rapid developments in cognitive radio and mesh networks, exclusive channel assignments are no longer the only – nor always the best – way to guarantee quality of service. Thus, exclusive frequency assignments should be made sparingly, and limited to a reasonable time horizon. We believe that the commercial interests of electronic communication network operators – who need a certain amount of time to recover the cost of developing a particular market – must be balanced against the public interest to ensure that radio spectrum use is optimised. Commissioner Reding[2] puts it this way:

> "Most 'valuable' does not mean only the most 'profitable' services. We need to think in terms of optimisation of spectrum in a wider sense, integrating social, cultural and economic aspects. As the European Commission also stressed in our recent Communication on the Digital Dividend, there is a necessity to shift our focus from technical spectrum efficiency to an optimisation in terms of the value to society of the services underpinned by the spectrum."

OSA was pleased to see that the European Commission promotes harmonized release of the spectrum for the reasons stated in the document. Regarding the Ministry's preference for more clarity in the sizing of the sub-bands and the vision of the Commission, OSA has filed comments on the RSPG's public consultation on the digital dividend. (Open Spectrum Alliance, 2009)

OSA members could not find in the consultation document how the policy of the Ministry would be for acquisition of the license. We assume it will be by auctioning to Mobile Service Providers. Since the outcomes of radio license auctions depend almost entirely on economic factors – especially when they are service-and technology-neutral –

[2] Vivian Reding, Member of the European Commission responsible for Information Society and Media.

the Commissioner and the RSPG seem to be cautioning member states not to rely exclusively on auctions to distribute the digital dividend – unless, perhaps, social, cultural or political factors are used to qualify bidders, or some significant part of the digital dividend is awarded by other means. We have recommended RSPG to assist Member States how to take social, cultural and political factors into account – suggesting, for example, how much of the digital dividend ought to be awarded by methods other than auctions. Some license-exempt bands – 2.4 GHz, for instance – achieve an extraordinary degree of service-and technology-neutrality without reflecting only economic factors.

The traditional approach to licensing tends to "lock in" assumptions about the demand for particular services. Newer media like the Internet, portable game consoles and "smart phones" may already be reducing the public's appetite for television -- digital or analogue. Meanwhile, experts predict that demand for new types of mobile services (including some that cannot yet be imagined yet) will grow during the next decade. Unfortunately, the relatively long duration of television broadcasting licenses will slow the adjustment of channel assignments to future levels of demand. Even if an aftermarket for broadcasting licenses is developed in Europe, it would be extremely difficult for a non-broadcast ECS/ECN operator to re-purpose a TV channel – or an array of channels, in the case of a TV network. Much has been written about the problem that a proliferation of license exempt devices allegedly poses for the "re-farming" of spectrum. But in fact, the need to negotiate with and perhaps "buy out" license holders is no less a problem.

We therefore recommend that significant amounts of spectrum across all bands be made available under a general authorisation regime. Spectrum is either on (co-)primary or secondary basis, wherein licenses explicitly reserve the right to secondary cognitive use when assigned channels are not used by the license holder or not assigned to a license holder in a geographical area.

4. Lessons learned from available open spectrum

The Netherlands have been one of the few leading Administrations instrumental in the assignment of Open Spectrum in the 2.4 GHz band in 1991 (CEPT, 1991) and the 5 GHz band on a licensed-exempt basis in Europe (CEPT, 1992).

Since that time, the use of that spectrum by the general public as well as companies providing Internet access through hotspots has been phenomenal. However, the most striking social and cultural breakthrough has been seen in communities setting up networks to bring broadband communication services to rural areas where the incumbent service provider did not or could not provide a broadband infrastructure. Moreover, even urban areas were deprived from broadband and community networks have been set-up successfully leading to alternatives for commercial networks.

4.1. Empirical data

4.1.1. Djursland.net

The Djursland Network has brought broadband internet access to more than 7000 (2008 status) households, institutions, and firms in the rural area, giving connectivity to more than 20.000 rural people who were otherwise not having connectivity since the investments were considered prohibitive by the incumbent telephone and cable

companies. The method based on Wi-Fi provides comparable service to the rural people against prices much lower than those paid by people in the city (Nielsen, 2008).

4.1.2. Athens Wireless Metropolitan Network (AWMN)

AWMN was formed as a community back in 2002. Due to the tremendous problems with broadband services in Greece then, the number of broadband services available to home users was extremely limited. Thus AWMN was founded as an alternative broadband network, which allowed its users to experience real broadband services.

However after a short period from its "birth" AWMN started to change. An increasing number of people started to have an interest in the network, expressing their interest in joining this project. Very soon the number of network nodes started to grow exponentially, and the network's character changed from an alternative telecom network to a social network of people based on their interest in the IT/Telecom sector.

More information is available on
http://en.wikipedia.org/wiki/Athens_Wireless_Metropolitan_Network and on
http://wind.awmn.net/?page=nodes&session_lang=english

4.1.3. Freifunk.net

Freifunk.net is a non-commercial free open wireless "meta" community, founded in 2003 with its roots in Germany. In first hand it was a reaction to the fact that German Telekom was not able to provide broadband access (due to OPAL), especially in the newly-formed German states after the reunion, but also in many rural areas in the Western parts of the country.

Based on the concept of an "open public local access network" (OPLAN foundation), developed by Malcolm Matson (a UK network pioneer) and inspired by other pioneer wireless community projects freifunk.net aims not only to provide technical and general information about open wireless networks, but seeks to help individuals and organizations raise public consciousness about freedom of information and communication.

Freifunk.net provides websites, FOSS based accesspoint firmware, technical expertise, teaching material and easy-to-understand Do-It-Yourself-manuals for starting wireless community networks in almost every environment. It follows a path of maximum decentralization in it's community structure and in it's technical solutions. Enabling and supporting local activities and actors and using the snowball effect are absolutely key to all activities.

Digital wireless communication in general is seen as one of the most beneficial technologies, especially in the developing countries. Not every angle of the world can be reached by either commercial or state-run top down organizations. There are many places on the globe which can be seen as so called "areas of market failure" - places where people have to help themselves. These are freifunk.net's targets. By setting up local wireless intranets (OPLANs) the community members can share their knowledge, data and bandwidth. On top of their networks they can run various applications like VoIP, community-radio, Wikis, etc. Existing network infrastructures can be included. The

community members can share expensive broadband internet connections and expand the geographical outreach of the internet.

Today the activities have expanded way beyond Germany and the topics addressed reach out to all aspects of free communication infrastructures, such as the development of new innovative technologies and devices, spectrum licensing politics or lobbying manufacturers for the global availability of inexpensive and FOSS compliant hardware.

There are many villages, towns and cities in Germany and all around the globe where people make use of wireless technology and the knowledge and technical solutions provided by freifunk.net and other wireless community projects to bridge the digital divide in a D.I.Y.-manner. There are thousands of Wi-Fi accesspoints out in the world, running the freifunk.net firmware, making use of meshing technologies like OLSR or b.a.t.m.a.n., that link the people in rural and urban environments to the internet and provide them with local ICT services.

Over the past 5 years freifunk.net has proven that it provides a community model, teaching material, technical solutions and workshops to really serve people's need for low-cost do-it-yourself local digital communication infrastructures.

4.1.4. Funkfeuer

Funkfeuer.at is a meshed wireless community Wi-Fi network in Vienna , Graz and other rural areas in Austria.

The Vienna network covers the whole city and extends 30 km towards Bratislava and Hungary.

Funkfeuer is a community Wi-Fi network meaning it is built by its users (the node owners). Data rates are often in the 20 Mbit/s range and can stretch many kilometres. Access to the internet is provided by the funkfeuer.at association for free to the node owners. Thus, all a node owner needs to do is to connect to the network via the mesh and pass along packets for other node owners.

The meshed community Wi-Fi network uses OLSR (RFC 3626) as mesh routing protocol. The OLSR.org implementation of OLSR is actively maintained by individuals who participate in the network. A mesh has the additional benefit that it will “self-heal” dynamically whenever nodes become unavailable. Since Funkfeuer and individual open source coders actively enhance and extend OLSR.org (and test the implementation in a real life test bed), OLSR.org became highly scalable reaching a scalability target of a couple of thousand nodes while still running on small embedded devices such as a 200 MHz embedded processor.

4.1.5. Guifi.net

Guifi.net have promoted the deployment of open telecommunications networks, based on peer to peer connection agreements, since 2004. Participants connect their own network segment with others. The network is open, free and neutral. It is *Open* because they publish complete information about how it works and its components, allowing the participation of everyone who is interested in it. It is *Free* because the conditions are the same for everyone – it does not have a single or corporatised owner who may impose

unilateral conditions on others. It is *Neutral* because the extent of the peer to peer agreement is limited to the terms of connectivity only, and not the content.

Until now, the scope of the activities of guifi.net has been in what is known by the ”user loop”. Currently (July 2.009) guifi.net provides broadband to more than 7,000 homes and the total network “path” extends over 9,000 kilometres of connections. They experience continuous and sustained growth, based entirely on self-generated user demand, which has been experienced in Catalonia, Spain. Guifi.net is willing to extend the experience all over the world.

Guifi.net participants chose this model motivated for various reasons. Among these we have listed the following illustrations, without intending to limit our reach:

1. The need to seek solutions where there were no options for access to broadband -- often in rural areas.
2. Technology enthusiasts, free-networkers or volunteers have more to gain while they cooperate.
3. Small and medium-sized service companies in the territory, that see options and possibilities to lend their services
4. Municipalities interested in improving digital inclusion.
5. Professionals or businessmen who prefer a model where they maintain decision-making control over investment costs, lower TCO, reliability and control over service levels, and ownership over the segment of the network of their interest.

5. Specific responses to the questions

1.	Do you agree with the choice made in the policy proposal to (also) make the upper part (790-862 MHz) of the UHF band available for electronic telecommunication networks and services? Can you explain any objections and provide qualitative and quantitative support for your arguments?

OSA supports the clearing of the upper UHF band from high power broadcast services and assigning the band to electronic telecommunication services that use medium to low power. However, we observe that the current thinking is to assign the majority of the band to LTE. We are missing any reference to Wireless Access Systems including WLAN, the method that, along with a license exempt regime has brought broadband to both urban and rural areas, that forced competition, and affordable pricing to the people.

2.	What is your vision on the expectation that the need for spectrum for electronic telecommunication, including mobile broadband applications, will increase in the near future? Does this expected growth in demand justify the use of additional spectrum in the 800 MHz frequency band for this purpose?

OSA supports the extension of spectrum on a license exempt regime throughout the radio spectrum. OFCOM research has concluded that “Inner city locations are extremely busy and do exhibit signs of congestion as well as interference. We expect this to be occurring in most large cities of the UK.” (OFCOM, 2009). Therefore additional spectrum is warranted.

3.	Do you expect that the financial crisis will have any effects on investments? Can you indicate what consequences this could have on the present policy proposal?

The Wi-Fi case has proven that the investments are only to be made by the manufacturers. Adaptation of the Wi-Fi design to the new frequency bands and the new regulatory requirements only involve a small part of the end product, i.e., Layer 1 of the architecture, meaning that the investment is relatively small compared to the LTE stack of protocols on the design table.

See the answer to Question 4 for the need to quickly make a decision and fix the regulatory requirements.

4.	What problems do you anticipate with respect to the policy proposal, as current/possible future user of the UHF frequency band? Can you quantify these problems? And can you indicate whether – and, if so, how – these problems can be resolved within the context of this proposal?

OSA recommends that the policy would be harmonized throughout Europe, and further harmonized throughout the globe, so manufacturers can benefit from the "economies of scale". With drop in prices users can benefit from the low-cost devices.

OSA also recommends making the decision upfront, so that manufacturers can quickly attract funding to have products by the time the bands become available. They can do so only if they are working on a safe investment.

5.	Do you expect problems for consumers? These problems could relate, for example, to the switchover of set-top boxes or the risk of interference in the reception of both terrestrial broadcasts and cable programmes. Can you quantify these problems? How can these problems be resolved?

The consumers are always experimenting. They buy new devices and equipments if it is going to aid them increase the pace at which they interact/communicate. Thus we see no serious problems. With improved systems and technology, the interference will die sooner than later.

Quantifying the problems is difficult and qualitatively the problems are less..

6.	What is your vision of the increasing availability of frequency spectrum for such uses as mobile broadband in rural areas? In your opinion, are there other ways to meet this need and, if so, what are they?

OSA opines that in stead of or in addition to LTE, assigning the band to WAS including RLAN on a license-exempt regime will benefit the rural areas to both get mobile as well as fixed connection to broadband as is shown in the case of Community networking using Wi-Fi.

7.	Assuming that the spectrum is released in 2012, when do you think that the different phases of this policy proposal (allocation, release of the uppermost sub-band, distribution of the spectrum released) can be performed most effectively?

OSA is of the opinion that allocation should be made as soon as possible for the reason given in the answer to question 4.

8.	What are the advantages and/or disadvantages of the possible later reassignment of channels after 2012, such as reassignment upon the expiry of the current licences in the UHF spectrum on 31 January 2017?

The technology is changing. There is more to Moore's law.

The disadvantage of later reassignment: It lowers the process of spectrum reuse and spectrum efficiency if we start late. The current technology can definitely take care of interference, which we will not be utilizing.

Further, the world will not wait for some OLD treaty to expire.

The advantage is minimal and limited to avoiding interference, whatsoever..

9.	What might be a reasonable method of compensation in the case of a switchover to lower channels before the end of the licences of the current users in the UHF frequency band?

OSA currently has no opinion on this question.

10.	Do you see any advantages and/or disadvantages if the issue of the so-called '800 MHz band' is linked to the allocation of other spectrum that becomes available? What are those advantages/disadvantages?

OSA currently has no opinion on this question.

11.	What alternatives do you see for facilitating the applications for programme supporting services and events (wireless microphones, reporting connections and other users) if the 790-862 MHz upper band is used for electronic telecommunications networks? When will these alternatives be available for use?

OSA recommends that a harmonised approach is to be taken to allow Program Making and Special Event (PMSE) manufacturers and users to benefit from a common market for devices, even though the frequencies available for PMSE are likely to vary from location to location, from time to time, and from member state to member state. In light of this variability, we recommend using cognitive techniques to solve band sharing problems between wireless Internet access and television-related networks.

6. Other issues

OSA would like to stress the importance of keeping in mind the future addition of allocation of cognitive radio devices in mind while designing regulations for new services and licenses.

7. Referenced documents/websites

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