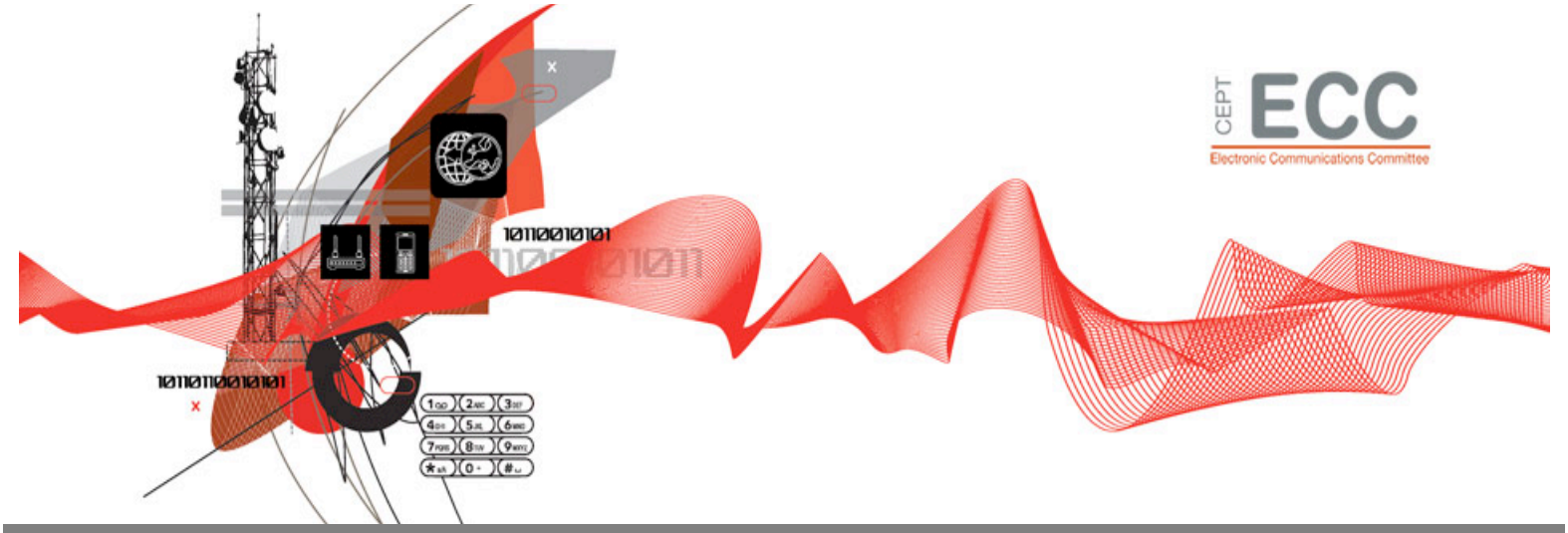


ECC NEWSLETTER **October 2013**

Licensed Spectrum Access opens new opportunities

Introduction

It is quite rare for the ECC to agree a harmonisation measure which designates spectrum more or less exclusively for a specific use. These measures will almost always include some provision for compatibility with identified incumbent services in the same band. These days ECC Decisions on harmonising measures focus on liberalisation of existing provisions (especially where technology neutrality is promoted), the exemption of devices from individual licensing, and how new services may be introduced on a shared-spectrum basis with existing ones.

Authorised Shared Access and Licensed Shared Access: licensed services in shared bands

During the 72nd meeting of the ECC's Working Group Frequency Management (WG FM) held in Miesbach, Germany, on 16 - 20 May 2011, industry stakeholders gave a presentation on '*An evolutionary spectrum authorisation scheme for sustainable economic growth and consumer benefit*'. The Authorised Shared Access (ASA) concept was presented as an enabler to unlock access to additional frequency bands for mobile broadband under an individual licensed regime while maintaining incumbent uses. ASA has been developed with the aim of making the dynamic use of spectrum possible, whenever and wherever it is unused by incumbent users. Spectrum initially sought for mobile services on a shared allocation basis is in the 2.3 GHz band (mobile service sharing with military applications/wireless cameras) and the 3.8 GHz band (mobile with satellites).

In November 2011, the RSPG[i] finally adopted for publication a Report on collective use of spectrum and other sharing approaches which included consideration on the regulatory aspects of a Licensed Shared Access (LSA) concept similar to ASA. The extended LSA concept is not only limited to International Mobile Telecommunications (IMT) services. According to this RSPG Report, it can provide new sharing opportunities on a European scale under individual licensed regimes, while safeguarding current national spectrum usages which cannot be re-farmed.

In the broadest sense, LSA is nothing new: introducing new services which are compatible with existing ones has been the spectrum manager's practice for decades. However, what is new is the possibility to apply smarter tools such as dynamic databases to track and define the opportunities for new services to share with

incumbent users which may be quite specifically defined geographically, and limited in the time over which they need to be protected. From a European perspective, the LSA approach can address the market demand for the harmonised introduction of new applications, operated under an individual licensed regime, in specific bands characterised by fragmented incumbent uses which have to be maintained in different countries. Overall, this allows for more efficient spectrum use.

Scope of LSA

Following some initial investigations, in September 2012, CEPT established WG FM Project Team FM53, with the aim of providing generic guidelines on Licensed Shared Access (LSA). The RSPG established in parallel a working group to develop a response to the European Commission's Request for an Opinion on spectrum issues concerning LSA.

The draft report, ECC Report 205, was developed by FM53 and adopted for public consultation in October 2013 and is due for publication in February 2014. It provides an overview of the regulatory framework for the use of spectrum, current practices in terms of spectrum management and management of frequency authorisations. The report includes a detailed analysis of the application of LSA to mobile broadband services.

Taking into account the initial RSPG working definition of LSA and how it fits into the current regulatory framework, the report clarifies the concept in relation to supporting its potential for fostering spectrum sharing.

- LSA is a complementary spectrum management tool that fits under an 'individual licensing regime'. It aims to facilitate the introduction of new applications in a frequency band while maintaining incumbent services in the band.

- LSA, as a general concept, does not specify the nature of the incumbents and LSA users. LSA licensees and incumbents operate different applications and are subject to different regulatory constraints. They would each have exclusive individual access to a portion of spectrum at a given location and time.

- LSA impacts the national allocation of a frequency band, which is a sovereign decision on the destination of this public resource. The decision on the incumbent services to be protected within a 'sharing framework' is to be made by national administrations in light of national policy objectives, and taking into account international obligations and community law in the case of EU member states. The sharing framework shall give a certain level of guarantee (i.e. taking into account user requirements and sharing constraints) with respect to the spectrum that can be made available, with corresponding technical and operational conditions for alternative usage under LSA. Its development requires the involvement of all relevant stakeholders.

- LSA does not prejudge the modalities of the authorisation process to be set by Administrations/NRAs taking into account national circumstances and market demand. It is not a tool to regulate the spectrum market and is based on different principles to 'spectrum trading'.

From a European perspective, a CEPT harmonisation measure would designate a frequency band and define harmonised conditions of use (e.g. BEM, radio interface). Investigations at a European level on the various sharing constraints aim to ensure that corresponding harmonised standards include the necessary tools for implementation of sharing mechanisms required for operation in the band. Flexibility in the national implementation is required to enable the protection of incumbent services.

The report was also developed in conjunction with ETSI TC RRS[ii]. As well as technical measures to support the implementation of LSA, the report considers an example of LSA functional architecture and identifies interfaces that would require standardisation.

Finally, it should be noted that LSA could be one solution for mobile network operators to access complementary spectrum for Mobile/Fixed Communications Networks (MFCN) and should not preclude efforts to secure exclusive access to spectrum for mobile broadband.

Frequency band 2.3-2.4 GHz

The frequency band 2.3-2.4 GHz was allocated to the Mobile Service and identified for IMT globally in the ITU Radio Regulations at the World Radiocommunication Conference in 2007. The band is suitable for application of TDD[iii] technology and is standardised by 3GPP as LTE Band 40. Based on this standardisation work, and driven by the growing developments in the Asia Pacific region, multi band equipment is already available in support of this LTE band.

The situation within CEPT countries is fragmented today: incumbent uses, such as military communications and cordless cameras – these are often limited in time and location, have to be maintained in certain countries, while in others the band may be unused and is attractive for MFCN.

The results from ECC Report 172 suggested that the introduction of MFCN may be possible on a shared basis with appropriate provisions. CEPT decided to study the applicability of LSA for MFCN in the 2.3-2.4 GHz band and established WG FM Project Team FM52.

The Draft ECC Decision for MFCN in the band 2.3-2.4 GHz developed by FM52 includes in particular the following provisions:

- harmonised frequency arrangement – 20 blocks of 5 MHz suitable for TDD;

- Least restrictive technical conditions developed as Block-Edge Mask, containing in-block and out-of-block power limits for both BS and UE. Currently under definition, taking into account recent activities, in particular in the 3.4-3.8 GHz band;

- administrations wishing to introduce MFCN in the band, and maintain the long-term incumbent use of the band in their territory, shall develop appropriate provisions based on LSA.

The ECC Decision is scheduled for consideration for adoption for public consultation by WG FM in February 2014. It will then be forwarded to the ECC for final adoption and publication in June 2014.

Emmanuel Faussurier,
Chairman of the ECC's Project Team FM53

i The Radio Spectrum Policy Group, a high level advisory group of EU member states to the European Commission
ii RRS = Reconfigurable Radio Systems
iii TDD = Time division duplex, as opposed to defining individual channels in each direction by frequency division duplex (FDD).

Short range devices with a long reach

As the seemingly insatiable appetite for spectrum for wireless broadband continues apace, supported by the European Union's spectrum policy programme which calls for 1200 MHz to be made available, we take a contrasting look at why some of our more moderate spectrum users are also ripe for growth. A wide range of highly valuable uses of spectrum are to be found squeezed into a few relatively narrow bands operating as (typically unlicensed) Short Range Devices (SRD). These devices have a huge significance in our daily lives, whether as assistance for people with a hearing impairment, or bringing down the costs of supermarket goods, or as part of making an intruder alarm system affordable, to give just three examples.

Our Newsletter article of June 2012 outlined how the ECC is working to improve the efficiency of these bands and widen the possibilities for accessing them. This is based on applying a step-by-step evidence-based process for enabling more generic conditions to be applied to wider spectrum bands than before, instead of slicing the available frequencies into narrow bandwidths for niche applications. Our Newsletter in January 2011 highlighted how one sector, RFID (Radio Frequency Identification Devices) can bring huge cost savings and efficiencies to logistics in the commercial and public sectors. That article also announced the date of a major workshop on short-range devices which was hosted by the ECC and held in the early summer of that year.

Now, a major milestone, driven by demand

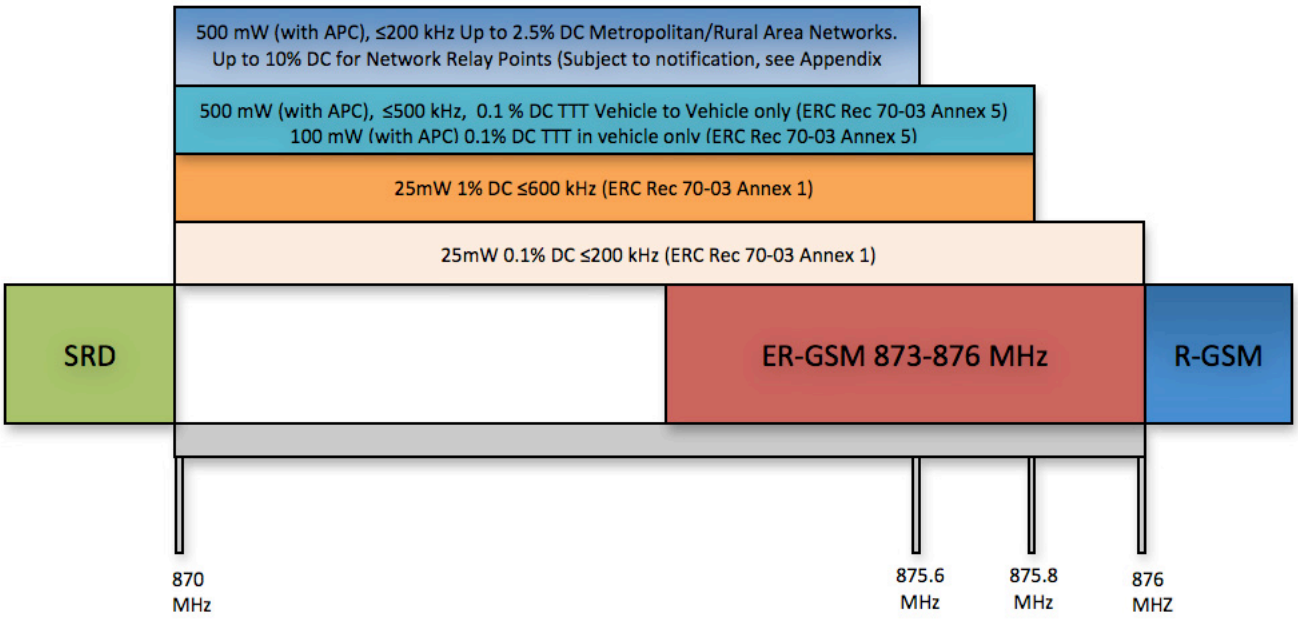
Now the ECC is reaching a major milestone in the development and management of frequencies in the favoured range just below 1 GHz for a wide variety of SRD applications with the creation of a new roadmap which paves the way for a major upgrade of 19 MHz of spectrum. At present the range 863 to 870 MHz is used extensively for SRDs. However, these ranges are filling up quickly and a lot of new developments are anticipated, as set out in ECC Report 182 (Survey about the use of the frequency band 863-870 MHz) and by ETSI[i] in a set of System Reference Documents. This includes rising spectrum demands for generic SRD, UHF RFID, Home Automation & Sub Metering, Automotive SRD, Smart Meters and Smart Grids, Metropolitan Mesh Machine Networks (M3N) applications, Alarm and Social Alarm systems, and Assistive Listening Devices (including hearing aids). In addition to capacity constraints, the bandwidth of the existing plans is limiting to developing applications, e.g. a wider bandwidth for individual RFID devices will improve their performance and function. With machine mesh networks, the required bandwidth of the systems would not fit into the existing narrow bandwidths that are available.

Against this background, we need to take account of two significant considerations. Firstly, in the American continent nearby frequencies (902 to 928 MHz) are allocated to ISM[ii], which is a convenient basis for using SRDs, and therefore a lot of equipment is being developed to operate in this range. For Europe, as part of the ITU-R Region 1, no ISM band was identified at the World Administrative Radio Conference (WARC-79) in 1979 in this part of the spectrum. This new SRD harmonisation measure (together with the DSI[iii] harmonisation effort about ten years ago) is for practical purposes a Europe-specific review of that decision made 34 years ago. Secondly, there are two significant adjacent frequency ranges which are seriously under-utilised in many countries: namely 870 - 876 MHz, and 915 - 921 MHz; these are frequencies which had been prepared for use by private mobile radio systems, but that development has seen very little take-up.

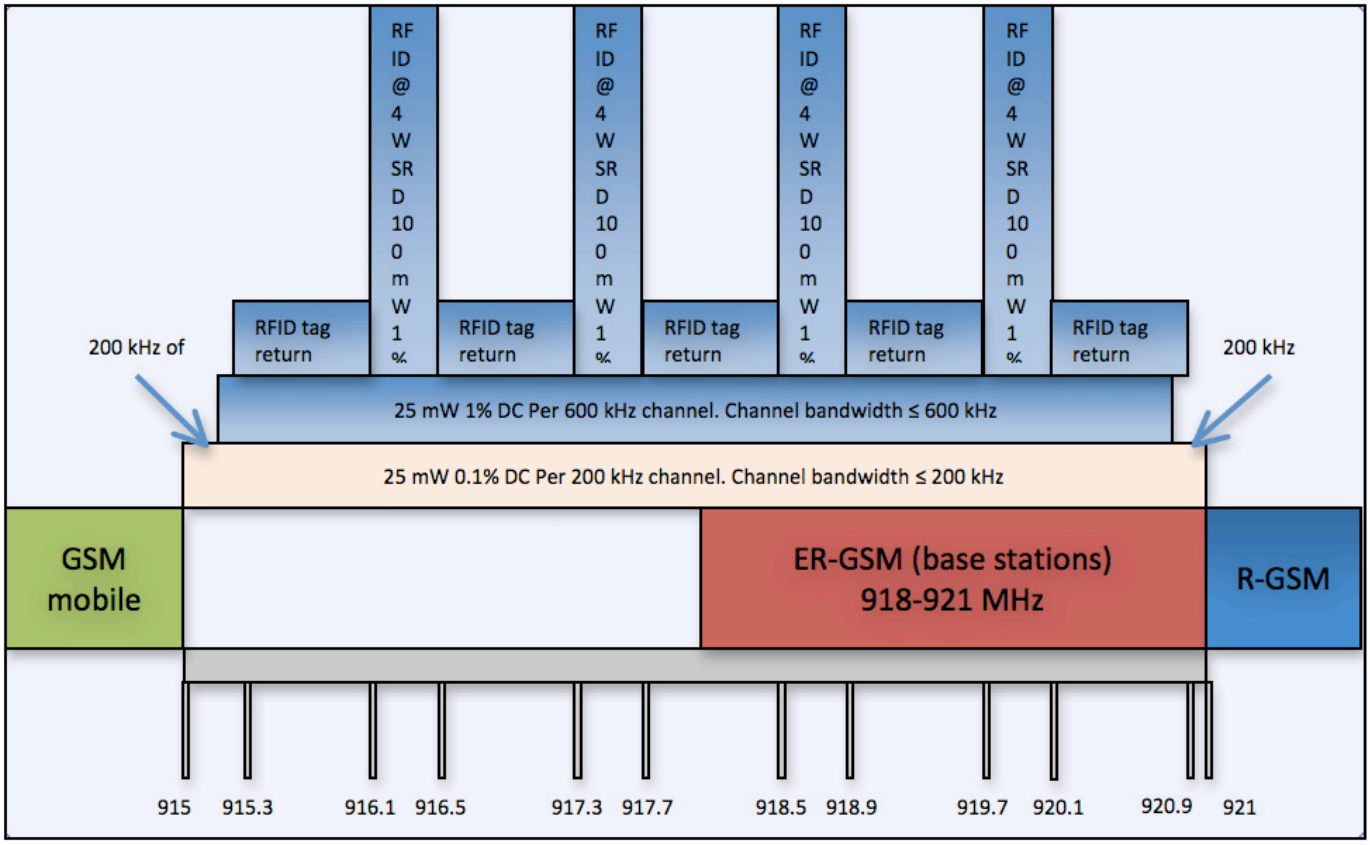
ECC instruments and conclusions

ECC Report 200 gives the background and conclusions to a comprehensive set of coexistence studies in these under-utilised UHF bands in Europe. Some of these used the ECC's SEAMCAT analysis tool, developed and maintained by the ECO in Copenhagen. The related ECC Report 189 prepared by the ECC's SRD Maintenance Group, uses these conclusions to define recommended regulatory parameters for SRDs. This report is currently out for public consultation, and when finalised it is expected to form part of the ECC's key regulatory document on SRDs, Recommendation 70-03. ECC Report 200 looks partly at the compatibility issues between different sorts of SRDs to investigate whether their use of the band is compatible with existing services. However, the major part of the report recognises that although under-utilised for Professional Mobile Radio (PMR), there are significant existing governmental services with access to part of the new frequencies in several countries which would need protection in the future at the discretion of the relevant national administrations. The review included an audit of these existing and planned uses, which revealed not only some of the military tactical systems as known about, but also some new uses such as remote control of unmanned aircraft (UAV). Some other countries anticipate needing to use the spectrum in some specific locations for an extension of the existing GSM-R bands. The studies in the ECC have covered this utilisation to provide a solution for spectrum sharing with GSM-R.

870-876 MHz band plan:



915-921 MHz band plan:



ECC Report 200 also describes the use of network access points/network relay points forming part of metropolitan area 'mesh' networks for utilities or other applications for the purpose of data acquisition for example.

Network relay points can be operated by various providers in the same metropolitan area and are recommended to be notified to the administration as part of a general authorisation framework. This means that it is not intended to limit the number of M/RAN (Metropolitan/Rural Area Network) in a given area *a priori* and that the principles as set out in CEPT Report 44 should apply, such as equal access to the spectrum, on a shared basis, in a technical and application-neutral manner. Further technical measures are not recommended at the moment but may be subject to review, should traffic overload situations materialise in the future.

This particular approach provides a good example of the ECC's use of 'soft harmonisation', where existing services remain protected to the extent that national administrations deem it necessary, yet providing the opportunity for the harmonised development of new services in the majority of European countries. The success of ERC Recommendation 70-03 owes much to its 'soft harmonisation' approach, which is quicker to set up than a more rigid, centralised harmonisation process, where the measures needed to deal with important but limited incumbent interest can block or delay the process at the European level.

Thomas Weber, ECO Expert in Frequency Management and
Mark Thomas, Director of the ECO

i The European Telecommunication Standards Institute published five system reference documents: Generic SRD, RFID, Home Automation & Sub Metering and Automotive SRD, TR 102-649-2; Smart Meters and Smart Grids, TR 102 886; Metropolitan Mesh Machine Networks (M3N) applications, TR 103 055; Alarm and Social Alarm systems, TR 103 056; and Assistive Listening Devices, TR 102 791.

ii Industrial, Scientific and Medical uses.

iii Detailed Spectrum Investigation, a three-phase thorough review of the European plan for allocation of frequencies.

Internet access, it's all about speed, right?

Decisions, decisions

As consumers we rely on product information in order to inform our everyday purchasing decisions. And it is unusual for us to rely on one single product attribute on which to base those decisions. When purchasing a car, for example, most of us would not rely solely on the top speed a car can achieve. It's more likely that we would also consider other factors such as price, fuel efficiency, size, and functionality, across different makes and models, before making our decision. Realising that while speed might be an attractive attribute, it's unlikely we would ever get a chance to put it fully to the test anyway, at least not without problems with the law!

Unfortunately, there is an over-reliance on speed when it comes to purchasing Internet access services. The Internet is now an integral part of our daily lives and as consumers of Internet services one of our primary needs is a fast and reliable broadband connection. When purchasing an Internet access service, the less technically knowledgeable among us (which is most of us!) predominantly make our purchasing decision based on two criteria: speed and price. Unfortunately, our expectations on speed are seldom met, as the results of the European Commission's recent study on fixed broadband performance shows with Europeans consumers receiving, on average, only 74% of the advertised headline speeds for which they have paid.

Winning and retaining retail Internet access customers is a competitive game and requires significant marketing spend. Internet Access Service Providers (ISPs) go to great lengths to 'outdo' each other using advertising campaigns that proclaim greater speeds than those offered by competitors. Choosing between different market offerings is often confusing and even frustrating. There is no common set of measurement parameters that would allow us to make objective comparisons. We therefore tend to rely on headline advertised speeds. If we think the price is reasonable for the speed then we say 'yes' and hope for the best. This is not an ideal scenario when it comes to such an important purchasing decision and consumers are often left with services that are either not fit for purpose or do not meet their own unique requirements adequately. This information gap needs to be addressed by policy makers. The European Commission's further studies on broadband performance will certainly provide some welcome data, but more can still be done.

In Europe, the legislative framework is already in place to address the information gap

Indeed, the EU has already made provisions to allow National Regulatory Authorities (NRAs) to take steps to address this issue. Article 22 of the Universal Service Directive requires Member States to "ensure that national regulatory authorities are ... able to require undertakings ... to publish comparable, adequate and up-to-date information for end-users on the quality of their services ...".

Article 22 also states that "regulatory authorities may specify ... the quality of service parameters to be measured" and that "authorities are able to set minimum quality of service requirements".

Facilitating comparability of available Internet access services is a very important action for NRAs in order to fulfill the requirements of the Directive.

Quality is king

Consumers require consistent and predictable end-to-end levels of service quality from Internet access services. There is no doubt that publicly available, easily comparable and comprehensive, information on Quality of Service (QoS) would contribute to more informed decision-making. A common approach to advertising Internet access offerings is needed and the focus should be on overall quality of service and reliability with headline speed being just one of a number of measurable parameters.

The time is right for policy guidelines

At its 6th meeting in Budapest in April, the CEPT/ECC Working Group on Numbering and Networks (WG NaN) adopted ECC Report 195 on 'A Minimum Set of Quality of Service Parameters and Measurement Methods for Retail Internet Access Services'. This report was developed by WG NaN's Project Team on Technical Regulatory Issues (PT TRIS).

The main objective of this ECC Report is to provide guidelines to NRAs on the practical application of the EU's regulations on QoS in order to allow comparisons, not only based on price and advertised maximum speed but also on the performance of the connection. This report summarises current practices by Member States and recommends converging actions towards a more consistent and harmonised approach in the future. Possible parameters, measurement configurations and other aspects are discussed.

The report defines a minimum set of technical QoS parameters (consisting of "actual minimum and average values of transmission speed" and "average values of delay, delay variation, packet loss ratio and packet error ratio") that should be used and, to the extent possible, harmonised between CEPT countries. The report also proposes various QoS evaluation and measurement methods to assess the minimum set and recommends that relevant information should be published in a central source using a standard format to allow consumers to access information easily to compare the different market offerings.

With reference to previous experiences by Member States, this minimum set of standardised parameters is selected to become the baseline for evaluating QoS. The measurement configurations to be considered can be divided into 'in-net' measurements and 'over-the-top' measurements. The in-net measurements cover the area of influence of ISPs, while over-the-top measurements are more closely related to the end user's environment. In addition, complementary measurement methods mirroring the perception of the end user are presented.

The report not only identifies the parameters and their values to be measured but also gives guidance on how and where (in the network) they should be measured. These are essential guidelines for ensuring comparable information on the quality of Internet access services. The presentation, form and observed values must then be presented in a standardised way so that the information is accessible to all.

In addition to the minimum set of technical parameters identified, NRAs are free to observe and evaluate more technical and/or administrative parameters as they see fit. Measurements of access to IXPs (Internet Exchange Points) are the most pragmatic and most widely used approaches to evaluating QoS at present. This ensures a fair comparison between the different ISP networks. A good indicator of the performance experienced by the end user can also be achieved using end-to-end/over-the-top measurements such as speed test tools.

Intensifying competition and service innovation requires an environment where consumers are well informed and confident in the choices they make. This report should make a significant contribution towards achieving these high level regulatory goals.

The Report is now available on the ECO Document Database here.

Freddie McBride,
ECO Numbering and Networks Expert