Radio Spectrum Policy Group Public Consultation on Wireless Access Platforms for Electronic Communications Services (WAPECS)

WiMAX Forum Response

The WiMAX Forum is an industry-led, non-profit corporation formed to promote and certify the compatibility and interoperability of broadband wireless products harmonized to the IEEE 802.16 and ETSI HiperMAN wireless MAN standard. The WiMAX forum's goal is to accelerate the introduction of these devices into the marketplace. WiMAX Forum Certified™ products will be fully interoperable and support a global platform for Broadband Fixed, Portable, and Mobile Applications with an all IP Packet system architecture. The WiMAX Forum has over 330 members, split between Component Suppliers (22%), System Manufacturers (24%), Ecosystem members (21%) and Operators (33%). Nearly one third of the members are European companies in the following categories: Component Suppliers (20%), System Manufacturers (22%), Ecosystem members (12%) and Operators (46%). The WiMAX Forum has seven working groups that include Marketing, Regulatory, Applications, Technical, Service Provider, Network and Certification.

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Final

Question 1: Do you agree with this operating definition of WAPECS? Do you consider that the WAPECS concept should include spectrum intended for private, as well as public, applications?

Background

The "possible working definition" proposed by the RSPG is:

> "Wireless access platforms for electronic communications services (WAPECS) are the platforms used for radio access to electronic communications services, regardless of the bands in which they operate, or the technology they use."

Response

- The WiMAX Forum supports the flexibility embraced in the WAPECS concept.
- WAPECS should include spectrum for both public and private use.

The WiMAX Forum supports the inclusive and expansive WAPECS definition proposed by the RSPG. The WAPECS concept recognizes that traditional approaches to spectrum regulation have been overwhelmed by technology and market factors. Radio and associated computing technologies have become increasingly robust, flexible, pervasive and cost-effective. Global scale economies, miniaturisation, multi-mode radio access devices, software-defined radio platforms are overcoming the technology constraints that previously encouraged closed and/or proprietary end-to-end systems. Spectrum policy has enabled and reinforced a closed system paradigm for creating and accessing electronic communications services via wireless means; but that paradigm is no longer valid.

The power of the Internet Protocol (IP) illustrates that closed or proprietary systems are no longer necessary, and are becoming outmoded – IP enables the cost-effective delivery of any type of content through any type of access technology. Furthermore, the Internet's ability to provide a nearly pervasive path for interconnection and transport means that the delivery of content or applications no longer needs to be captive to a particular radio platform. In response to the overwhelming user acceptance as well as the technical advantages of IP, service providers are migrating their networks in the direction of open, all-IP architectures.

There now is clear evidence that converged, innovative electronic communications services are succeeding in the market. These services cut across previously separate access types and service domains. In the Internet age, the speed of service innovation and market adoption greatly outpaces the rate at which highly prescriptive regulatory approaches can respond effectively. Commercial and operating models that are proscribed by inflexible regulatory constructs are unable to service this emerging demand.

WAPECS anticipates that next generation systems beyond IMT-2000 will bridge across the historically discrete domains of broadcasting, mobile and fixed access. WiMAX is one such next generation technology, and it is positioned at the forefront of the technology and market dynamics that the WAPECS concept seeks to address. It can enable the adoption of the sorts of services that WAPECS seeks to enable.

The WiMAX Forum have identified a broad service concept called *personal broadband*, described in its recent filing with the RSC in *IMT-2000 in the 2.6 GHz Band – Consultation Response*, excerpted as follows:

> "Following the widespread adoption of broadband over fixed networks over the past few years, users have become accustomed to an always-connected environment without significant bandwidth limitations. Internet access applications, in that environment, have been embraced by both the business and consumer markets. High traffic volumes are

> now being generated by applications such as music downloads that were previously confined to the entertainment and broadcast industries. Person-to-person applications requiring high bandwidth have emerged as an unanticipated but significant source of traffic. Many of these new services and applications are inherently personal to the user. Users naturally want and expect those services to travel with them when they move. They expect the services to be available without restriction in nomadic and mobile environments, not only in their own country but also across the globe.
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> This level of user expectation for ubiquitous personal broadband is a relatively recent phenomenon not fully anticipated during the design phase of 3G systems. Meeting that expectation has been called: "Bringing true broadband into the mobile domain" or "DSL on the move". The most widely accepted term is "personal broadband". A very significant aspect of this evolution is the rising market requirement that *every type of electronic communications service* – be it voice, streaming media, entertainment, file sharing, multiplayer gaming, internet and intranet access, and so forth – *be affordable and accessible, anytime, anywhere* – in other words, via broadband mobile means.
>
> Personal broadband can be characterised as the genuine manifestation of broadband in the mobile domain. It reflects the user expectation that whatever they can do in one environment should be translatable to other environments. The personal broadband market can be characterised by an increasing consumer demand for bandwidth, broadband services and various degrees of mobility.
>
> The personal broadband vision is the first real instance of convergence across fixed, nomadic, mobile and broadcasting platforms. Personal broadband can be regarded as an entirely new class of service, adding a new dimension to existing service categories. 3G services have already removed the constraints of time and space. Personal broadband services extend the functionality of 3G by removing the constraints of bandwidth."

A technology and service-neutral approach to implementing WAPECS would address the opportunity and risk described in this personal broadband vision, and enable the broad-scale adoption of personal broadband services through the capabilities of technologies such as WiMAX.

To be fully inclusive and expansive, the WAPECS concept should include spectrum intended both for public and private uses. The WAPECS concept creates a fundamental long-term direction for policy making. Implementation will likely require several progressive phases, with accompanying benefits growing over time. The balance between public and private spectrum needs and uses could easily shift over time. To exclude private uses could unnecessarily limit the flexibility that the WAPECS concept seeks to achieve. Many of the considerations involved with managing public use spectrum in a technology and service neutral manner apply as well to private use spectrum (e.g., managing interference) and regulators may need the ability to affect specific outcomes because of that. Regulatory forbearance should be the assumed starting point for the approach to spectrum identified as being for private use. Additionally, adopting a technology and service neutral approach to all of WAPECS would not burden private use spectrum with inflexible restrictions.

Question 2: Do you consider that the term "platform" should be more closely defined? If so, what definition do you propose?

Background

In June 2004 the European Commission requested that the RSPG develop and adopt an Opinion on WAPECS. The EC stated that *"there is a large variety of services and a larger variety of wireless access platforms potentially operating in various frequency bands. . . . Members of the group are hereby invited to . . . give their views on:*

- *A common understanding of the range of wireless access platforms…and their spectrum-related challenges…*
- *Common long-term objectives for the regulation of spectrum being used by such platforms…*
- *Options for…allowing industry to combine various technologies and access platforms as most appropriate.*

The RSPG draft opinion states "WAPECS platforms can provide mobile, portable, or fixed access, for a range of electronic communications services, using the term "services" in the sense of the Framework Directive 2002/21." Further definitional information is included in a footnote: "The Framework Directive defines "electronic communications service" as "a service normally provided for remuneration which consists wholly or mainly in the conveyance of signals on electronic communications networks, including telecommunications services and transmission services in networks used for broadcasting …." However, the Framework Directive also covers electronic communication networks, which are not limited to commercial use."

Response

The WiMAX Forum suggests that the term "platform" should relate to the combination of component elements whose inter-relationships determine the characteristics of the wireless access, namely:

- Spectrum
- Radio transmission equipment
- Devices or other end-user terminals with an air interface

Such an approach addresses the shift away from "dedicated, closed or proprietary end-to-end systems" that have traditionally delivered unique services. Since such "end-to-end systems" were service-specific, services regulation has been paramount. But with the convergence of services, and the delivery of competing services over multiple modes of wireless access, regulation's focus should shift away from services toward the elements of wireless access platforms.

WAPECS correctly anticipates that the technology elements in previously end-to-end systems or platforms are becoming interchangeable, or converged - or more open - and that such openness and inter-changeability demands a more technology neutral, service neutral and market-oriented regulatory approach. The definition of "platform" should therefore incorporate three elements: WAPECS spectrum, and the associated radio transmission equipment and devices/terminals with air interfaces that consume services using WAPECS spectrum. Platform should not be defined to include the networks behind air interfaces, interconnection interfaces, equipment used to create applications or services, or the content that is conveyed.

By incorporating WAPECS spectrum bands into the definition of "platform," the RSPG would acknowledge the technical inter-relationships between the RF properties, transmission equipment and devices/terminals in each spectrum band. Different spectrum bands are not

equal and are not interchangeable – they come with propagation characteristics that the transmission equipment and devices/terminals must accommodate. Those propagation characteristics affect the suitability and performance of different families of services in each WAPECS spectrum band.

The migration of the existing platform elements into the WAPECS construct must address spectrum, transmission equipment and devices/terminals in a coordinated manner. Such coordination is particularly essential where difficult legacy issues or use limitations exist. Such an approach also facilitates the furtherance of Services of General Economic Interest, and the mixing of private and public uses in some or all bands.

Question 3: What, if any, constraints should there be on the provision of services using spectrum primarily in the broadcast domain?

Background

As broadcast networks migrate from analogue to digital, a large amount of attractive spectrum will become available for new uses. This newly available spectrum is sometimes referred to as the "digital dividend". Current spectrum "owners" prefer to maintain control and use of this spectrum. As convergence takes place, it is important now to consider the best approach to reuse this spectrum.

Response

- Some constraints on usage for some service categories may be appropriate in certain cases.
- Further investigation of the impact of peer to peer content generation and its implications is supported.

Technology and service neutrality should be the goal for the 'broadcast domain' spectrum bands but constraints restricting usage to specified service categories may be appropriate in the following circumstances:

- Services such as public broadcast services that are instruments of national policy, addressing issues of freedom of information and cultural plurality, and which come with universal coverage obligations
- Services with international coverage (such as satellite services) requiring harmonised spectrum
- Services with a potential global service or equipment market that would be enabled by harmonised spectrum

Technical coexistence and interference constraints can be more severe for broadcast services than for communication services. Broadcast services have evolved from a business model predicated on very low cost end user receiver devices (radios, TVs). As a result, broadcast receivers contain relatively little interference protection compared with most communication terminal devices, traditionally relying on exclusive rights to spectrum for resolution of interference issues. Adding more interference protection to broadcast receiver devices would shift the burden of investment from the service provider towards the end user. The relative economic benefits of increased interference protection in the receiver compared with the continuing use of exclusive spectrum property rights may require detailed study.

Traditional broadcast services also differ from conventional communications services in that they deliver content rather than connectivity. Rather than being content agnostic, broadcast services must protect consumers from inappropriate content that creates complex cross-border issues for service delivery. Does the content have to be legal or socially acceptable in the country of origin or the country of reception? Do the same rules apply for broadcast type services using spectrum in the broadcast domain compared with information services using the same or different spectrum bands?

Broadcast services, as well as information and data services delivered over the latest communications technologies, also have to be concerned about protection of the rights of the content producer or owner. Different technologies can have different Digital Rights Management (DRM) capabilities and so DRM requirements on services may impact technology neutrality.

The distinction between broadcast and communications services is no longer clear. Broadcast equivalent services are already offered via competitive alternatives such as Cable TV and video over DSL in the wired environment and 2.5G and 3G services in wireless. Mobile TV can be offered over streaming video on 3G networks or can be broadcast directly to mobile terminals over dedicated networks using protocols such as DVB-H derived from audio broadcasting standards. WiMAX can be used as a component in the provision of DVB-H services. Interactive mobile TV mixes broadcast DVB-H network services on the downlink with an uplink return path provided by a mobile network, mixing completely separate spectrum bands within a single service. Recent innovations include time shifting options offered through internet-based service providers and video podcasts aimed at portable video playback devices.

The impact of content related protection measures is no longer restricted to traditional broadcast services. The potential implications of such measures on spectrum management options may need further clarification. Broadcast services are based on a point-to-multipoint model in which content is assumed to be held centrally and then distributed to users. But experience with fixed broadband services is indicating that an alternative point-to-point model also needs to be considered within the personal broadband environment. Today a considerable volume of broadband traffic is created by users and distributed directly to other users rather than going through or originating from a central point. The implications of the market demand created by this peer-to-peer phenomenon on spectrum requirements and management issues within the WAPECS context could be significant and warrant further investigation.

Question 4: What specific rules should be introduced or maintained to safeguard the delivery of Services of General Economic Interest in the future? Is it most appropriate to deal with these issues through the regulation of spectrum, or through other instruments such as competition law or state aid policy?

Background

Services of General Economic Interest include public broadcasting and emergency services.

Response

Most regulatory concerns related to Services of General Economic Interest can be dealt with over time through technology progress and market-based mechanisms. As a result, forbearance or minimization of regulation should be an objective since reliance on market mechanisms, industry self-regulation and competition law should be sufficient. Until that time, however, significant transition issues will remain, and retaining regulatory authority is important to assure that the WAPECS concept is realized completely.

The continued regulation of the spectrum bands and platforms used for such services is unavoidable in the short-to-medium term. To step back from regulatory oversight would be only to shift the problem elsewhere, to parties who may not be as willing or able to promote the public interest or the objectives behind the WAPECS concept.

In particular, Services of General Economic Interest are subject to some of the same issues that spectrum regulation regularly addresses, such as hoarding, interference, valuation, and transition management. Just as with the rationale we promote for the continued regulation of private uses of spectrum, it is important for one regulatory body to maintain a holistic perspective and authority in the pursuit of the WAPECS concept for Services of General Economic Interest.

Additionally, some of the spectrum currently reserved for such services may be able to be transitioned over time to other public or private uses, depending on the advance of technology and the intensity of spectrum use for such services. Retaining regulatory authority to facilitate such transitions is vital. Technology neutrality may be appropriate to promote the most cost-effective pursuit of these services

Question 5: How do you think changes in spectrum policy will impact on the requirement for standardisation? What policy will best ensure the timely availability of standards?

Background

As regulators move more in the direction of technology neutral spectrum management, there may be need for more cooperation between Standard Development Organizations (SDO) to meet the requirements set by WAPECS. Spectrum policy will still be needed to define the spectrum arrangement and general co-existence and compatibility requirements.

Response

- The need for technical coexistence to enable the desired flexibility within WAPECS will require more cooperation between standards bodies than has previously been the case.
- Objective interference guidelines need to be established before WAPECS can work effectively.

Spectrum bands designated as being suitable for WAPECS would in principle be capable of providing any service using any technology. Removal of constraints would result in more flexible rights of use, allowing for more efficient use of spectrum and increased competition. Technical coexistence rules necessary to manage interference would need to be specified, potentially imposing an additional although necessary burden on the standardization process.

In practice it is not clear that allowing a completely uncontrolled mix of different service categories within the same spectrum band would be a viable proposition. For example it would be very difficult to fit broadband into some of the spectrum blocks around 174 MHz. Certain combinations of service types within a specific frequency range may require the imposition of numerous and sizeable guard bands such that the use of spectrum may become more inefficient rather than more efficient. The cure may be more painful than the disease.

A selected mix of technologies and services from similar families may be acceptable, whereas an uncontrolled mix may not. The need to define the parameters and nature of these families would challenge the standardization process, but may be a necessary prerequisite for the success of the WAPECS concept.

The standardization process has already adopted the family approach in certain circumstances when balancing the need for harmonization against the need for flexibility. In a sense the mechanisms are already in place given the acknowledged importance of harmonization benefits within the definition of the WAPECS concept.

But there is no single standardization process of course. Approaches to standardization differ markedly in telecoms centric bodies such as ETSI and 3GPP compared with the computing centric standardization bodies such as IEEE and IETF.

The telecoms centric SDOs focus on comprehensive network based standards incorporating inter-working and interoperability issues. The standards process can be lengthy but results in end-to-end solutions with a limited number of options.

The computing centric SDOs on the other hand focus on device based standards at the physical and media access levels. Standards development can be rapid. The resulting standards have numerous options and require a secondary process of profile definition to ensure interoperability through bodies such as the WiMAX Forum.

The need for technical coexistence to enable the desired flexibility of different services and technologies within WAPECS demands more cooperation between existing standards bodies than has been the case to date. Without such cooperation WAPECS is unlikely to be viable as services and technologies originating in long-range environments begin to overlap with those originating in short-range environments. There is an inherent clash between the long-range approach which favours using spectrum property rights to control interference and the short-range approach which focuses on controls such as transmit power limitations at the device level.

These approaches have to be reconciled within the context of WAPECS. It's not just a question of cooperation. One of the dangers is that protectionism can come through the back door by the use of worst-case scenarios to determine acceptable interference levels. Objective guidelines on the definition of undue or harmful interference not only need to be established before WAPECS can work effectively but such guidelines also need to be agreed to and coordinated across the different standardization bodies.

Questions 6: Are there any other challenges that the RSPG should consider?

Response

A clear challenge will be to build and manage decision mechanisms and other governance processes that can move quickly – facilitating the timely resolution of disputes, and managing transition issues with a bias toward speed. Although the WiMAX forum favours a managed transition toward market-based mechanisms, within this transition and in the design of the end-state the requirement for speed must remain paramount. Regulatory and market-based mechanisms must be able to operate with a minimum of delay and administrative overhead.

A specific task for the RSPG might be to ensure that a mechanism exists to identify and agree on a list of frequency bands where the WAPECS concept could be applied irrespective of time frame, and to identify sub-sets of those bands where there is consensus that concrete steps could be taken.

As the computing, communications and consumer electronics industries converge, the traditional rate of innovation in the telecommunication and broadcasting industries is under intense pressure from the faster pace of change that is the norm in the computing and consumer electronics industry. Our focus on the need for speed is in recognition of the accelerating pace at which technology and consumer expectations continue to change.

Our experience is that market requirements emerge increasingly quickly, and often on a global basis. To compete effectively, device and terminal manufacturers now design and release products for a global market, competing to meet the most advanced market expectations wherever they exist. If one region falls behind (due to regulation, inadequate network capability or market take-up) then other regions become the focus of marketing.

The ability for Europe to realize the potential of the WAPECS concept is dependent, in our view, on the ability for market participants to move quickly. Regulation must recognize this.

Question 7: What is your view on the long term policy goals mentioned above and more specifically on how to achieve the right balance between "minimising and harmonising constraints" presented under point 9?

Background

The RSPG has specified the following policy goals:

"Long Term Policy Goal

5. It is envisaged that the long-term policy goal should be towards converged and coherent spectrum regulation, and this would require technological neutrality, service neutrality and coherent authorization mechanisms, taking into account that harmonization may be beneficial from the point of view of inter-operability and roaming capabilities.
6. Regarding technological neutrality, for each frequency band which has been identified by CEPT as a harmonised band, any technology that is technically compatible with other services at the band edges and which supports seamless access to services may be used by an operator, with a view to ensuring technological neutrality and flexibility in future use of the spectrum.
7. Regarding service neutrality, any service covered by WAPECS may be provided in any frequency band designated for WAPECS, as long as an effective and efficient use of spectrum is not endangered. No service should have exclusive use of any band, although in exceptional cases (for example, where services of general economic interest such as public broadcasting or emergency services are involved), an operator or operators may have an obligation to provide some specific service in a specific band or sub-band and to ensure media pluralism and cultural diversity.
8. Regarding coherent authorization, it would be beneficial to have co-ordination at the European level on issues such as 'sunset' clauses or reviews, authorization conditions, particularly if a frequency band(s) has been identified as a high priority for WAPECS.
9. A broad range of regulatory approaches could be adopted to further the WAPECS agenda. These range from maintaining the status quo (which is well understood by spectrum management authorities and industry and would provide certainty, but which lacks flexibility and discourages innovation), to a totally "laissez-faire" approach (which would be highly flexible and allow innovation, but would risk inefficient and fragmented use of spectrum). The best approach to minimising and harmonising constraints in the use of spectrum may be to adopt a neutral approach to both services and technologies. This would require adherence to defined interference limits. This would facilitate both flexible use of spectrum and single market cohesion, although issues of potential interference would have to be carefully controlled and monitored. "

Response

The WiMAX Forum agree that Europe's long-term policy goals should favour converged and coherent spectrum regulation built on technological neutrality, service neutrality and coherent authorization mechanisms.

We also agree that adopting implementation target dates that effectively accelerate the expiration of existing licenses is a difficult but necessary step to assure that spectrum policy responds to the quickened pace of technology and market change. Additionally, as we have previously stated, we believe the WAPECS framework should extend into private use of spectrum in order to promote the greatest flexibility of use.

Progressive adoption of market-based mechanisms should be favoured, with a concomitant increase of reliance on self-regulation and antitrust law in the place of regulation. A "laissez-faire" market approach can be the ultimate objective, but a progressive approach to it allows all interested parties – regulators, operators, public sector participants – to learn and adjust as

they go through a series of check points. One important focus of learning is to determine what truly requires ongoing regulation, where forbearance is advised, and where the elimination of all regulation and the reliance on less intensive approaches is optimal.

Question 8: Are there any other long term policy goals that the RSPG should consider?

Response

The WiMAX Forum supports the three broad policy objectives outlined in the i2010 initiative, namely:

- Promoting a borderless European information space,

- Stimulating innovation, and

- Making the European Information Society in 2010 an open, transparent and inclusive society.

The pursuit of these policy objectives is best assured by having spectrum regulatory decisions made at the European level, as opposed to the country level.

The WiMAX Forum believes that competition regulation should be sufficient to guard against concentration of spectrum ownership. The RSPG should endorse the role of competition policy in protecting against this risk. Although not explicitly expressed as a concern in the i2010 broad policy goals, or in the long term policy goals specified by the RSPG, undue concentration of spectrum ownership would not be consistent with stimulating innovation, the media pluralism necessary to support a diverse, inclusive society, or promoting the vigorous and broadly-based commercial participation necessary to assure consumer choice between technologies and services.

Question 9: Do you think that these steps form an adequate basis for achievement of the European objectives in this area? Are there any other steps that are required?

Background

The RSPG is considering the following actions

- "The Radio Spectrum Committee should be asked to prepare a mandate for CEPT, asking for a detailed report on the frequency bands initially identified as most suitable for WAPECS, stating where it would be appropriate to remove constraints and where it would not, and what technical coexistence rules would have to be observed.
- The Radio Spectrum Committee should also, for each of the frequency bands referenced above, report back to the RSPG on each of three classes of issue which may hinder the development of WAPECS:
    i. technical issues related to the use of the spectrum;
    ii. non-technical issues at national level;
    iii. non-technical issues at EU/international level.
- Member States should regularly exchange views and information on progress towards WAPECS"

Response

The WiMAX Forum does not have additional suggestions at this time.