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**Re: Consulta Pública sobre os Direitos de Utilização
da Faixa de Frequências 2500-2690 MHz**

WiMAX Forum[®] Response

The WiMAX Forum[®] welcomes the opportunity to provide its views and comments concerning the issues raised in the public consultation document on the topic above.

The WiMAX Forum¹ is an industry-led, not-for-profit organisation formed to certify and promote the compatibility and interoperability of broadband wireless products based upon the harmonized IEEE 802.16/ETSI HiperMAN specifications. A WiMAX Forum goal is to accelerate the introduction of these systems into the marketplace. WiMAX Forum Certified[™] products are interoperable and support Metropolitan Broadband Fixed, Nomadic and Mobile Applications. Along these lines, the WiMAX Forum works closely with service providers and regulators to ensure that WiMAX Forum Certified systems meet customer and government requirements. For more information about the WiMAX Forum and its activities, please visit www.WiMAXForum.org.

The WiMAX Forum responses to this consultation can be seen in Annex 1.

Yours Sincerely

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Annex 1

In addition to the specific WiMAX Forum responses, this annex includes the translations of the questions posed by ANACOM used as a basis for these responses.

1) Would you agree with making 2500-2690 MHz available in Portugal for electronic communications accessible to the general public?

The WiMAX Forum supports the award of the 2500 – 2 690 MHz spectrum for broadband mobile communications at the earliest opportunity. The WiMAX Forum considers this range of frequencies a key global band for mobile WiMAX.

With this aim, the WiMAX Forum has formally supported the EC Decision 2008/477/EC and in particular Article 2 which states that “No later than six months after entry into force of this Decision Member States shall designate and subsequently make available, on a non-exclusive basis, the 2 500- 2 690 MHz band for terrestrial systems capable of providing electronic communications service....”

To support early commercialisation of the band, the WiMAX Forum has agreed equipment certification profiles for TDD equipment based on the IEEE 802.16e-2005 standard for the entire 2500-2690MHz frequency range (see Table 1). Equipment aligned with this profile is included in the IMT air interface family as OFDMA-TDD-WMAN identified in ITU-R Recommendation M.1457-7.

SYSTEM PROFILES	CERTIFICATION PROFILES		
	Spectrum	Duplexing	Channel Width
Mobile WiMAX (IEEE 802.16e-2005, OFDMA)	2.496 - 2.690GHz	TDD	5, 10 MHz (dual)

Table 1

The first 2.6GHz Mobile WiMAX products achieved WiMAX Forum Certification in Q2/3 2008.

WiMAX Certification is underway or in development for other frequency ranges too and the following document provides helpful information on the programme:

http://www.wimaxforum.org/sites/wimaxforum.org/files/WiMAX%20Forum%20FAQ_June2008.pdf

Currently over **30 products** have been certified against the MP05 profile for the 2.6GHz band and are available today.

In addition, the WiMAX Forum forecasts that more than 950 products will undergo Mobile WiMAX certification testing by 2011, representing an influx of new consumer devices and infrastructure equipment to support continued rapid WiMAX user adoption in the 2.3 GHz, 2.5 GHz, and 3.5 GHz frequency bands. The WiMAX Forum's current network of six labs in China, Korea, Spain, U.S. and two in Taiwan will expand to nine with additions in Brazil, India and Japan to handle the anticipated certification demand.

For the European market, ETSI has recently finalized Harmonised Standards² for Broadband Data Transmitting Systems in the 2.6GHz band.

2) What is your opinion regarding tying the spectrum to be made available in 2.6 GHz with other frequency band(s)? Please indicate what combinations would you consider appropriate and how would they contribute to the objectives defined in n^o2 of art^o 15 of LCE (Electronics Communications Law).

The WiMAX Forum does not support an explicit link between the 2.6GHz band and other frequency bands for the purposes of the award.

However the WiMAX Forum considers the importance of enabling the combination of different bands without explicit linkage in auctions, providing operators further options to address the market in a way they consider effective. The WiMAX Forum considers this an important tool to achieve increased competition in the broadband mobile communications market to which ICP-ANACOM is legally committed and bound to implement (paragraph 2 of article 15 of the LCE).

In this respect the WiMAX Forum welcomes a swift implementation by ANACOM of the 3.4-3.8 GHz band auction, in order to enable operators to develop their business and deployment plans. The WiMAX Forum would also welcome ANACOM enabling the TDD option within the 2x28 MHz paired bands that will be auctioned, in pursuance of technology neutrality and having in mind that Mobile-WiMAX equipment is one of the more competitive platforms available today for deployment in this band.

Additionally the WiMAX Forum calls the attention of ANACOM to the issue of implementing the WRC-07 decision on the digital dividend band for IMT use (in Europe 790-862 MHz) in order to allow mobile broadband services to have access to lower frequencies. These are important frequencies to enable competitive large coverage plans including rural areas.

3) What types of services may be developed with the spectrum usage of this band?

² EN302 544 Parts 1 and 2 for TDD Base Stations and User Equipments respectively.

Mobile WiMAX devices and networks will support a full range of mobile broadband services. The WiMAX Forum fosters an open IP based network architecture that makes it simple to create a multi-service environment. WiMAX Forum profiles based on the IEEE 802.16e-2005 standard support mobile, nomadic and fixed services. WiMAX Forum network specifications also support interworking with IMS core systems thus enabling a multi-service environment encompassing today's 3G services. WiMAX 802.16e also supports QoS based on multiple service types thus allowing the provisioning of multiple types of services to different users based on defined metrics.

4) What technologies are available or planned for the band?

Mobile WiMAX as reflected in the response to Question 1.

5) What is your opinion regarding the attribution of the rights to use the 2500-2690 MHz in an electronic communications service neutral basis and in a technological neutral basis (including IMT)?

The WiMAX Forum fully supports the technology and service neutrality concept applied to spectrum assignments in this frequency range - in accordance with the European WAPECS concepts.

6) Would you agree with the concession of Usage Rights in a nationwide basis for 2.6 GHz?

The WiMAX Forum has no strong position on this topic but has a preference for national networks in order to support economies of scale. However, it is noted that population density and income distribution, vary widely over the territory of Portugal. Therefore operators that operate on a nation-wide scale may be faced with pockets of low revenue. This should be taken into account in any roll-out obligations as well as in the pricing.

7) Would you consider that coverage obligations should be imposed (area and/or population)? In case of yes, what should be the phasing/timeline?

The WiMAX Forum has no comment on this topic.

8) What other conditions would you consider necessary to define regarding the rights to use the 2.6 GHz band?

The WiMAX Forum supports the conditions as defined in the EC Decision 2008/477/EC as the least technically restrictive parameters in the Annex.

9) Would you agree with the FDD/TDD partition of the spectrum as based on CEPT ECC/DEC/(05)05 decision? In case yes, considering the two alternatives presented in Figures 1 and 2, what spectrum utilization would you consider more suited for the 50 MHz center gap of the 2.6 GHz band? Justify.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
2500	2505	2510	2515	2520	2525	2530	2535	2540	2545	2550	2555	2560	2565	2570	2575	2580	2585	2590	2595	2600	2605	2610	2615	2620	2625	2630	2635	2640	2645	2650	2655	2660	2665	2670	2675	2680	2685
FDD														TDD										FDD													
U	U	U	U	U	U	U	U	U	U	U	U	U	U	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D

Figura 1 – Alternativa 1 de canalização proposta na Decisão ECC/DEC/(05)05

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
2500	2505	2510	2515	2520	2525	2530	2535	2540	2545	2550	2555	2560	2565	2570	2575	2580	2585	2590	2595	2600	2605	2610	2615	2620	2625	2630	2635	2640	2645	2650	2655	2660	2665	2670	2675	2680	2685
FDD														FDD Downlink (externo)										FDD													
U	U	U	U	U	U	U	U	U	U	U	U	U	U	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D

Figura 2 – Alternativa 2 de canalização proposta na Decisão ECC/DEC/(05)05

The WiMAX Forum recognizes the interest in following the ECC Decision (05)05 but remains concerned that the amount of spectrum for TDD (and therefore OFDMA-TDD-WMAN applications) could remain artificially constrained.

Instead the WiMAX Forum fully supports the EC Decision 2008/477/EC and the flexibility this introduces in terms of FDD/TDD apportionment. Generally the WiMAX Forum supports procedures that allow this flexibility to be exercised as a part of the award itself rather than attempting a priori decisions which may not reflect the true market demand for one duplex technique or another. The identification of “guard frequencies” as “restricted channels” strikes the right balance between flexibility and efficient spectrum utilization.

The WiMAX Forum has sponsored an independent study³ into flexible use of the 2.6GHz band that examines many of the perceived difficulties from the regulators’ perspective. This concludes that these challenges are not insurmountable and that they are not new issues for regulatory authorities. This report is available on the WiMAX Forum Regulatory Portal⁴ on the WiMAX Forum web site.

³ Flexible use of the 2.6 GHz band in Europe – A report by PA Consultants.
http://www.wimaxforum.org/regulators/spectrum_policy/tdd_fdd_flexibility

⁴ Regulators and Government agencies can register as Regulator Observers to gain free access to the WiMAX Forum regulatory portal through a link on the WiMAX Forum web site at:
<http://www.wimaxforum.org/membership/regulators>

The report examines many of the perceived difficulties surrounding band plan flexibility and concludes that many of these are manageable and that they do not present any new challenges for administrations.

The WiMAX Forum does not support use of this band for external FDD pairing as suggested by Figure 2.

10) What is your opinion regarding the implementation of the maximum intra-block power limits for Base Stations at 25 dBm/5 MHz (including at “Block Edge Mask - BEM of more restrictive parameters”) in adjacent bands between FDD/TDD systems and between non synchronized TDD systems?

The WiMAX Forum shares the opinion that at least a restricted block is required between FDD and TDD and therefore supports the 25 dBm/5 MHz restriction as defined in EC Decision 2008/477/EC. To avoid such a restricted block between two adjacent TDD operators the WiMAX Forum encourages TDD operators to synchronize their networks.

Additionally, the WiMAX Forum supports inter-operator agreement rather than imposing a power limit. The power limit could apply in the absence of any bi-lateral or multi-lateral agreement between the licensees...

11) What is your opinion regarding the possibility of increasing the intra-block maximum power of Base Stations from 61 dBm/5 MHz to 68 dBm/5 MHz, according to the conditions described in CEPT report #19?

The WiMAX Forum supports an increase in BS power where it is appropriate as detailed in CEPT Report 019.

12) What is your opinion about the implementation of BEM for Base Stations following the conditions mentioned in the Annex of Decision 2008/477/CE?

The WiMAX Forum believes that the BEM developed in CEPT Report 019 and transposed into the annex of EC Decision 2008/477/EC provides a good basis for increased band arrangement flexibility encouraged by the European Commission. The WiMAX Forum is also of the view that in order to facilitate implementation of the EC Decision it is important that national regulations encourage coordination between the licensees. Specifically, the burden for any required guard frequencies must be shared

equally by licensees of both duplex technologies to encourage active participation and ensure growth.

13) What is your opinion about the implementation of BEM with less restrictive parameters for Base Stations following the conditions mentioned in the Annex of Decision 2008/477/CE ?

See the response to question 12.

14) What is your opinion regarding the possibility of operators negotiating technical parameters amongst them, provided the agreements reached do not jeopardize other utilization / services?

The WiMAX Forum fully supports collaboration driven by the industry as the best way to resolve coexistence issues and maximize the efficient utilization of the spectrum. This mutual cooperation is recognized in EC Decision 2008/477/CE as the basis for managing interference challenges and the BEM is identified as an applicable measure only in the absence of bilateral or multilateral agreements between neighbouring networks

15) What is your perspective on ICP-ANACOM interventions regarding managing interference between neighbor networks when BEM technical conditions are met?

The WiMAX Forum supports ICP-ANACOM's view that operators are in the best position to resolve the deployment and interference management challenges which may become very specific to individual implementations and scenarios. ICP-ANACOM should promote this activity and encourage eventual licence winners to work through an appropriate forum to facilitate mutually beneficial collaboration.

16) What should be the minimum amount of spectrum per carrier to make operations viable within 2500-2570 MHz and 2620-2690 MHz bands (FDD), considering the services / targeted markets? Provide rationale.

The WiMAX Forum has no view on this topic but is concerned that the question implies that already the amount of FDD spectrum has been pre-determined.

17) What should be the minimum amount of spectrum per carrier, considering the services / markets, to make operations viable within

2570-2620 MHz bands for each of the possible alternatives, TDD and external FDD?

The WiMAX Forum does not support use of this band for external FDD pairing.

The WiMAX Forum has published an assessment of the spectrum requirements for widespread deployment of Mobile WiMAX systems in the WiMAX Forum white paper titled “A Review of Spectrum Requirements for Mobile WiMAX™ Equipment to Support Wireless Personal Broadband Services” from September 2007⁵.

As a result the WiMAX Forum recommends that regulators allocate spectrum blocks of a minimum of 30MHz per operator to facilitate the timely and economic deployment of a full range of Personal Wireless Broadband services, with the caveat that local needs may require more spectrum to be allocated in some circumstances.

18) What should be the maximum FDD spectrum (and TDD, if that is the case) per carrier that would you consider adequate for the 2.6 GHz band?

The WiMAX Forum does not support any specific upper bound as increased spectrum can be beneficial to encourage a truly broadband user experience and the development of new applications.

19) Under the assumption of a need to limit the number of usage rights in the 2.6 GHz band, what should be a more adequate assignment process? Indicate the advantages of this option versus others.

Generally the WiMAX Forum supports procedures that allow FDD/TDD flexibility to be exercised as a part of the award itself rather than attempting *a priori* decisions which may not reflect the true market demand for one duplex technique or another. Examples of such an award process have been defined and used in several European countries including Norway, Netherlands and the UK.

20) Would you agree that the access to 2.6 GHz spectrum should be granted to all carriers / service providers? In case no, justify your answer and define categories of carriers / service providers that you would consider should be excluded or controlled (imposing conditions) in the process of spectrum assignment, considering n^o2 of art^o 15 of LCE.

⁵http://www.wimaxforum.org/sites/wimaxforum.org/files/documentation/2009/spectrum_requirements_for_mobile_wimax_sept2007.pdf

The WiMAX Forum has no view on this topic.

21) What is your opinion regarding the selection process happening up to the third quarter of 2009? In case you have a different suggestion, please inform.

The WiMAX Forum believes that the mobile broadband market need for this spectrum exists today and therefore encourages the Portuguese administration to start the award process as soon as possible. The WiMAX Forum supports the timing outlined in Article 2 of the EC Decision 2008/477/EC.