

Consultazione pubblica sull'utilizzo della banda di frequenze a 2.6 GHz Ref: 559/08/CONS,

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To:	Autorità per le Garanzie nelle Comunicazioni
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	c.a. ing. Mauro Martino
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- Date: Monday, 01 December 2008

Intel Corporation (Intel) welcomes the opportunity to provide our views and comments in response to "CONSULTAZIONE PUBBLICA SULL'UTILIZO DELLA BANDA DI FREQUENCE A 2.6 GHZ".

Intel's responses to this consultation can be seen in Annex 1.

Yours Sincerely,

Claude Pin Wireless Standards and Regulations Manager Intel Corporation SAS (France)

1. Standard, tecnologie e mercati

1.1) Quali sono gli standard e le tecnologie che il rispondente prevede possano essere introdotti per l'utilizzo nella banda 2.6 GHz ? Che tipo di architetture di rete si prevedono ? Che modalità di gestione dello spettro adopereranno ?

1.2) Quando saranno disponibili i terminali e gli apparati di rete ? Che costi sono ipotizzabili ?

1.3) Quali servizi potrebbero essere offerti nella banda di frequenze in argomento ?

1.1) What are the standards and technologies that you foresee might be introduced in the 2.6 GHz band? What type of network architecture is planned? What spectrum management process is envisaged for them?

Intel supports technology and service neutrality and believes that Operators are best able to determine the technology most suitable for their business model. This is a fundamentally important position which is maintained throughout this consultation report and influences the responses to the questions asked.

Currently IP and OFDMA based IMT standards such as LTE and WiMAX seem the most likely candidate technologies for the 2.6 GHz band.

Next Generation Mobile Network architecture is planned which will provide affordable and new innovative broadband services (lower cost per bit advantage).

Intel supports Mobile WiMAX based on IEEE 802.16e-2005 as our technology of choice for delivering this next generation fixed, nomadic and mobile personal broadband

WiMAX is the first IP and OFDMA based IMT-2000 standard. The OFDMA technology has become commonly accepted as the basis for the evolution of mobile technology towards 4G, as it can provide cost effective high data rate capability and excellent support for new features such as advanced antenna technologies to maximize coverage and the number of users supported by the network. OFDMA (specifically, the air interface designated "WirelessMAN-OFDMA" within IEEE 802.16) provides multipath and interference tolerance in non-line of sight (non-LOS) conditions to achieve ubiquitous broadband coverage in a wide range of operating environments and usage models, including full mobility.

1.2) When terminals and network material will be available? What are the estimated costs?

There is significant demand for a wireless mobile broadband experience from a consumer perspective as well as from an Operator perspective as can be seen from the activity across the whole of Europe and indeed globally.

Here is some example of real Intel products. More details on Intel product roadmap can be provided if required.

Intel WiMAX Solutions Roadmap



Intel WiMAX Products & Designs



* Internal code names for projects in development. Product names and plans are preliminary and subject to change.



The WiMAX System Profiles and Currently Approved Certification Profiles applying to the 2.6 GHz band are as follows:

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

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

For all bands of interest, the situation is reflected as follow.

WiMAX Forum Certified Products (August 2008)

25 certified base stations, 29 certified subscriber stations; WiMAX Forum Certification



The WiMAX Forum estimates that by 2011 there will be more than 1,000 Mobile WiMAX Forum Certified products found throughout the world.

1.3) Which services could be proposed in the 2.6 GHz band?

Intel fully supports Service and Technology Neutrality. We believe the 2.6 GHz band can deliver next generation mobile broadband services and in addition voice (via VoIP). We expect the broadband experience to be at least the same but in most cases significantly better than 3G with an expectation of providing IMT-Advanced capabilities as technologies evolve.

Intel believes that improving rural area coverage and increasing access to mobile internet will benefit tourism in country and commercial industries such as shipping and leisure. Providing ubiquitous broadband coverage, whether wired or wireless, will also benefit the real estate market in Italy and improve property acquisition. Introducing a wireless solution will provide consumers with an ADSL alternative for broadband access and thus introduce competition which will in turn reduce end-user costs and increase penetration. Expanding broadband connection outside of the city will increase the trend to tele-work from home. This will reduce fuel usage and pollution. Moving from a fixed/nomadic type experience to a truly mobile broadband experience will make it possible to tele-work outside of the home. This is where broadband wireless connectivity is required.

(intel)

2. Gestione dei rischi di interferenze e canalizzazione della banda

2.1) Il rispondente indichi se condivide l'approccio suggerito di utilizzare la canalizzazione e le regole di coesistenza previste dalla CEPT e dalla Decisione della Commissione, ivi inclusa l'imposizione dell'utilizzo del blocco ristretto TDD nella parte bassa di ciascuna assegnazione contigua TDD. In particolare ritiene che occorra lasciare variabile, in base alla domanda, il numero complessivo di blocchi TDD (opzione A), oppure ritiene che occorra attenersi strettamente alla canalizzazione CEPT (opzione B) ?. In caso non ritenga appropriate entrambe le opzioni il rispondente fornisca le ragioni per procedere differentemente.

2.2) Sono sufficienti, a parere del rispondente, le norme contenute nella Decisione della Commissione riprese dal Report 19 CEPT, per prevenire le interferenze nocive nei vari casi possibili ? Che tipo di ulteriore coordinamento dovrebbe essere necessario fra operatori (sia a livello intra-service che inter-service), sia tra bande adiacenti che fra aree adiacenti ? Che tipo di ulteriore coordinamento dovrebbe essere necessario a livello internazionale ? Esistono altri studi in corso di definizione a riguardo ?

2.1) The respondent should indicate if he shares the approach suggested to use the channelization and the coexistence rules defined by the CEPT and the Commission Decision, including the obligation to use the TDD restricted block in the lower part of each assignment adjacent to TDD. In particular, do you retain that the number of TDD blocks remains variable, subject to demand (Option A), or believe that we must adhere strictly to CEPT channellization (option B)? If none of those options should apply, indicate your reasons to proceed differently

2.2) Do you find sufficient the rules contained in the Commission Decision and included in CEPT Report 19 to prevent harmful interferences in all possible cases? What kind of further coordination should be required between operators (at both intra-service and inter-service levels), between adjacent bands as well as adjacent areas? What kind of further coordination should be necessary at international level? Are there other studies under way on their definition?

Intel strongly supports Option A, that is that the number of TDD blocks should remain variable, subject to demand. We concur that this solution could greatly benefit Italian citizens and consumers since it relies on market forces to determine the correct allocation of TDD and FDD spectrum. A market based process does not need to be complex as it could be a simple two round auction. Furthermore, by maintaining the 120 MHz duplex gap for paired operation, any concerns about the non - harmonization of bands and the possible loss of economies of scale would be alleviated.

Intel supports the work undertaken by CEPT in response to the Commission mandate to develop the least restrictive technical conditions for frequency bands addressed in the context of WAPECS, in particular the Block Edge Masks (BEMs) which were subsequently codified for the EU in the Commission Decision 2008/477/EC of 13 June 2008.

Intel would like to highlight two key points with regard to the EC Decision and the use of restricted blocks. First, the Commission deliberately departed from the suggestion of the earlier European Communication Decision¹ regarding the band and did not mandate how the restricted blocks should be assigned. Moreover the Commission deliberately stated that the technical parameters were for application "in the absence of bilateral or multilateral agreements between neighbouring networks, without precluding less stringent technical parameters if agreed among the operators of such networks."

Taken together these principles provide the framework for the most efficient use of the band. By allowing the restricted blocks to be assigned independently of the rest of the spectrum, and allowing operators to negotiate

¹ On harmonised utilisation of spectrum for IMT-2000/UMTS systems operating within the band 2500 – 2690 MHz" (ECC Dec. (05)05 from 18th March 2005)

between themselves to determine alternate arrangements, they provide the incentive and opportunity for the market to make the most use of the entire band. Indeed in many cases it will be possible for operators to coordinate their spectrum planning to keep adjacent bands sufficiently separated geographically, or use other mitigation techniques such as synchronization, so that the blocks could be used without restrictions.

To fully realise these benefits enabled by the EC decision Italy needs to adopt the simple principle of allowing the restricted blocks to be assigned separately from the rest of the spectrum.

One way to accomplish this is the two phase approach taken by UK whereby an initial auction determines the relative demand for TDD and FDD spectrum, and a subsequent auction allows for bids on individual FDD, TDD, or restricted blocks. We articulate on this further in section three.

However it is important that whatever methodology is eventually used the restricted blocks are assigned independent of the rest of the spectrum to ensure that they are used in the most efficient manner and one technology is not disadvantaged over another by imposing upon them the total cost of interference avoidance

3. Modalità di rilascio dei diritti d'uso

3.1) Si è d'accordo nel prevedere, per le procedure di assegnazione, un minimo ed un massimo per ciascun soggetto di banda assegnabile in multipli di 5 MHz, con un minimo di 10 ed un massimo di 50 MHz ?

3.2) Fatto salvo il cap di cui sopra, quanti blocchi (numero dei diritti d'uso) dovrebbero essere idealmente aggiudicati per area di servizio al fine di offrire servizi commercialmente remunerativi ed allo stesso tempo prevedere una effettiva concorrenza, sia nel caso TDD che FDD ?

3.3) Si è d'accordo con la procedura selettiva generale proposta dall'Autorità (asta a due fasi, con clock auction nella prima fase per lotti generici seguita da graduatoria mediante offerta libera in busta chiusa per l'attribuzione nella seconda fase) ? Il rispondente può proporre delle alternative, specificando esattamente quali sarebbero i vantaggi dell'alternativa ?

3.1) For allocation procedures, do you agree with the definition of a minimum and a maximum for each assignable bandwidth in multiples of 5 MHz, with a minimum of 10 and a maximum of 50 MHz?

3.2) Based on the above (3.1), how many blocks (number of rights of use) should ideally be awarded for service area in order to offer commercially profitable services and, at the same time, provide an effective competition, both in the case of TDD and FDD?

It is clear from the above extract that the European Commission is empowering Administrations to take a more market-based approach to spectrum management and assignment which is fully aligned with Intel's position. This flexibility maximises the available spectrum based on Operator's requirements while still allowing for some FDD with a 120 MHz duplex spacing. This flexibility is exactly how the UK will be releasing the 2.6 GHz band in 2009.

The diagram below highlights some possibilities for releasing the 2.6 GHz band which has been provided by UK Ofcom. There are many market-based options available and three are shown –

- Typical implementation based on ECC Decision(05)05 with 2 X 65 MHz paired with a 50 MHz unpaired allocation plus two 5 MHz co-ordination channels
- A theoretical example of a market-based approach to the paired / unpaired allocation in this instance showing 2 X 40 MHz paired with a 105 MHz unpaired allocation plus one 5 MHz co-ordination channel
- A 5 MHz raster as defined within ITU-R Recommendation M.1036 showing ultimate flexibility

UK 2.6 GHz Auction; TDD/FDD Flexibility



"Spectrum is critical to enabling next generation of converged services; major implications for competition & innovation in communications sector"

Intel suggests that not precluding the possibility of deploying TDD in paired spectrum can also assist to maximize the greatest chances of sustainable deployments.

Operators need sufficient spectrum to build a profitable and scalable network. Economic viability of a service provider's business case is highly sensitive to the size of the spectrum allocation license. Operators will not be able to offer affordable broadband services with insufficient spectrum and this in turn will adversely affect the range of services and service quality. In line with the European Commissions desire to increase flexibility in the 2.6 GHz band through their WAPECS initiative, Intel recommends that a market-based approach is employed to determine the paired / unpaired split. Following on from the WiMAX Forum recommendation on spectrum requirements per Operator which suggest a minimum of 30 MHz contiguous is required it is clear that if only the 50 MHz "centre gap" is made available for unpaired then only one fully efficient Operator would be enabled. Furthermore, this may not be sufficient spectrum to enable some Operator's business models. Our recommendation excludes any coordination or guard band (restricted) requirements where necessary.

Intel acknowledges the importance of maintaining the 120 MHz duplex spacing for paired deployments but recommends sufficient unpaired spectrum is available subject to market demand.

Intel suggests that the licence duration should be a rolling 20 years to provide Operators with a significant opportunity to build-out a network and achieve a return on their investment.

3.3) Do you agree with the general selective procedure proposed by the Authority (tender in two phases, with at first step clock auction for generic lots followed by a gradual offer in a sealed envelope for the award in the second stage)? The respondent may propose alternatives, specifying exactly what would be the advantages of the alternatives.

Intel does not comment on the detailed design of the award procedures but supports processes such as those proposed that facilitate a market based mechanism for the award. Intel supports a two-phase approach with a preliminary phase to determine the relative interest in TDD and FDD allocations followed by bidding on defined sets of channels which have been assigned to minimize the number of guard bands. Allowing operators to bid on this basis in the pre-allocation phase gives a good indication of how the market sees the optimum allocation. Prior to the second phase, the Authority should decide on the best band plan that minimizes the number of guard bands.

needed. Furthermore, we believe that operator coordination should be allowed to minimize interference wherever possible.

3.4) Si è d'accordo con una pianificazione dei diritti d'uso su base geografica nazionale ?

3.5) Si è d'accordo con i criteri di fissazione del valore minimo di partenza dell'asta per blocco accoppiato da 5 MHz proposto ?

3.4) Do you agree with the rights of use planned on a national geographic basis?

Intel prefers National licenses or large regional licenses that can be easily aggregated. Collaborative arrangements between Operators should be allowed to enable an improved business case and maximise coverage. Operator coordination should be encouraged and partnerships with Government could be useful.

3.5) Do you agree with the criteria for setting the minimum start value of a 5 MHz paired block as proposed?

See answers to 3.1 and 3.2.

4 Condizioni associate al rilascio dei diritti d'uso delle frequenze e tempistica

4.1) Il rispondente è d'accordo con la proposta dell'Autorità circa gli obblighi a carico degli aggiudicatari dei diritti d'uso delle frequenze ? Quali altre condizioni tecniche ed obblighi occorrerebbe introdurre a carico degli assegnatari ?

4.2) Si concorda con la proposta dell'Autorità in merito agli obblighi di copertura ?

4.3) Si è d'accordo con la durata proposta per i diritti d'uso delle frequenze in questione ?

4.4) Quale tempistica si ritiene opportuna per il rilascio dei diritti d'uso delle frequenze in questione ?

4.5) Il rispondente ritiene che occorra introdurre delle specifiche riserve di banda a favore di alcune categorie di soggetti, ad esempio nuovi entranti ? In caso affermativo, come potrebbe essere definito, a parere del rispondente, un operatore nuovo entrante nel contesto del rilascio dei diritti d'uso delle frequenze in questione ? Quali potrebbero essere le riserve a favore del nuovo entrante ? Nel caso si potesse prevedere la riserva di una specifica porzione di banda, come dovrebbe essere individuata tale porzione ed attuata una procedura ristretta, nel caso delle opzioni A e B ?

4.1) Do you agree with the Authority proposal on obligations of use of the frequencies? What other technical conditions and obligations should be introduced for the owners of the frequencies?

4.2) Do you agree with the Authority proposal in favor of coverage obligations?

Intel believes that the greatest economic benefit comes from the sustained utilisation of the spectrum and we encourage its use rather than allowing spectrum to lie fallow. However, Intel does not recommend mandatory "rollout conditions" because they can impose significant and unnecessary overhead costs. They can also disfavour new entrants. Intel supports infrastructure sharing since this minimises capital expenditure and reduces time to roll-out networks. We recommend that the regulatory environment enables infrastructure sharing but not necessarily mandate it.

4.3) Do you agree with the duration proposed for the rights of use of the frequencies?

Intel has no comment on this question.

4.4) What is the appropriate timing for issuing the rights to use the frequencies in question?

With reference to the above information, Intel believes that the mobile broadband market need for this spectrum exists today and therefore encourages the Italian administration to start award licenses as soon as possible. This approach would be consistent with EC Decision 2008/477/EC.

4.5) Do you believe that we must introduce some reserved band, specific for certain categories of subjects, such as new entrants? If so, how could, in the opinion of the respondent, a new entrant operator be defined in the context of the release of the rights of use of the frequencies in question? What could be the reservation for the new entrant? In case the reservation of a specific bandwidth portion could be planned, how could be identified such portions and a restricted procedure implemented in the case of options A and B?

Intel has no comment on this question.

5. Manifestazioni di interesse

Il rispondente fornisca:

5.1) Lettera di manifestazione di interesse a fornire al pubblico servizi utilizzando tecnologie compatibili nella banda a 2.6 GHz, recante denominazione, identità giuridica e sede legale dello scrivente e campo di attività con indicazione di eventuali titoli abilitativi (autorizzazioni e diritti d'uso) già posseduti.

5.2) Breve descrizione (massimo 2 pagine) del servizio che si intende offrire, incluse: una indicazione della tecnologia che si intende utilizzare, del servizio e della tipologia di terminali che si intendono utilizzare, la copertura geografica di interesse, la tempistica di massima del proprio piano progettuale, gli investimenti ipotizzati.

5.3) In particolare il rispondente indichi la quantità di spettro minima cui aspira ai fini del raggiungimento degli obiettivi del piano economico, specificando se intende utilizzarla in modalità FDD, TDD, entrambe (ed in questo caso specificare la quantità per tipologia) ovvero se la scelta è al momento indifferente.

A.1) Il rispondente ritiene adeguata, sia nel caso abbia privilegiato l'opzione A che nel caso abbia preferito l'opzione B, la procedura così delineata per l'assegnazione dei lotti ? Quali sono eventualmente le possibili varianti che il rispondente ritiene appropriate, indicando i relativi vantaggi ?

A.2) In particolare esprima la propria eventuale condivisione sui criteri per determinare l'aggiudicatario TDD che avrebbe, in alcuni casi, una assegnazione spezzata, sul tipo di compensazione a favore di tale aggiudicatario, sui criteri per determinare l'ordine di scelta nella fase di attribuzione. Il rispondente ha delle alternative da proporre su ciascuno dei detti punti, specificando esattamente quali sarebbero i vantaggi dell'alternativa ?

Intel has no comment on these questions.