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23rd February 2009

To:

**Austrian Regulatory Authority for Broadcasting and
Telecommunications**

Vienna

Via E-Mail: tkfreq@rtr.at

**Intel Corporation comments on
“Consultation on the allocation of frequencies in the 2500 – 2690 MHz
band”**

Intel Corporation welcomes the opportunity to comment on the “Consultation on the allocation of frequencies in the 2500 – 2690 MHz band” published by Austrian Regulatory Authority for Broadcasting and Telecommunications (RTR) in January 2009.

Intel supports allocation of the 2500 – 2690 MHz band for Mobile Broadband Wireless Access in Austria. In general Intel believes that technology and service neutrality as well as transparent competitive rules should be applied when licensing the spectrum.

Products for this 2.6 GHz band have already been certified by the WiMAX Forum, which is the leading industry body for products based upon the IEEE 802.16 standard. Intel already offers combined Wi-Fi/WiMAX radio modules integrated into commercially available notebooks.

Momentum for WiMAX networks continues to grow. The WiMAX Forum recently announced that there are over 400 WiMAX networks worldwide, including over 100 networks based upon Mobile WiMAX.



Some of the leading networks being deployed are Korea Telecom in Korea, Clear in the United States, and Comstar in Russia. UQ (KDDI led consortium) will be launching trial services in Japan in Q1/2009 followed by commercial services in Q2/2009. Several leading telecom operators in India have WiMAX deployments and have recently indicated their intention to deploy nationwide networks.

These types of deployments are important for enabling global economies of scale. Also, there is very strong momentum in emerging and developing markets worldwide, e.g. Wateen Telecom which is deploying Mobile WiMAX services in 17 cities in an accelerated timeframe of 9 months. Further expansion of the network was announced in October 2008.

Intel believes that 2.6 GHz band will achieve a high level of interest in Austria and respectfully encourages Austria to release and assign the spectrum early 2009 to allow Austrian citizens to take advantage of the data rich services and applications that MBWA technologies can offer.

Intel respectfully submits these comments to the consultation in the attachment below.

Best regards

Christoph Legutko

Wireless Standards and Regulations Manager
Global Public Policy, EMEA Communication Team



Attachment

Intel Corporation Response on “Consultation on the allocation of frequencies in the 2500 – 2690 MHz band”

2.4 Current frequency use

If you currently use frequencies in the 2.1 GHz (UMTS FDD) band:

When would you expect to start using all of the frequencies (frequency packages) allocated to you in the 2.1 GHz band?

Intel Corporation response:

No comment

2.5 Intended use

Do you intend to use frequencies in the 2.6 GHz band in the future?

No

Why not?

Intel Corporation response:

Intel is not a mobile telecommunication operator and does not use radio frequencies.

However Intel would welcome the early release of the 2.6 GHz band to enable true mobile broadband wireless access to the Internet for the citizens of Austria. In 2012 there will be over 1 billion devices in global circulation with the capability of Internet access with the speed of a typical DSL connection that they currently experience at home.

The 2.6 GHz band is a key band that would offer sufficient spectrum bandwidth to cover the densely populated areas with close-meshed networks delivering 10 -100 Mbit/s of data transfer rates individually to the subscribers.



2.6 Expected services

In your view, which services/applications would be especially well supported by the 2.6 GHz band?

Intel Corporation response:

Rapid improvements in microprocessors are making RF solutions more complex and integrated thus providing greater flexibility and lower cost. These devices that might benefit from being able to communicate will likely have an integrated radio (or multiple radios) design. Low-cost, small form factors like Ultra-Mobile PCs (UMPCs) and Mobile Internet devices (MIDs), such as Intel's embedded Wi-Fi/WiMAX card combination solutions for broadband services, will provide ubiquitous mobile communication.

Availability of ubiquitous radio mobile communication will enable the rapid spread of services/applications requiring real broadband like entertainment, e-Commerce, e-Education, e-Health, e-Government, security and other new applications that will proliferate as a result of e-Inclusion.

2.7 Technologies

Which technologies do you plan to use in the 2.6 GHz band (or: in your view, which technologies will be deployed in this band)?

Intel Corporation response:

Intel supports increasing both broadband deployments and internet subscribers in all countries. Other wireless technologies available today do not have the capability of solving the mobile broadband and internet penetration issues that countries are currently facing. WiMAX is a low cost, fast to deploy, next generation wireless broadband technology capable of meeting these demands. Intel fully supports WiMAX for this reason.

Mobile WiMAX is considered as a next generation 4G technology (all IP based, higher data rates, advanced antenna techniques, cost advantage etc.). 4G Technology is available today and for the 2.6 GHz and 2.3 GHz bands and citizens can start to benefit from the 4G rich services on offer ahead of many other countries that are currently supporting only "narrow band" 3G deployment.

WiMAX is real; more than 400 commercial WiMAX networks are available in more than 130 countries. Commercial WiMAX network and user terminal products are available from many manufacturers. WiMAX Forum expects more than 1000 certified Mobile WiMAX products will be available by 2011



2.8 Need for unpaired frequencies

What is your estimate of the frequency requirements of an operator planning to acquire unpaired frequencies? In your view, how much bandwidth would an operator want to acquire as an absolute minimum? How many interested parties would you expect?

Intel Corporation response:

Intel supports technology and service neutrality.

Operators should be able to choose any standard technology and should be also able to offer all possible services with minimal regulatory restrictions.

As a minimum requirement Intel suggests 30MHz of unpaired spectrum (excluding any guardbands if needed) per operator to enable a mobile broadband wireless experience to the citizens of Austria.

Additionally, when addressing the detailed technical discussions and particularly considering issues such as radio wave propagation, interference conditions, cell radius, and data throughput, Intel would encourage flexible use of the 2.6 GHz band.

The original spectrum arrangement as described by the ECC Decision (05)05 defines 2x70MHz of paired (for FDD) plus 50 MHz of unpaired (for TDD) spectrum for this band. Such an arrangement limits the use of unpaired spectrum to only one licence – see minimum requirement defined above. It limits also spectrum bandwidth and with that maximum data throughput for operators.

The EC Decision 2008/477/EC issued on 13 June 2008 offers the possibility of flexible use of TDD and FDD spectrum arrangements in the 2.6 GHz band. This is achievable by the implementation of least technical restrictive conditions and these apply where no bi-lateral agreement exists. It is therefore possible, where market demands it, to assign more than the 50 MHz of unpaired spectrum and it would be more spectrally efficient to assign this during the spectrum award (auction) process. The auction in Norway and the intended auctions in The Netherlands and United Kingdom are examples of how spectrum can be awarded more flexibly and aligned with market demand.

Such regulatory policy with greater flexibility for the 2.6 GHz band would enable Austria to react properly to its own unique market conditions.



2.9 Interest in unpaired frequencies

Are you generally interested in unpaired frequencies?

Yes

In what amount? (minimum/maximum bandwidth in MHz)

Intel Corporation response:

As described above, Intel is of the opinion that unpaired frequency arrangement for 2.6 GHz is advantageous for both the operators and consumers.

The minimum spectrum per operator should be 30 MHz (excluding guard bands).

The TDD transmission mode operating in the unpaired spectrum fits better to data oriented applications with highly statistical, dynamic UL/DL ratio and to small cells feasible in the 2.6 GHz band.

Furthermore, it is uncertain what are the market demand and the operators' response to it in the next future.

Given this uncertainty regulators should rely on flexibility to allow carriers response to market forces to determine the auction's outcome.

2.10 Need for paired frequencies

What is your estimate of the frequency requirements of an operator planning to acquire paired frequencies? In your view, how much bandwidth would an operator want to acquire as an absolute minimum? How many interested parties would you expect?

Intel Corporation response:

No comment.

2.11 Interest in paired frequencies

Are you generally interested in paired frequencies?

Intel Corporation response:

Please refer to Intel's comments to questions asked in paragraphs 2.8 and 2.10 applying to 2.6 GHz band.



2.12 Expected rollout

What rollout scenario do you expect or plan for the 2.6 GHz band? In what regions will these frequencies primarily be used? Do you expect comprehensive network coverage or joint use with other frequency bands (e.g., at hot spots?)

Intel Corporation response:

Intel advocates timely access to spectrum preferably utilising global allocations where possible for new services on a technology and service neutral, market-based basis. Intel is in favour of harmonisation where “harmonisation” in this context means “commonly available spectrum” and not “restrictive channel plans” or “specifying particular technologies”. Additionally, Intel advocates the re-farming of underutilized spectrum for new and more innovative broadband services.

The existing narrow band 3G deployments offer data services in bands below 2.3 GHz at low data rates per customer. Intel expects that to complement this, networks operating above 2.3 GHz will be needed to complement existing deployments.

2.13 Subdivision of frequency band

In your view, what subdivision of the frequency band would be most reasonable? How many frequency packages (in what size) should be put up for allocation?

Intel Corporation response:

Intel would recommend that the spectrum packages are a minimum of 30 MHz (excluding guardband requirements if needed) as previously explained to enable true mobile broadband delivery.

2.14 Arrangement of frequency packages

How important is it that the frequency packages allocated to an individual bidder are directly adjacent to one another? Why?

Intel Corporation response:

To ensure high data transfer speeds via radio interface and to achieve the optimum spectral efficiency the frequency packages should be designed according to market demand which may result in some split TDD spectrum awards however it is favourable that every individual bidder gets contiguous spectrum.



2.15 Differences between frequency channels

In your view, are there significant differences between the individual 5 MHz frequency channels? Does this apply to all frequency channels, or only to certain ones?

Yes

Please indicate precisely which frequency channels you mean, and please describe the differences as well as their significance.

Intel supports bi-lateral or multi-lateral cooperation between the licensees to achieve more efficient spectrum usage. According to the CEPT Report 19 and EC Decision 2008/477/EC the 5 MHz channel on the boundary between FDD and the TDD block maybe subject to in-band power restrictions. Intel fully supports the technical parameters called Block Edge Mask as detailed in the annex to the EC Decision 2008/477/EC.

From a technical/economic perspective, are the differences between the individual frequency packages so significant that it would be absolutely necessary to account for them in the allocation procedure, even if this would involve a far more complicated auction procedure?

Yes

Why?

Intel would advocate that the restricted blocks identified in EC Decision 2008/477/EC are allocated outside of the spectrum auction and would be subsequently awarded to the TDD licensee(s).

2.16 Duration of use

In your view, what minimum duration of use would be necessary? What should the maximum duration of use be?

Intel Corporation response:

Intel would encourage a minimum licence duration of 15 – 20 years.



2.17 Coverage obligations

Coverage obligations may be imposed in order to ensure the effective use of frequencies. In your view, what specific coverage obligations would be most appropriate for this purpose?

Intel Corporation response:

The 2.6 GHz band is best suited for coverage of densely populated, urban and hot spot areas in offering high data transfer speeds. In these areas there is also sufficiently high public interest to make investments economically feasible. Therefore it should be carefully considered if the country-wide coverage obligation is feasible and desirable or if the coverage obligation at 2.6 GHz band should be limited to the areas with potentially high interest in high speed data transfer service.



2.18 Schedule

As mentioned in the introduction, the frequencies could be allocated at the end of the year 2009. In your view, is that a reasonable time for allocation, or would allocation a later time (at the end of 2010) be more sensible? Please provide reasons for your response.

Auction at end of 2009

Reason(s):

Intel Corporation response:

The European Commission (EC) recently adopted a legally binding spectrum decision on 13 June 2008 for the harmonization of the 2.6 GHz band. Accordingly all 27 European Union (EU) Countries shall make provisions to make available the 2.6 GHz band by end of 2008.

Intel supports the licensing of the 2.6 GHz, and also 2.3 GHz bands were appropriate, as soon as possible for transformation of mobile users to next generation broadband mobile internet users. Intel believes in citizens having access to affordable broadband services. As part of that strategy Intel is producing silicon for lower cost Mobile Internet Devices which still offer many of the PC functionality expected in netbooks and notebooks.

Mobile WiMAX is considered as a next generation 4G technology (all IP based, higher data rates, advanced antenna techniques, cost advantage etc.). As mentioned previously, 4G Technology is available today and with access to the 2.6 GHz and 2.3 GHz bands, citizens can start to benefit from the 4G rich services on offer ahead of many other countries that are currently supporting only "narrow band" 3G deployment.

WiMAX is real: more than 400 commercial WiMAX networks are available in more than 130 countries. Commercial WiMAX network and user terminal products are available from many manufacturers. WiMAX Forum expects more than 1000 certified Mobile WiMAX products will be available by 2011.

Many companies have commercial WiMAX base stations in the 2.6 GHz band and many user terminals are currently available (Laptops, PC Cards, USB modems, MIDs, Dual mode GSM/WiMAX and 3G/WiMAX handsets and other personal devices).

2.6 GHz and 2.3 GHz (mobile) WiMAX is fast becoming a standard feature in laptops, Mobile Internet Devices (MIDs), mobile telephones, video cameras, car computers etc. which is of major benefit to citizens.

Commercial 2.6 and 2.3 GHz band Mobile WiMAX networks are already operational in many countries e.g. US, Russia, South Korea, Malaysia, Singapore, and there will be more commercial deployments during 2009.



3 Contact information

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4 Request for comments

To this end, please indicate whether you are willing to allow the full publication of your comments:

Yes, with an indication of the company's name