

23rd May, 2008

The Secretary

Telecom Regulatory Authority of India

A-2/14, Safdarjung Enclave

New Delhi – 110 029

Sub: TRAI Consultation Paper No. 8/2008 on “Allocation and Pricing for 2.3-2.4 GHz, 2.5-2.69 GHz & 3.3-3.6 GHz bands”

Dear Sir,

Please find attached the response of the Broadband Wireless Consortium of India (BWCI) to the Consultation Paper No. 8/2008.

BWCI is a strategic initiative of the Centre of Excellence in Wireless Technology (CEWiT). It was launched in March 2007 to provide a common national forum for broadband wireless. BWCI membership is open to companies involved with cellular and broadband technologies in India (including operators, equipment manufacturers/vendors, technology services and semiconductor companies) as well as Indian academic institutes and R&D organisations. All these stakeholders are currently very well-represented in BWCI.

We will be pleased to provide any further clarifications required in this regard.

Thanking you,

Yours faithfully,

On behalf of the Broadband Wireless Consortium of India

Prof. Bhaskar Ramamurthi

BWCI Response to TRAI Consultation Paper on “Allocation and Pricing for 2.3-2.4 GHz, 2.5-2.69 GHz & 3.3-3.6 GHz bands”

Issues for consideration

1. What should be the revised reserve price for the spectrum in 3.3-3.6 GHz band? The various options available are as below:
 - a. The reserve price of this spectrum remains as recommended earlier.
 - b. The reserve price for the spectrum is made equal to 50% of the reserve price recommended for the 3G spectrum.
 - c. The reserve price is made equal to the price recommended for the 3G spectrum
2. What should be the eligibility conditions for bidding for spectrum in the bands of 2.3-2.4 GHz and 2.5-2.69 GHz?
3. In the 2.3-2.4 GHz band, the maximum amount of spectrum which a licensee can bid for?
4. In the 2.3-2.4 GHz band, the size of the spectrum blocks for the bidding?
5. In view of limited availability of spectrum in this band and possible conflict between the technologies using FDD and TDD modes, how the spectrum in 2.6 GHz band be allocated?
6. In case the present available spectrum is allocated for BWA technologies using unpaired spectrum, then, will it be feasible in future, from technical and economic angle, to refarm the allocated spectrum in the 2.6 GHz band in line with the global practices?
7. Unlike a number of other countries, a major portion of spectrum in the 2.6 GHz band is yet to be got vacated by WPC. What measures can be taken to accelerate the process of vacation so that the Indian telecom sector is not at a disadvantage in relation to other countries?

BWCI Response

Question 1 (Pricing of Spectrum in 3.3 - 3.6 GHz band)

The global trend in spectrum policy is that of neutrality with respect to technology, applications and services. The recent auction of 700 MHz by FCC in the US is one example. Similarly, the UK regulator Ofcom is preparing to auction spectrum in the 2.6 GHz band on service and technology neutral basis. Another related development is the WAPECS (Wireless Access Policy for Electronic Communications Services) framework in Europe [1].

Differential pricing of spectrum for 3G and BWA services appears to be going against these trends. However, if we assume, as is currently the case with ISP licenses, that BWA service providers will not be allowed to provide full-fledged Internet telephony (including originating/terminating calls to/from PSTN and PLMN), their revenue earning potential will be relatively small compared to 3G service providers who will be eligible to offer voice services

also. In the near-term at least, demand for voice services is expected to outstrip the need for data services. Furthermore, realisation of the oft-stated goal of 20 million broadband subscribers in India by 2010 might also need some form of incentives and/or subsidies to service providers. Hence, there is a socio-economic rationale for differential pricing of spectrum for BWA and 3G services. It should be noted, however, that the issue of spectrum pricing is intrinsically linked to the licensing policy. If a converged license for all services were to become a reality, spectrum will also have to be priced uniformly. Therefore, it is recommended that if an economic case for pricing BWA spectrum lower than 3G spectrum is established, then differential pricing can be used. However, in this case, a clear roadmap should be prepared to converge the licenses and equalize the price of spectrum.

Questions 5 & 6 (Allocation of spectrum in 2.6 GHz band)

Studies done by the UK regulator, Ofcom, to verify the co-existence of FDD and TDD systems have been helpful in identifying the deployment challenges and mitigation techniques [2][3]. Interference issues relating to different possibilities with FDD & TDD co-location have been investigated and it seems there is an identified approach to have both FDD and TDD allocations co-exist in the same band, through provisioning of appropriate band plan and mitigation techniques. Further to these studies, Ofcom issued a memorandum which addresses the issues and also suggests possible options between FDD and TDD deployments - availability of complete band seems to have greatly helped the planning process of arriving at possible allocations between FDD and TDD [4].

At the moment, it is not clear as to how much spectrum will be made available in the 2.6 GHz band. Any decision on allocation of spectrum for TDD and/or FDD systems will depend on the amount of spectrum as well as its location within the band. If a relatively small quantity of spectrum (compared to the total band size) is to be allocated initially, then it can be given to either TDD or FDD. Note that the latter case will be feasible only if paired spectrum can be allocated with 120 MHz spacing. Allocating a relatively small amount of spectrum for both TDD and FDD simultaneously will result in a significant waste of bandwidth due to the need for having spectrum blocks in which no/limited usage is allowed. However, if a sufficiently large chunk of 2.6 GHz spectrum is made available up-front, then there is no problem in allocating it for TDD and FDD systems if appropriate guard bands and emission restrictions are specified, as has been demonstrated in the Ofcom proposals [4].

Given that it is not very clear as to what are the exact frequencies under consideration and proposed availability of spectrum and timelines, it becomes very important that the Authority takes a holistic approach to spectrum allocation, in consideration of both FDD and TDD allocations, while ensuring the incorporation of mitigation techniques and specification of radiated powers and spurious emissions.

In addition, in order to facilitate long-term smooth functioning of the services, following points may be considered [5]:

- 120 MHz spacing between lower and higher blocks of paired FDD spectrum must be provided

- Frame duration and Uplink-Downlink sub-frame ratio to be used in the TDD spectrum must be specified. These must be same for all operators in each band but could be different in different bands.
- Synchronisation between TDD operators is a must, and appropriate mechanisms (GPS, Synchronous Ethernet based on G.8261, Packet synchronization method like PTP or NTP etc.) must also be specified by the spectrum licensing agency.

Furthermore, in accordance with the global trends towards (technology and service) neutrality, the spectrum usage conditions must be set in such a way that there are no implicit constraints on the use of a specific technology.

- E.g. Specification of UL/DL ratio, mandatory synchronization for TDD systems can help ensure a level-playing field.
- In the case of FDD, the duplex spacing and UL, DL bands automatically restrict the choice of technologies.
- The spectrum licensing agency must recommend operation of new technology within specified limit for radiated power and spurious emissions.
- Operator can choose to go in for TDD or FDD spectrum depending on availability and technology choice, but guided by the spectrum blocks allocated.

Finally, for maximum flexibility in use of spectrum, Govt. may evaluate the option of permitting existing UASL based service providers to migrate to newer generation technologies and systems in bands where currently 2G systems (and later, 3G systems) are deployed. However, this must be done in consideration of technical aspects such as interference avoidance to other occupants of the band and in consideration of any licensing issues as may be applicable.

References:

- [1] Radio Spectrum Policy Group Opinion on “Wireless Access Policy for Electronic Communications Services (WAPECS)”, Nov. 2005.
- [2] Ofcom Discussion Document, “Award of available spectrum: 2500-2690MHz, 2010-2025MHz”, August 2007.
- [3] Ofcom Statement, “On the impact of interference from TDD terminal stations to FDD terminal stations in the 2.6 GHz band”, April 2008.
- [4] Ofcom Information Memorandum, “Auction of spectrum: 2500–2690MHz, 2010–2025MHz”, April 2008.
- [5] Broadband Wireless Consortium of India Report, “Indian Broadband Wireless Technology Requirements”, November 2007.