

# Comments / Suggestions by 'Nokia Siemens Networks' and 'Nokia' on the 'Issues' in TRAI Consultation Paper on Allocation and Pricing for 2.3-2.4GHz, 2.5 -2.69 GHz and 3.4 to 3.6 GHz bands

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## General comments for consideration

1. The Consultation Paper may need to be clarified on the following points:
2. The intended usage of the term Broadband Wireless Access (BWA) and the framework (rules) on BWA implementations in our country, such as, eligibility of radio interface standards, channeling plans for the related spectrum bands, road map, licensing conditions etc may need to be specified for the sake of clarity.
3. In the absence of such clarity, there could be a risk of the generic term 'BWA' including non-standard/sub-standard/unrecognized radio interfaces technologies (i.e. not evaluated and not carrying recommendations for specific frequency band allocations by ITU) and the risk involved in such broadband technologies claiming spectrum allocations into the ITU allocated and harmonized frequency bands, for IMT. The co-existence of such broadband systems (i.e. other than IMT family) into the IMT allocated / harmonized bands may cause interference issues and impair the effective and efficient usage of the allocated spectrum for IMT ; may involve significant spectrum wastages.
4. It may be worthwhile to mention that the Broadband services can as well be made available by the six radio interface standards (including OFDMA TDD WMAN) of the IMT family (a few more are reportedly are in pipeline) and it may not be appropriate to discriminate between the 'IMT'/3G and 'BWA' services / systems for the purpose of frequency band allocations and spectrum pricing. Such distinction may not be in line with the international trends towards Convergence.
  - We believe that the IMT-2000 (3G)/IMT family of standards / technologies and the related ITU allocated / harmonized bands alongwith the ITU channeling arrangements provide a sound platform for mobile broadband services by optimal usage of the scarce spectrum. Further, IMT (3G) migration to evolving new generation technologies may not only deliver low cost voice telephony but also mobile broadband services at an affordable tariff by providing high speed data capability with rich mobility experience.
5. It may be pertinent to note that WRC-07 after due deliberations has allocated the frequency bands, namely, 450-470 MHz, 698-806 MHz (India option ), 2.3-2.4 GHz and 3.4-3.6 GHz for 'IMT'. WRC-2000 had earlier allocated 2.5 to 2.69 GHz band for IMT-2000 (often referred as extension band for IMT). ITU has also rendered structured channeling arrangements for specific frequency bands. These frequency band allocations have undergone harmonization studies and are reflected in the ITU-RR.

6. It should be noted that IMT is the only technology family for which specific spectrum bands have been identified. This reflects the unique importance of globally harmonized spectrum for IMT by ITU. By implementing ITU harmonized frequency bands / structured channeling arrangements, we could ensure the effective and efficient use of the spectrum and avoid harmful interference issues both on handset terminal / device front as well as the network equipment. It may be of interest that the production of the network equipment and handsets / devices for IMT/3G and upcoming new evolving generation technologies (like LTE) are largely lined up by the vendors (NSN and Nokia) based on the international standards and provisions in the ITU-Radio Regulations on spectrum allocations.
7. The implementation of ITU recommended frequency bands for various wireless systems/ / applications including Broadband (like IMT/3G) would not only ensure efficient and effective use of the spectrum but also bring benefits of economies of scale, roaming, equipment compatibility and inter-operability of systems, which are of great importance, specially for penetration in rural areas.
8. In the provision of technology neutrality, and smooth migration to the evolving new generation technologies in the long term, we may like to ensure conformance to ITU globally harmonized bands / channeling arrangements as well as consistency in certain technical parameters, like emission levels, FDD duplex separations, UL/DL directions in FDD , UL/DL ratio in TDD systems etc to facilitate interference free implementations in the allocated bands.
9. We recommend to make the bands available for IMT-2000 / IMT in line with the band plans in ITU-R Rec M. 1036 making both FDD and TDD bands available. ITU does not identify any band specifically for BWA and this aspect may be of relevance for consideration in national spectrum allocations and licensing. We feel that the licenses need not be limited in a specific technology (like BWA).
10. Thus, it may be appropriate for ensuring efficient and effective usage of the spectrum as well as growth of broadband services in the country ( current & in long term ) that,
  - (i) The 'IMT' family of radio interface standards for mobile telecommunication services including broadband systems/services may be implemented in the frequency bands allocated/harmonized by ITU for IMT-2000/IMT applications, as per ITU channeling plans.
  - (ii) the Broadband systems/technologies other than IMT ( including fixed Broadband ) may be considered for implementation in the frequency bands other than ITU allocated/harmonized bands for 'IMT' applications, preferring ITU channeling plans.
11. Inconsistency and lack of clarity in the policy implementations may bring uncertainties in the market and adversely affect the investment climate.
12. Would the Broadband systems (other than IMT/3G) carry voice and whether these would link to PSTN; such implementations may tend to distort the current competition scenario and the level playing field ??

## Issues for consideration by TRAI

**Issue-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:**

- *The reserve price of this spectrum remains as recommended earlier.*
- *The reserve price for the spectrum is made equal to 50% of the reserve price recommended for the 3G spectrum.*
- *The reserve price is made equal to the price recommended for the 3G spectrum.*

**Issue-8: What should be their reserve price for the purpose of auction for the spectrum in 2.3-2.4 GHz and 2.5-2.69 GHz ?**

### Comments

- (i) We believe that the reserve price for the spectrum should be based on the characteristics and attractiveness of the spectrum and should be the same for the same blocks of spectrum. (suggested block is 5 MHz)
- (ii) The allocation and pricing methodology in the above three bands could be the same as has been observed by the country for IMT/3G services in the 2.1 GHz band.
- (iii) The proposed differential pricing by subsidization in spectrum allocations for Broadband services/systems may bring increased broadband penetration in the short term but would create problems and complexities in the long term, specially related to utilization of spectrum/frequency bands.
- (iv) We believe that uniform spectrum pricing policy for the systems rendering same services should be implemented ; would promote convergence and technology neutrality.
- (v) We feel that the reasonable way to set the reserve price could be that it takes care of the attractiveness/propagation conditions of the band. As a good guideline, the reserve price (RP) could be, e.g. ,

450 MHz	: 1 x RP
700 MHz	: 1 x RP
800 MHz	: 1 x RP
900 MHz	: 1 x RP
1800 MHz	: 0.8 x RP
2100 MHz	: 0.8 x RP
2.3 GHz	: 0.6 x RP
2.6 GHz	: 0.6 x RP
3.4 GHz	: 0.5 x RP

**Issue-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 ?**

Comments

The eligibility conditions for the bidders on the technological front, if any, could basically flow from the ITU-RR provisions / channeling plans on frequency band allocations for the 2.3-2.4 GHz band and 2.5-2.69 GHz bands.

As regards the eligibility conditions for the bidders on licensing /commercial aspect are concerned, we have no comments. However, for the sake of uniformity in policy, the eligibility conditions could be considered to be the same as for the IMT applications in the 2.1 GHz band.

**Issue-3: In the 2.3-2.4 GHz band, the maximum amount of spectrum which a licensee can bid for?**

**Issue-4: In the 2.3-2.4 GHz band, the size of the spectrum blocks for the bidding?**

Comments

The technologies are largely needing spectrum blocks of 5 MHz and for providing the IMT services, including Broadband services, the minimum need per operator should be 15 MHz, keeping in view the operator capacity requirements and RF planning in a particular geographical area (would enable 5 MHz for each sector with frequency re-use of 3). The maximum quantum could be of the order of 30 MHz.

**Issue-5: In view of the limited availability 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.**

Comments

- (i) This band (2.5 to 2.69 GHz) was identified by WRC-2002 for 'IMT-2000'. The ITU-R recommendation M. 1036 contains the channeling arrangements for the IMT-2000/IMT and we believe that ITU structured band plans in options 1 and 2 for 2.6 GHz band should best support the objectives of spectrum harmonization and should be implemented in the country.

Option-1:

- Paired block -> 2500-2570 MHz (uplink)/paired with 2620-2690 MHz, (downlink)  
..... for IMT (FDD)
- Central/duplex gap -> 2570-2620 MHz  
..... for IMT/TDD

Option-2:

- Paired block-> 2500-2570 MHz (uplink)/paired with 2620-2690 MHz  
.....for IMT (FDD)
- Central/duplex gap -> 2570-2620 MHz  
.....for FDD Downlink  
External

- The first two options provide separation of FDD (duplex separation of 120 MHz) and TDD blocks, with minimum risk of interference. We prefer & suggest option -1 for implementation in our country.

- (ii) We suggest, Option-1, namely, 2 x 70 MHz spectrum in the band, 2500-2690 MHz i.e. paired part (2500-2570 MHz /paired with 2620-2690 MHz) be allocated for the terrestrial IMT technologies in FDD mode, (like WCDMA/ HSPA/ LTE) with a duplex separation of 120 MHz (in line with ITU recommendations), and, the 50 MHz duplex/central gap spectrum i.e. the un-paired part ( 2570-2620 MHz ) be allocated for the terrestrial IMT technologies in TDD mode, (like OFDMA TDD WMAN, LTE TDD). This harmonized and structured channeling arrangement, would minimize risk of interference.
- (iii) We suggest that the border between paired part of the band (i.e. 2500-2570 MHz / paired with 2620-2690 MHz) and un-paired part of the band (i.e. 2570-2620 MHz ) should be made in line with the global fixations (without national variations), as the differences in border would lead to difficulties in filter implementations in the handset terminals, which are needed to avoid interference between FDD and TDD equipments.
- (iv) It may be noted that co-existence of TDD and FDD systems in adjacent bands would need additional filtering or other non-standard means to solve the increased interference in the equipment as well as in the handset terminals; such implementations could involve wastage of spectrum for guard bands.
- (v) We believe that the ITU harmonized and structured channeling arrangement will bring benefits to consumers, in the form of faster availability of innovative services and lower equipment/handset & devices prices due to economies of scale. A harmonized band plan will not only ensure efficient and effective use of the scarce spectrum but also facilitate seamless roaming, equipment compatibility, network inter-operability at a global level and extend the significant benefits of global 2G roaming to 3G/IMT, which are of great importance for penetration of broadband services, specially in rural areas.

- (vi) Additional spectrum for TDD systems for Broadband Wireless services could be considered in 2.3-2.4 GHz band and 3.3-3.6 GHz band preferably in line with the ITU structured channeling arrangements.

***Issue-6: In case the present available spectrum is allocated for BWA technologies, using un- paired spectrum, then, will it be feasible in future, from technical and economic angle, to reform the allocated spectrum in the 2.6GHz band in line with the global practices ?***

Comments

The suggested allocations by us in 2.5 to 2.69 GHz band (cf. Issue-5), i.e , the unpaired spectrum ( 2570-2620 MHz ) allocations in this band for TDD technologies, like OFDMA TDD WMAN applications, taking care of interference with FDD mode spectrum in the band, would be In line with global standards and practices. Deviations from ITU harmonized frequency bands / / ITU structured channeling arrangements would have implications both technological and economical. If we implement the ITU - R harmonized and structured band plans / channeling arrangements, the need for refarming of the allocated spectrum may not arise.

- We also suggest to make the 2.6 GHz band available in a way that both FDD and TDD licenses could be given at the same time.
- We feel that if India specific band allocations in 2.6 GHz band are considered for BWA technologies other than IMT and / or, the FDD paired part of the spectrum is deployed for TDD / fixed wireless services including fixed BWA, the 'IMT' (FDD) implementations in the band would be adversely affected by FDD/TDD interference issues, as explained earlier (cf. Issue-5).
- The subsequent re-farming in the band may pose complex and practical technological problems with key system elements, such as base station power amplifier, even if technical solutions are resorted for transfer of the equipments and devices from FDD part of the band to TDD part of the band .
- It may not be out of place to mention that, if past experience is any guide, it may be extremely difficult and time consuming to get back the allotted spectrum timely from a allotted user.
- Such policy implementations may bring uncertainty in the market and may adversely affect the investment climate.

**Issue-7: Unlike a number of the other countries, a major portions 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.**

Comments

- (i) The part of the band allocated for LMDS/MMDS systems (40 MHz) could be got re-farmed on high priority, as such systems are not widely in use in the country.
- (ii) As regards the spectrum allocated for Mobile Satellite services (MSS) and for Broadcast Satellite services (BSS), the Government has to convince the existing users for vacation of the spectrum on high priority, with assurance of appropriate compensation to meet the alternative relieving equipment costs, wherever so necessary. No new MSS/BSS applications/ systems in 2.5 to 2.69 GHz should be permitted onwards for deployment .
- (iii) Implement the provisions in ITU-RR for the existing/future satellite (including INSAT) and terrestrial services in the band.

**Issue-9: Is there a need for putting a maximum limit on the cumulative holding of spectrum acquired in these bands by a licensee and what should be that limit ??**

Comments

Keeping in view the current environment of limited availability of spectrum in the bands in the near future and the prevailing trend for wide competition, we may consider to initially limit the acquiring of the spectrum by an operator in these bands to three blocks of 5 MHz. The maximum limits can be reviewed later, when sufficient spectrum becomes available in various frequency bands.

