

Bharti Airtel response to Consultation Paper on IMT- Advanced Mobile Wireless Broadband Services

Q1. Whether there is a need to define a particular user equipment or architecture to be used by the vendors or this may be left to the market forces?

Bharti Airtel Response:

The international standard bodies, such-as ITU, 3GPP, IEEE and 3GPP2 have defined the architecture and specifications for user equipment to a great level of specificity.

The system architecture for each operator will vary depending on its specific factors (such as, spectrum bands, service offering etc.). Therefore, the implementation of system architecture is a matter of design for the operators.

The regulator need not define particular user equipment to be used by the vendors however; operators may choose to specify a minimal set of qualifications for UEs that may be allowed to operate in their networks. This is also a general issue associated with different technologies and as such not necessarily unique to IMT-Advanced systems.

Q2. Whether there is a minimal set of performance characteristics the UE has to meet before it is permitted to enter a network? These characteristics are over and above the interoperability, protocol conformance and emission tests which presumably the UE has already passed.

Bharti Airtel Response:

It is best to leave these performance characteristics to be addressed by market forces rather than regulatory intervention. The operators may determine certain minimal set of performance characteristics to improve their network efficiency. These parameters may also change with time.

Q3. In addition to what has been described above, what can be the other security issues in IMT-Advanced services? How these security issues can be addressed?

Bharti Airtel Response:

Technologies adopted in IMT Advanced are based on standards adopted by international bodies such as 3GPP. Most of security issues have been considered in 3GPP, IETF and other standards bodies, and mitigation strategies have been incorporated into protocols or recommended best practices have been provided.

In general, IMT-advanced services (4G services) have the same security issues as 3G services such as (but not limited to) Radio Jamming, physical compromise of BS (eNodeB) at vulnerable location and manipulation of control plane etc. In addition there are Evolved Packet System (EPS) specific threats mentioned in details in TR33.821 3GPP specification.

LTE-Advanced security architecture is an evolution of the LTE security architecture and is specified in the Release 10 version of 3GPP which provides an effective suite of network layer security features for LTE-Advanced to meet the needs of users, operators and regulators.

Q4. What basic security frameworks should be mandated in all networks to protect customer?

Bharti Airtel Response:

Security frameworks for networks should take into consideration: secure architecture as specified by 3GPP on one hand and security services on the other. The recent UASL amendment goes into details of such security services required to be implemented throughout the lifecycle of the network.

We would like to submit that 4G network should atleast provide the same level of security as that of 3G/2G networks and should be able to defend against intrusions, viruses, trojans attacks etc.

Q5. Which spectrum bands should be identified for the IMT-Services in India?

Bharti Airtel Response:

As per earlier World Radio-communication Conference (WRC)s, certain bands have already been identified for IMT services. India has been a part to these WRCs. The spectrum bands specified for Region-3 (which includes India) should be reserved for IMT services in India. It is important that the spectrum bands are harmonized with the rest of world. The benefits of commonly agreed band plans are as follows:

- Economies of scale and hence affordable User Equipment
- Wider choice of service providers and brands of devices for consumers
- Minimized risk of radio interference
- Maximized total economic value of spectrum
- Facilitated cross-border coordination
- Global roaming

One of the goals of WRC-07 was to identify additional, harmonized, worldwide spectrum, to enable global roaming services while bringing economies of scale. In this regard, WRC-07

identified the 450-470 MHz and 2300-2400 MHz bands for IMT (which includes both IMT-2000 and IMT-Advanced) on a global basis. In addition, WRC-07 identified portions or all of 698-862 MHz and 3400-3600 MHz.

With regards to spectrum bands for IMT services in India, we would like to submit that following bands should be identified:

1. 700 MHz band (698-806 MHz)

Following the recommendations of the ITU's WRC in 2007, Governments across the globe have actively pursued policies to facilitate use of this spectrum for mobile broadband as soon as possible. The WRC in 2007 identified the following blocks of spectrum in 700 MHz band, for different regions of the world (according to the ITU's system of regional classification):

- a. Region 1: (Europe, Africa, the Middle East west of the Persian Gulf including Iraq, the former Soviet Union and Mongolia) 790-862 MHz band (72MHz).
- b. Region 2: (The Americas, Greenland and some of the eastern Pacific Islands) 698-806MHz band (108MHz).
- c. Region 3: (Asia, east of and including Iran and most of Oceania) The majority to follow Region 1 and nine countries to follow Region 2.

As per IND 38 of National Frequency Allocation Plan (NFAP) - 2011, the requirement for IMT and Broadband Wireless Access may be considered in the frequency band 698-806 MHz subject to coordination on a case-by-case basis.

It is submitted that 700MHz band is especially relevant for India, as majority of future growth is expected from rural India and because of its good signal propagation characteristics, less infrastructure is required to provide wider coverage in this band. Thus, communication services can be provided in rural areas at lower cost (savings in capex) and it will also help to bridge the 'digital divide' in India and thus provide affordable mobile broadband to help develop a knowledge based economy. It is essential that India remains aligned with the global regional developments in order to reap the benefits of economies of scale and also provide the benefits of broadband to its citizens.

2. 2.5-2.69 GHz band

The entire band 2.5-2.69 GHz is recommended by ITU to be internationally harmonized for IMT services. This is as such a critical extension band for IMT/3G services; this was identified by WRC-2000 almost 10 years back band for terrestrial IMT 2000 services, and would provide economies of scale as it is globally harmonized.

Therefore, India should also consider this band for the provision of IMT Services, in line with the Radio Regulations and ITU-R recommendations/harmonized channeling plans, ensuring protection from harmful interference between different applications including FDD and TDD.

The INSAT operations in this band should be restricted as per ITU Radio regulations and future allocations for INSAT/ MSS systems should not be done in this band.

Q6. What should be the block size of spectrum to be put on auction? How many blocks of spectrum should be allocated/ auctioned per service area?

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Q7. What is the minimum spectrum block size for effective use of 4G technologies?

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Q8. What should be the maximum amount of spectrum which a service provider can be allocated through auction?

Bharti Airtel Response:

It is submitted that substantial bandwidth should be made available to each operator so that real benefits of technology for broadband services can be provided. It is essential that fragmentation of the bands be avoided; instead large contiguous blocks and sufficient quantum of spectrum should be made available to the operators to achieve better efficiencies and throughputs. At least 3 blocks (other than reserved category) should be allocated/auctioned in each service area.

The minimum block size of 2X10 MHz per operator in FDD mode and 20 MHz per operator in TDD mode should be allocated/ auctioned for optimum throughputs, efficient utilization of spectrum and affordability.

We believe that availability of additional spectrum for mobile broadband will be critical to achieve speeds of more than 100 Mbps in IMT-Advanced broadband access. The advanced standards in future such as LTE 3GPP rel 10 will require further additional spectrum.

Q9. Whether there is a need to specify the use of particular duplexing scheme based on the band in which spectrum allocation is done? If yes, in the case of TDD, is it required to specify further the frame duration, mandate frame synchronization using one of a specified set of timing sources and a permissible set of Uplink/Downlink sub-frame schemes compatible with the IMT-A standards?

Bharti Airtel Response:

To efficiently use the spectrum and prevent interoperability issues the duplexing scheme should be specified by the regulator. However, the choice of technology should be left to the service provider. In order to gain economies of scale we recommend that the regulator should align the duplexing scheme in the particular band with the rest of the world.

We strongly support the adoption of the APT band-plan for India in 700 MHz band as it maximizes the amount of usable spectrum within the relevant spectrum range. The APT band-plan allows for 45MHz of paired spectrum. It is also highlighted that South Korea, Australia and New Zealand have already proposed to adopt the APT band-plan.

For the 2.5-2.69 GHz bands, we would like to submit that ITU Option 1 should be preferred in India. i.e. 2 x 70 MHz in FDD mode and a 50 MHz in TDD mode in the middle.

TDD parameters may be left for operators who may choose them based on user/market requirements. However, it is necessary that sufficient guard band, as identified globally, be provided between spectrum blocks allocated to different service providers to avoid any mutual interference. This would allow service providers to deploy independent configurations based on their market needs.

Q10. What should be the reserve price per MHz in different spectrum bands?

Bharti Airtel Response:

The TRAI should undertake a socio-economic impact study for wireless broadband combined with commercial viability to estimate the reserve price for spectrum bands. It is pertinent to mention that this will need to be considered within the policy framework of the NTP 2011.

Q11. What should be the eligibility conditions for bidding for spectrum?

Bharti Airtel Response:

We would like to submit that this issue shall be discussed during the consultation phase for the design of the actual auction process. However, in the event that the auctions are held under the existing licensing regime, we believe that only UASL/CMTS operators should be eligible for bidding for spectrum.

Q12. Should there be any roll out obligations for spectrum given through auction? Should it be different in different bands?

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Q13. Whether there should be any specific rollout obligations in respect of rural areas?

Bharti Airtel Response:

We recommend that it may be more appropriate to discuss this issue during the consultation the actual auction.

The deployment of services requires a suite of spectrum bands for coverage, capacity density and hot-spot access. The deployment across these bands depends on the operator's service objectives and target markets, so specific rollout coverage requirements would be hard to define.

If there are rural roll out obligations then Government should provide subsidy in some form such as USO fund to operators for deploying IMT Advanced services. It may be noted that the cost of providing services to rural areas is more than that of infrastructure rollout, which would lead to higher tariffs for such areas. This would go completely against the national objectives of increased penetration and more affordable services in the rural areas. Roll out in rural areas should be supported by the USO schemes brought out in a timely manner.

Q14. What should be the spectrum usages charges? Should it be based on revenue share or be a fixed charge?

Bharti Airtel Response:

We recommend no spectrum usage charges on the spectrum allocated through auction. However, if it has to be specified, then it should be a flat and uniform rate irrespective of technology and/or spectrum band. The spectrum usage charge shall be applied to the AGR from the services provided using that spectrum only.

Q15. Using MIMO technology what can be the possible infrastructure sharing issues and what can be the probable solutions.

Bharti Airtel Response:

We recommend that technology for infrastructure sharing should be left to the market forces.

Q16. What regulatory mechanisms are to be provided for delivery of voice services over IMT-A systems?

And

Q18. What are the QoS measurements that can be reported on IMT-A systems? Suggest the appropriate KPI for data and voice services to guarantee customer satisfaction.

Bharti Airtel Response:

The IMT-A standards are still evolving; therefore, it is not possible to define the KPIs for IMT-A systems.

Q17. Should the interoperability of services to legacy 2G/3G systems be left to market forces?

Bharti Airtel Response:

Yes, we agree that the interoperability of services to legacy 2G/3G systems shall be left to market forces.

The telecom service providers have invested huge sums of money to build 2G GSM/GPRS/EDGE, CDMA 2000 1x networks, 3G, EVDO and HSPA networks which provide voice and data services to more than 800 million users. Therefore, it is essential to continue using these highly optimized 2G/3G networks with interoperability with LTE networks.

Q19. In view of the likely deployment of scenarios where the cell radius is scalable to much smaller levels using the concepts of femto and pico cells:

- a. What will be the impact of femto cells/SoN architecture on KPI?
- b. What will be the impact of Relays/femto cells on spectrum policy?
- c. What will be the impact on infrastructure sharing?
- d. What policy guidelines are required to encourage low emission low energy and high capacity architecture like femto cells overlaid over macro cells?

Bharti Airtel Response:

Trials of femto cells are at early stages, therefore, at this stage it is not possible to define the impact of femto cells on KPIs and its impact on spectrum policy and infrastructure sharing.