DEFENCE VIEW POINTS ON TRAI CONSULTATION PAPER ON SPECTRUM RELATED ISSUES

1. Defence Services are major users of the electromagnetic spectrum. Their use of spectrum is unique. The communication system is mobile in true sense, where the base stations and the so-called mobile stations are mobile. The density of transmitters and receivers on different frequencies in a particular area is of the order of about 50000 in an area of 50 X 50 kms. The requirements of frequencies are very high, since various modes of communication are used, a large number of sensors/radars remain in operation and the defence operations are always under constraints of enemy electronic attacks that deny our use of the spectrum. The concept of warfront being limited only to the border areas changed after the attack on the heart of the country, i.e. the Parliament Building. Hence, the defence requirement cannot be limited to 100 kms along the border only. Defence forces play a very active and important role during catastrophes. Recently, one Air Defence Radar was moved to Delhi for security reasons during the Republic day parade. This caused interference to one of the mobile networks. This did not create much problem, since it was a peacetime requirement. Imagine, if such a case occurs during war. Unless the requirement of defence is understood and coordination carried out properly, such cases will reoccur.

2. Defence has been periodically coordinating major portions of spectrum allocated to it, considering the larger goals of national development. The growth in the cellular communication sector is sufficient proof of our cooperation in this regard. Most of the spectrum used by the cellular operators belonged to the defence services earlier and a major effort has gone into readjusting our usage and making way for commercial services. Further coordination may not be possible unless we have major changes in our equipment and systems. This will take a long time due to our limitations of procurement from other countries, limitations of indigenous development and international restrictions on transfer of technology.

Chapter 2: Current Spectrum Availability and Requirement – Issues and Comments

3. **Issue at Para 2.9 (i)** Should the 450 MHz or any other band be utilised particularly to meet the spectrum requirement of service providers using CDMA technology?

4. **Comments on Para 2.9 (i)** The 450 MHz spectrum is not utilized by Defence. The propagation properties of this band give increased reach, hence is suitable for rural areas, where wider coverage is required. 7+7 MHz of additional spectrum from this band will supplement existing 20+20 MHz available for CDMA operations. Defence can coordinate the spectrum in non-DIZ areas. Before we come to a conclusion on this, we must study the spectrum management of China. Total subscriber base of China is 300 crores and in our country it is 35 crores which is almost one-tenth. China has allocated approximately 65 MHz both for CDMA and GSM. We have already allocated 55 MHz both for CDMA and GSM and are still looking for more.

5. **Issue at Para 2.9 (ii)** The consultation paper has discussed ITU method for assessment of spectrum requirement. Based upon the methodology submit your requirement of spectrum for next 5 years. While calculating the required spectrum, please give various assumptions and its basis.

6. **Comments on Para 2.9 (ii)** Not applicable

7. **Issue at Para 2.9 (iii)** Whether IMT 2000 band should be expanded to cover whole or part of 1710 – 1785 MHz band paired with 1805 – 1880 MHz?

8. **Comments on Para 2.9 (iii)** The frequency band 1710-1785 MHz paired with 1805-1880 MHz is extensively utilized by Air Force ADGES network and Army RR network. Navy is not using this band. The idea to consider whole of this band for IMT-2000 services should be rejected in totality. A maximum of 25+25 MHz spectrum, as agreed by GoM be considered for coordination, subject to readjustment of systems in a time frame of 4-6 years and re-farming defence in suitable alternate bands. Further on induction of 3G/4G technologies, systematic phasing out of 2G/2.5G services be carried out by CMSPs. This will avoid re-farming of defence spectrum and lead to considerable saving.

9. **Issue at Para 2.9 (iv)** Should IMT 2000 spectrum be considered as extension of 2G mobile services and be treated in the same manner as 2G or should it be considered separately and provided to operators only for providing IMT 2000 services?

10. **Comments on Para 2.9 (iv)** Defence services supports this proposal of IMT 2000 spectrum to be considered as an extension of 2G mobile services due to following reasons:-

(a) The core band for IMT-2000 is 1920-1980 MHz paired with 2110-2170 MHz. 1920-1980 MHz falls under defence band whereas 2110-2170 does not fall under defence band thereby saving defence spectrum.

(b) 1920-1980 MHz spectrum is used for uplink from mobile to BTS having maximum power output of 5W thereby less chances of interference.

(c) Reduce pressure on other bands (GSM 900 & 1800 MHz), used extensively by defence.

11. **Issue at Para 2.9 (v)** Reorganisation of spot frequencies allotted to various service providers so as to ensure the availability of contiguous frequency band is desirable feature for efficient utilisation of spectrum. Please suggest the ways and means to achieve it.

12. **Comments on Para 2.9 (v)** The availability of contiguous frequencies should not have been a problem for the first and second operator, however, the third and fourth operators could not be given contiguous frequency spectrum due to the use of the spectrum by the defence forces. Coordination of continuous chunks, which was desirable from defense point of view, also was examined in detail and found to be unimplementable. However DoT can take up the exercise of reorganizing spot frequencies amongst GSM operators to improve the spectrum efficiency.

13. **Issue at Para 2.9 (vi)** Whether the band 1880 – 1900 MHz be made technology neutral for all BSOs / CMSPs / UASLs and be made available with the pair 1970 – 1990 MHz or should it be kept technology neutral but reserved for TDD operations only.

14. **Comments on Para 2.9 (vi)** Defence has been coordinating this band for indigenously developed CorDECT technology with maximum power output of 250 mW. So far no interference has been experienced by any of the existing defence operations. Opening of this band for CDMA based technology has following implications:-

(a) CDMA equipment has higher power outputs, which is likely to cause interference to our existing operations.

(b) CDMA is FDD technology. Therefore spectrum required to be coordinated will be 1880-1900 paired with 1960-1980 MHz. Defence will thus loose additional 20 MHz of spectrum from 1960-1980 MHz over and above 20 MHz in 1880-1900 MHz. Coordination of this 20 MHz will be problematic.

(c) Such a scheme will rule out the possibility of using the part of the (20 MHz) designated IMT-2000 core band in the future.

15. Therefore, this band should be reserved only for TDD operations.

Observation On Table No 2.3

16. Spectrum made available in 900 MHz Band as shown in Approach 1 and 2 at para 17 in Metro and Non-Metro cities is shown as 23.4 MHz. The fact is that only 19 MHz is available for GSM whereas defence is having 4.8 MHz and railways 1.2 MHz except in Delhi and Mumbai where certain additional allocations have been made.

Chapter 3 - Technical efficiency of Spectrum Utilization – Issues and Comments

17. **Issue at Para 3.3 (i)** Please offer your comments on the methodology outlined in this Chapter for determining the efficient utilisation of spectrum. Also provide your comments, if any, on the assumptions made.

18. **Comments on Para 3.3 (i)** Nil

19. **Issue at Para 3.3 (ii)** Please provide your perception of the likely use of data services on cellular mobile systems and its likely impact on the required spectrum including the timeframe when such requirements would develop?

20. **Comments on Para 3.3 (ii)** Nil

Chapter 4 – Spectrum Pricing – Issues and Comments

21. **Issues at Para 4.10 (i) to (ix)** All the issues relate to Spectrum Pricing and Methodology for commercial users. Defence is not mentioned.

22. **Comments on Para 4.10 (i) to (ix)** While evaluating the spectrum pricing and levying charges on various users of spectrum, it must be ensured that Defence services being a Government non-revenue earning organisation are not charged for the spectrum. Charging of spectrum will also increase the allocation of defence budget, which will send different signals to the world community.

Chapter 5 – Spectrum Allocation and Pricing Policy – Issues and Comments

23. **Issue at Para 5.11 (i)** How much minimum spectrum (refer approach (I) and (II)) in section (5.4) should each existing operator be provided? Give the basis for your comments.

24. **Comments on Para 5.11 (i)** While allocating minimum spectrum to each existing operator, Approach (I) in section 5.4.1 of the subject paper must be incorporated as a policy. With the advent of Unified Access License, the country today has 5-8 cellular mobile service providers in most of the areas with 3-4 operators being on GSM and 2-4 operators on CDMA. This is already a high figure and needs to be capped to a maximum of 6 CMSPs in each telecom circle. The available spectrum, after coordination with defence services, needs to be judiciously released to the existing operators.

25. **Issue at Para 5.11 (ii)** At what stage the amount of spectrum allocation to new entrants be considered in the 800 MHz / 900 MHz / 1800 MHz frequency bands?

26. **Comments on Para 5.11 (ii)** No new entrants should be allowed in 800/900 MHZ and 1700/1800 MHz band and present number of players be frozen. However, other frequency bands like 450 MHz, etc may be explored for them.

27. **Issue at Para 5.11(iii)** Should spectrum be allocated in a service and technology neutral manner?

28. **Comments on Para 5.11 (iii)** Spectrum should be allocated in a service and technology neutral manner but emphasizing that CMSPs should use best available spectral efficient technology equipment and must update with new emerging techniques in this field for this.

29. **Issue at Para 5.11(iv)** What should be the amount of cap on the spectrum assigned to each operator?

30. **Comments on Para 5.11 (iv)** Presently, there are eight operators providing cellular services using GSM and CDMA technology. The market will not be in a position to support all eight operators and in due course some players may opt out. Therefore, the spectrum requirement may not be worked-out keeping the existing figure of eight operators in mind. Instead the requirement of spectrum be worked out based on the number of users likely to use the services. This method will help to overcome artificial spectrum congestion.

31. **Issue at Para 5.11(v)** What procedure for spectrum allocation be adopted for areas where there is no scarcity and in areas where there is scarcity?

32. **Comments on Para 5.11 (v)** Uniform policy of allocation of spectrum on subscriber base be adopted for both the category of areas to avoid spectrum waste.

33. **Issue at Para 5.11(vi)** Which competitive spectrum allocation procedure (Auction / Beauty Contest) be adopted in cases where there are scarcity?

34. **Comments on Para 5.11 (vi)** Nil/ No comments

35. **Issue at Para 5.11(vii)** Should we consider giving some spectrum in 900 MHz band to fourth CMSPs?

36. **Comments on Para 5.11 (vii)** In 900 MHz band, Defence has already coordinated 20.2 + 20.2 MHz on All India Basis including Railways. Additionally 1.8 + 1.8 MHz in Delhi & 3.6 + 3.6 MHz in Mumbai has been coordinated. No further coordination of spectrum is possible in this band due to presence and operation of various Navigational Aids and Strategic Links. Hence, no more spectrum be allocated in 900 MHz band to fourth CMSP.

37. **Issue at Para 5.11(viii)** Comments of stakeholders are invited on the minimum blocks such as 2 X 2.5 MHz / 2 X 5 MHz of additional spectrum to be allocated to existing service providers in situations where IMT 2000 band is opened as well as in situation where it is not opened. Additionally, comments are also invited on the minimum allocation to new entrants.

38. **Comments on Para 5.11 (viii)** The number of stake holders should be maintained at the present state, in fact, reduced as and when time permits. In Malaysia, the number of service providers at a time were 8 but finally reduced to 3. This eased out the spectrum allocation and management problems. The minimum block for additional spectrum should not be defined now but be based on the availability of spectrum at that point of time. No new entrant be allowed.

39. **Issue at Para 5.11(ix)** In the event that IMT 2000 spectrum is treated as continuum to 2G, should existing operators using spectrum below the specified benchmark be treated as those eligible for IMT 2000 spectrum?

40. **Comments on Para 5.11 (ix)** An operator, who has not been able to fully exploit the allocated spectrum, should not be allowed to claim spectrum in IMT 2000 band. Such an operator, if allowed additional spectrum in core IMT 2000 band, should be asked to vacate 1700/1800 MHz band.

Chapter 6 – Re-farming, Spectrum Trading, M & A and Surrender - Issues and Comments

Re-farming of Spectrum

41. **Issue at Para 6.4(i)** What approach should be adopted to expedite the re-farming of 1800 MHz and IMT-2000 spectrum from existing users?

42. **Comments on Para 6.4 (i)** The requirement of spectrum for IMT-2000 services needs to be realistically worked out. Total of 749 MHz of spectrum is identified in WARC-92 and WRC-2000 for implementation of IMT-2000 services. This much spectrum will not be required. Further before refarming the existing users to other bands following issues needs to be considered:-

(a) Availability of suitable spectrum for refarming. The alternate spectrum should have similar propagation characteristics. The search for alternate band for migration of existing users from the IMT-2000 band appears to be impossible.

(b) Further, there is no assurance that in future the spectrum used for refarming is not considered for some other new technology

(c) Availability and cost of equipment also needs to be considered.

43. **Issue at Para 6.4 (ii)** What approach should be adopted for re-farming of spectrum after expiry of license?

44. **Comments on Para 6.4 (ii)** - Nil

Surrender of Spectrum

45. **Issue at Para 6.4(iii)** Should there be any refund for spectrum surrender in principle?

46. **Comments on Para 6.4 (iii)** There must be some refund for surrender of spectrum. This will encourage players to surrender any unutilized spectrum assigned to them, and may lead to saving of spectrum.

47. **Issue at Para 6.4 (iv)** Should there be refund for spectrum surrender consequent to Unified Access license policy? If yes, what should be the basis?

48. **Issue at Para 6.4 (v)** How should the amount of refund be estimated?

49. **Comments on Para 6.4 (iv) to (v)** – Nil

Spectrum Trading

50. **Issue at Para 6.4 (vi)** Should we open up the spectrum market for spectrum trading? If yes, what should be the time frame for doing so?

51. **Comments on Para 6.4 (vi)** Spectrum trading should not be considered at this stage as availability of spectrum is scarce and CMSP's have to co-exist with defence services in various frequency bands.

52. **Issue at Para 6.4 (vii)** What are the pre-requisites to adopting spectrum trading?

53. **Comments on Para 6.4 (vii)** Nil

Merger and Acquisitions

54. **Issue at Para 6.4(viii)** Whether we should specify a cap higher than 2 X 15 MHz for Metros and Category "A" service area and 2 X 12.4 MHz for Category "B" and "C" service area in case of M&As or should it be retained?

55. **Comments on (viii)** Spectrum allocation be based on number of subscribers. There should be cap on number of operators. All efforts must be made to encourage mergers and acquisitions to reduce the number of players, hence saving of spectrum.

56. **Issue at Para 6.4(ix)** In case, IMT 2000 is considered as a continuum of 2G Services, is there a need to have a cap higher than that without IMT 2000 services? Should there be individual caps on 2G and 3G spectrum or a combined cap?

57. **Comments on Para 6.4 (ix)** Nil

58. **Issue at Para 6.4(x)** In case of M&As where the merged entity gets spectrum exceeding the spectrum cap, what should be the time frame in which the service provider be required to surrender the additional spectrum?

59. **Comments on Para 6.4 (x)** – One year

RECOMMENDATIONS

60. The WP 8F has recently asked details of existing and proposed spectrum utilization in 2500-2690 MHz band. Acceptance of the band from 2520 to 2690 MHz (identified in WRC-2000) for implementation of IMT-2000 services in India will help to ease the spectrum demand in other bands.

61. On due justification of additional spectrum for CDMA operations (over and above present allocation of 20+20 MHz in 800 MHz band), the same may be considered in frequency band 1920-1980 paired with 2110-2170 MHz. However before considering such option 7+7 MHz of spectrum in 450 MHz band may be fully utilized.

62. The concept of defence band needs to be reintroduced to ensure unhindered growth of both private and defence operations, i.e., the pattern of spectrum allocation be as in the USA and/or China. All the band of spectrum be divided into following three groups of sub bands:-

(a) Sub-band for industry.

(b) Sub-band for government organizations.

(c) A sub-band common for usage by (a) and (b) above to be allotted on specific needs.

63. The spectrum allocation for all the three sub-bands, in a particular band, can be worked out by a study group. This will have the following benefits:-

(a) No requirement of coordination between any agencies as the band is defined for all.

(b) Assignment of frequency becomes much faster.

(c) It shall be easier to plan for a system to be imported as the frequency is known.

(c) Government agencies will know their limitations so the utilization of spectrum shall be more efficient.

(e) Presently defence faces a problem of being dependent on the spectrum provided by off the shelf equipment available in the world market. Many a times NFAP has to be violated which becomes difficult. This will ease out the problem.

64. The present strength of eight operators is on the higher side. In the long run so many operators may not sustain. This has been witnessed in number of countries. Therefore there should be cap on number of operators. Further, on merger of two or more operators, the time period for which the additional spectrum can be retained by joint operations need to be specified in time, leaving no loose ends.

65. Spectrum requirement be worked out based on number of users rather than number of operators. Also, a regime be introduced where-in, a spectrum-efficient technology is rewarded and an inefficient one is penalized. However, it should be assumed that overall allocation for GSM and CDMA does not make additional demands on defence spectrum.

66. The CDMA operators' spectrum requirement in 1880-1900 MHz paired with 1960-1980 MHz band can not be met due to existing defence operations in 1960-1980 MHz as well as 1880-1900 MHz band.

67. The following issues which do not find mention in the Consultation Paper need consideration:-

(a) Penalties for infringement of spectrum allocations and regime for detecting and imposing the allocations.

(b) Mechanism of resolution of interference problems.

(c) Capping / Ceiling of power output, height of antenna, range etc.

(d) Modalities for prevention of spill over across international borders.

(e) Limiting cell size to maximize frequency reuse.

(f) Tetra Technology, which is actively being examined by Defence Forces, is conspicuous by its absence.

(g) While possibility of a fifth operator is being debated in the political circles, TRAI needs to take into consideration the fact that Defence will very soon be another operator in CDMA-2X.

68. Our policy should ensure that in the long term our national strength in software is capitalized upon and our fledgling hardware industry is given support, whilst safeguarding National Security in all its manifestations. The consultation paper does not address the vital indigenisation aspects.

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