COAI'S RESPONSE TO

TRAI'S CONSULTATION PAPER NO. 11/2004

ON

SPECTRUM RELATED ISSUES

VOLUME – I

EXECUTIVE SUMMARY

CELLULAR OPERATORS ASSOCIATION OF INDIA

JULY 16, 2004, NEW DELHI

COAI'S RESPONSE TO THE TRAI'S CONSULTATION PAPER NO. 11/2004 ON SPECTRUM RELATED ISSUES

EXECUTIVE SUMMARY

A. INTRODUCTION

1. At the outset, we would like to welcome this initiative of the Authority to look into the spectrum related issues. **Spectrum is a key resource vital for providing mobile services** and the **Government's Policy on the important issues of spectrum allocation, pricing and its efficient usage will play a crucial role in deciding the future role of the Indian wireless sector** in contributing to country's national telecom objectives.

2. We believe the most important objective of the Authority should be to **maximize benefits to the entire population of potential mobile users in India** - in terms of extensive mobile service availability, low prices and good quality of service. This can be achieved by **encouraging, introducing and facilitating fair competition among mobile operators**.

3. In this context, we believe that there are serious implications and risks associated with some of the choices discussed in the consultation. We are of the view that a **number of options discussed in the consultation will put the GSM operators at a serious unjustified disadvantage to CDMA operators**. This imbalance would likely lead to far-reaching and adverse consequences which could include market exit and a resulting increase in market power among the remaining operators. **The resulting reduction in competition would be to the ultimate detriment of mobile users across India, and it would be irreversible**.

B. CONTEXT OF THE RECOMMENDATIONS

4. It is submitted that the reference to the Authority by the Government to consider the **"Efficient Utilization of Spectrum,"** entails **examining the efficient utilization of the respective spectrum that has been allocated to the mobile op**erators for providing their mobile services This is **also the position taken by the Expert Committees on Spectrum set up by the Government on GSM and CDMA** which have looked into the issue of optimum utilization of spectrum allocated to GSM and CDMA operators and laid

down separate subscriber-linked milestones for additional spectrum assignments to both GSM and CDMA operators.

5. We believe that the Authority has **erred in taking this reference as the mandate to make recommendations on the comparative efficiencies of the existing technologies**. This is incorrect, unjustified and unfair. The **Regulator has to maintain a technology neutral position and ensure that all regulatory decisions are aimed at ensuring free and fair competition between competing technologies.**

6. It may also be noted that it was **only after a critical examination of all possible technology options that the Government selected GSM as the technology of choice** for introducing cellular mobile services in the country. **India has benefited** from this far-seeing **decision of the Government as GSM continues to be the dominant technology, both worldwide and in India**, reaching **1.1 billion mobile consumers worldwide** and accounting for **over 75% of all digital mobile subscribers and 80% of all new additions.**

7. It is thus **not only outside the framework of reference but also incorrect and improper to now embark on a comparative analysis of two technologies** and that too, **on the basis of one single characteristic, which has led to erroneous conclusions.**

8. **Whilst maintaining that a comparative analysis of the two technologies is not the context in which the reference has been made by the Government, we nevertheless strongly disagree with the various statements** made in the Consultation Paper **claiming that CDMA is a more efficient technology** than GSM. **We do not agree with this view** as in **any comparison**, the efficiency or otherwise of any technology will depend on the basic assumptions and the specific situation taken into consideration.

9. In an environment where different technologies co-exist in an open market for providing the same service, it is **unjust and unfair to talk about 'superior' and 'inferior' technologies**. The ultimate advantages / benefits of a technology is the result of a summation of several complex attributes. In the case of mobile services, it is the result of an **inter-play of aspects such as seamless connectivity, interoperability, roaming, cost-efficiencies resulting from economies of scale, richness of services, user experience, etc**.

10. The inaccuracy of **the misleading conclusions drawn in the Consultation Paper, can be seen from the market scenario and the ground realities.** If GSM were to be a second best or inferior technology, then why do majority of the world mobile users still prefer GSM?? It is a well-known fact that **GSM is the most widely used digital technology in the world reaching 1.1 Billion mobile subscribers worldwide and accounting for over 75% of the world's digital mobile subscribers and 80% of all new mobile subscribers.**

11. Further, **in the case of 25 top data operators, recent analysis by EMC has indicated that 22 use GSM/ GPRS/ EDGE/ WCDMA platfo**rm, 2 use PDC/ WCDMA platform and only 1 uses CDMA platform.

12. We believe that it would be difficult, if not impossible for anybody to categorically conclude on such a globally controversial subject as to which technology is more efficient. We believe that it would **be best to leave the decision to market forces to determine which technology delivers greater value to customers.**

13. **It is respectfully submitted that the methodology and assumptions of the Authority** on the technical efficiency of spectrum utilization **are discriminatory and biased against the GSM in**dustry:

a. The Consultation Paper has considered a multi-layered architecture only for GSM and not for CDMA.
b. Considering the deployment of micro / pico sites only for GSM is discriminatory and unjustified. While Indian GSM operators are already using a variety of advanced techniques for optimal utilization of spectrum, the CDMA operators have not even deployed equal density of macro sites let alone adequate micro / pico sites in their networks.
c. The Paper **gives little thought to the scope to increase CDMA network capacity despite the Authority itself noting that the CDMA networks "were not found to be congested at the current traffic levels."**
d. To the best of our knowledge, **the 9-cell cluster used by the TRAI for GSM, is neither practicable not possible** and therefore any results derived from this assumption are incorrect
e. The Consultation Paper cites international practice of only 2-3 sites per sq km. and a maximum packing density of only 5-sites/sq km. for CDMA. This is

misleading and incorrect, as the CDMA technology does not put any restriction on the number of sites /sq km. and the constraints for restricting the number of sites in any given footprint are the same for both GSM and CDMA.

f. The calculations used for CDMA 1x networks under clause 3.2.2.1.2. are incorrect as the division factor should have been 5 (MHz) and not 6 for 4 carriers.

g. The Paper has also in a discriminatory manner chosen to dwell on the data requirements of CDMA operators while no such distinction has been made in the case of GSM operators.

14. **The spectral efficiency of GSM networks is far higher in markets where operators have an adequate assignment of spectrum. This is because GSM has a non-linearity characteristic** in the B Erlang table, **which can be exploited at optimal levels of spectrum allocation**. In this regard, we would like to suggest that the Authority may consider that **as far as possible, wherever spectrum is available and can be coordinated, it may be made available to the GSM operators without linking it to subscriber numbers**.

15. We believe that the in the context of the reference on 'efficient utilization of spectrum" requires the Authority to **ensure that all mobile operators, whether GSM or CDMA operators, fully and optimally utilize their allocated spectrum before being entitled to fresh assignments**. We believe that this could be ensured by **CDMA operators making network investments to achieve base station density equivalent** to **that of the GSM operators.** This will **ensure optimal utilization of allocated spectrum** and also **ensure level playing fiel**d.

C. UNDER LICENSE, 1800 MHZ BAND IS FOR BOTH GSM & CDMA

16. The Authority has incorrectly presumed that **the 1800 MHz band is only for GSM operators.** Under the **Unified Access Licenses, it is clearly stipulated that spectrum allocations to UAS Licensees will be in the 800/900/1800 MHz bands**. It is submitted that any allocations to the UAS licensees must only be in their designated bands under license.

17. **The DoT has also clarified that the cellular operators are only technology neutral within their designated frequency bands. This principle must apply equally to both GSM as well as CDMA operators. Thus, CDMA operators are technology**

neutral only within their designated bands of 800 MHz / 1800 MHz as per their license and the argument of technology neutrality cannot be used to move out of their designated frequency bands.

18. **Further, as adequate spectrum as well as equipment exists in the 1800 MHz band, there is no reason or justification to consider any other band, including the US PCS Band for CDMA**.

D. PREVAILING CELLULAR SPECTRUM USE POLICY MUST BE RESPECTED

19. The Government has most recently considered the spectrum requirements of both GSM and CDMA operators and arrived at clear roadmap for additional allocation of spectrum for GSM and CDMA operators. The **Government Cellular Spectrum Use Policy** was finalized after receiving inputs from an **Expert Technical Committees which considered all techo-economic parameters, optimal utilization of spectrum, future growth forecasts**, etc and after **participation of all stakeholders**, submitted its Report to the Government.

20. **For GSM** operators, it was only after examination of **current utilization of assigned bandwidth, network design practices, international norms, etc., that the S**pectrum Policy of the Government laid down a **subscriber-linked formula for allocation of 2x15MHz per GSM operator as recently as August 2003. This Policy may now deemed to be part and parcel of the GSM operators' license as it has been implemented vide a** Ministerial Order issued by the Ministry of Communications (WPC Wing) vide Letter No. L-14047/06/2004-NTG dated April 15, 2004 for graded spectrum charges for allocations upto 2x15 MHz.

21. **For the CDMA operators also, a similar exercise has been undertaken** and we **understand from newspaper reports** that the exercise has already **been completed** and that the Committee has recommended a subscriber linked formula for the CDMA operators. **This decision too, should be implemented.**

22. **In light of the above, we believe that Approach I and Approach II are inappropriate for spectrum allocation as they do not take into account the above Spectrum policy of the Government and the fact that mobile operators have already acted upon this Policy.**

23. **Scarcity of spectrum should not impede the growth of existing operators and adequate spectrum must be reserved for existing operators before considering the allocation of spectrum to new entrants.**

24. **As long as the spectrum is used efficiently and additional assignments can be justified** and **principles of level playing field and fair competition are ensured**, there should be **no artificial limit placed on the amount of spectrum per operator.**

E. SPECTRUM PRICING MUST BE IN CONSONANCE WITH NATIONAL TELECOM OBJECTIVES

25. The Authority's recommendations on Spectrum Pricing must consider:
    a. The **national objective of ensuring high quality and affordable mobile services** to consumers and the **achievement of national tele-density objectives.**
    b. The **existing Cellular Spectrum Use Policy** both in respect of spectrum allocation and pricing and ensure that the operators are no-worse off in the new environment.

26. **In a highly competitive and price-sensitive market** like India, operators do not have the freedom to generate super-profits, and therefore a **higher tax will simply be passed on to customers** (in the medium term, if not in the short term) in the form of higher prices or lower quality of service. This runs counter to the national policy and regulatory objective of making mobile telephony services much more widely available across India and thereby growing tele-density.

27. **Economic research has shown that it is more efficient for a Government to tax final goods (revenues) rather than intermediate goods**. In this context, spectrum is an intermediate good, and therefore imposing a tax on it is a poor long-term policy.

28. Since the Government already has a well-established "rationing" mechanism for ensuring efficient use of spectrum, i.e. by withholding additional spectrum assignments from operators until they have accumulated a prescribed subscriber base, there is no need to use **spectrum pricing as a method to discourage the inefficient use of spectrum**. The only effect of this will be **to increase costs to operators and prices to customers**.

29. **Spectral characteristics is only one of the factors** that determine the overall benefits / advantages of a technology – it **should not be chosen the basis for putting in place a pricing mechanism that favours one technology over the other**. As already pointed out, this is not the mandate under the consultation. The Regulator should maintain a technology neutral position and ensure that all regulatory decisions are aimed at ensuring free and fair competition between competing technologies.

30. It should be noted that the **Indian GSM operators have paid amongst the highest entry fees in the world to acquire spectrum** licenses to offer cellular mobile services. It is thus submitted that **spectrum up to 2x15 MHz** (which would somewhat be in line with international practices) **should be taken as the entitlement of the GSM operators** u**nder their license and they should be required to pay only a nominal usage charge (to cover the costs of administration & regulation**) for this bandwidth.

31. Our **preferred approach would be that spectrum usage charges should be sufficient to cover only the costs of administration and regulation** (**recovered on a revenue share basis from all operators**).

32. However, to ensure efficient utilization of this resource, the principle of incremental revenue share for additional spectrum **may be continued.** However, the **overall bar needs to be lowered, the incremental charges should be modest (as the Government will anyways gain from higher revenues**) and **there must be a cap prescribed on the maximum spectrum usage charges**. I**t is suggested that the overall cap for spectrum charges be set at 2% of revenues for spectrum allocations up to 2x15MHz per operator.** Within this overall cap of 2%, the Authority may adopt a stepped approach of, say, increments of 0.2 or 0.25%, for increased levels of spectrum allocation.

33. The advantage of the **current revenue share regime is that it** is **fair, simple, transparent and easy to administer** and it **directly connects the price of the spectrum to the value of commercial activities that use it.** Furthermore, this regime **also ensures the efficient use of spectrum** as additional spectrum is allocated at an incremental charge and only after reaching pre-defined subscriber milestones. The **present regime is, in fact, a form of Administered Incentive Pricing (AIP),** which has been **customized to suit the Indian environment.** As mentioned above, **t**his regime only needs to be fine-tuned in order to rationalize the present very high level of charges. This regime has been **finalized by the Government as recently as in**

August 2003 after extensive and elaborate consultations of all relevant aspects including optimal utilization, international practices, etc. This **regime meets all the important objectives enunciated by the Authority** for a spectrum pricing policy :

a. It **promotes spectrum efficiency** as spectrum is allocated only after full justification of existing assignments.
b. It is **simple, transparent & easy to administer**.
c. It will **recover the costs of spectrum management**
d. It will **promote competition**.

34. However, the **version of AIP proposed in the Consultation** Paper, is **not acceptable** for the following reasons :

a. It is based on a pre-determined conclusion that CDMA is the "most efficient technology" and that GSM is the "second best technology" We strongly disagree with this statement and we would also like to submit that it clearly establishes that the **version of AIP proposed is not technology neutral**.
b. All other things being equal, all that the AIP version proposed in the Paper would achieve would **be an increase in operating costs** for mobile operators leading to a **corresponding increase in tariffs for customers.**
c. **Since GSM operators are already** employing a variety of advanced techniques to ensure **optimal utilization of their allocated spectrum, AIP will not have any incentivising effect or result in further efficiency gain**s.
d. The **level at which AIP should be set is a practical challenge**. If it is **set exactly equal to the marginal cost** of additional infrastructure, the **choice** between paying for more spectrum versus paying for more equipment **will be determined in practice by economically irrelevant, short-term issues** such as the relative lead times on provisioning the additional capacity. If they **set it at all below the marginal cost** of additional infrastructure**, operators will always choose additional spectrum over additional infrastructure**, and the mechanism will be ineffective. And **if it set at substantially higher than the marginal cost of infrastructure, then given that the GSM operators are already employing all optimization techniques, it will either result in increased cost of service or in deteriorated performance**.

35. We **do not favour the auction** approach, as we believe that it would **only result in increased costs and corresponding increase in tariffs.**

36. With the introduction of unified access licensing (fixed and mobile services) and the imminent introduction a full unified telecom license **(**all telecom services), **the basis for charging for spectrum usage must also be aligned to a common basis for all wireless usage (fixed or mobile).**

F. EARLY INTRODUCTION OF IMT-2000/ 3G IN ITU WARC-92 IDENTIFIED CORE BAND

37. **Expeditious introduction of IMT-2000/ 3G is important and relevant for India as this will deliver maximum benefits to mobile customers** in India, in terms of **higher voice capacity, data-speeds, increased service offerings,** etc., common with those other countries where these services have been introduced.

38. **Spectrum** for IMT-2000 / 3G services **should be as per the WARC–92 identified Core Band (1920-1980 MHz paired with 2110 to 2170 MHz) and as allocated in the National Frequency Allocation Plan.** This band is the **only band in which commercial equipment is available** and all countries that are offering IMT-2000 / 3G are doing so only in this band. Further, it is also **truly technology neutral and will ensure the evolution of both GSM as well as CDMA operators to IMT-2000 in the most spectrally efficient, harmonized, interference-free manner.**

39. **The first round of 3G spectrum assignments from this Core Band should be made *simultaneously* to all existing, interested operators – GSM and CDMA**. Under no circumstances should any consideration be given to pre-emptive assignment of *any* spectrum for 3G networks to a subset of the community of mobile operators in India. This would introduce unfair advantage and create non-level playing field.

40. International best practice, for Asia and Europe, indicate that **2 x 15 MHz should be reserved** for each GSM operator. **In order to gain any of the advantages of the IMT-2000 band,** international convention must be followed and the band should be allocated in minimum blocks of 2x5 MHz**.**

41. **Equipment rollout based on WRC identified bands is a time consuming and an involved process.** Based on ITU-R recommendations, **it took more than 10 years for the industry to come out with commercially available infrastructure for IMT-2000** applications / services in the WARC 92 identified band i.e., 1920-1980 MHz / paired with 2110-2170 MHz. As of today, **120 operators /licenses** have been awarded in **40**

countries, which have **either commercially deployed IMT-2000/FDD mode** (WCDMA) access standard (i.e., the evolution path to 3G for the GSM operators to migrate to IMT-2000 **or are in different stages of deployment** / launching (37 networks are already commercial with almost 6 million users; 60 networks expected to be commercial by end-2004).

42. Interference free operation is an important pre-requisite for efficient spectrum use, which is one of the fundamental mandates of the present consultation exercise. Use of the ITU WARC-92 globally harmonized spectrum for IMT-2000 will also ensure:

- **Interference-free operations**
- **Optimal utilization of spectrum (no wastage by guard bands etc),**
- **Facilitation of Global roaming**
- **Availing of the benefits of the economies of scale of globally available standard equipment, etc**

43. Almost all countries are adopting the principles of harmonized spectrum use and are allocating spectrum as per the ITU globally harmonized bands **(WARC-92 identified) for IMT-2000.** This is evident from the **Chart that clearly brings out the fact that** whilst ITU has identified bands for IMT-2000 in both WARC-92 as well as WRC 2000, **all the countries that have gone in for IMT-2000 have done so in the WARC-92 identified bands.**

44. **In cases where part of this band had been allocated to PCS 1900 (US) MHz for historical reasons, those countries are** revising / re-farming their frequency allocation plans so as to be in consonance with the ITU globally harmonized bands for IMT 2000**.**

45. **The importance of spectrum harmonization was also emphasized by the ITU Regional Working Group on Private Sector Issues**, which met on April 26-27 in New Delhi, which inter alia recommended :

> "Harmonized frequency allocation is essential for facilitating global roaming, economies of scale, wide competitions and benefits to the end-users…. **the thrust of the ITU Recommendations was achieving global harmonization of spectrum use and that the same should be implemented."**

These recommendations were **consensually agreed between all stakeholders,** including representatives from **several Asia Pac and other countries** as **also representatives of DoT, WPC, TEC, ABTO and COAI.**

46. **If any bands other than the above WARC-92 identified band**, such as the WRC-2000 identifications **are considered for IMT-2000,** then there **is absolutely no chance/ possibility of any infrastructure being commercially available in the next several years, if not more.** It may also be noted that even when equipment does become available, it would be costlier because of lower volumes of production. **This would delay India's move to 3G thus depriving the millions of Indian mobile users from deriving** the wealth of benefits associated with (WCDMA (GSM 3G) and CDMA) IMT-2000 products that will be available to most other mobile customers in the world.

47. **In this context, it may be noted that consideration of the US PCS band entails very serious adverse implications for the existing as well as future operations of the GSM operators.** This is because **allocation of the US (PCS) band will directly reduce both the available GSM 1800MHz band as well as impair the IMT-2000 band by severe harmful interference.**

48. **Allocation of any portion of the IMT-2000 WARC-92 identified band to CDMA**, **will block the evolution of the GSM operators to IMT-2000/3G** thus denying the millions of Indian GSM consumers the opportunity to avail of the feature-rich experience of 3G services / applications. It will also lead to a waste of full 60+60 MHz of commercially viable, technology-neutral, interference-free, harmonized IMT2000 core spectrum.

49. Allocation of the US PCS band, in part or full, to the CDMA operators **will cause a very high level of interference both in the BTS as well as in the terminals**. This interference cannot be mitigated. While the Authority has noted the aspect of interference, it **does not appear to have grasped the magnitude / intensity of the problem and its serious adverse implications**. We believe that this is a **very serious issue and such examination** of the intensity of the interference and its adverse impact on QoS **should be completed in an open, transparent and consultative manner, BEFORE any decision is taken** that could jeopardize the future of both GSM and CDMA in the country.

50. **Even the current GSM networks in 900 MHz are experiencing interference from CDMA networks in the 800 MH**z band because of the allocation of part of the e-GSM

band to CDMA. **Efforts at mitigating this interference have not proved effective** even though the duplex directions are the same, thereby rendering downgraded performance. The **interference in the case of PCS 1900 MHz would be far worse and more severe**, as the duplex directions are opposite.

51. Because of the above serious implications, **there is no such country / example where 1900 MHz band has been allocated in the same city/geographical area to a CDMA operator where GSM was already operating.**

52. **It may also be noted that the mixed band plan of frequency arrangements PCS 1900 with IMT-2000 WARC-92 bands for paired IMT-2000 operation does not find a place in the ITU recommended options for IMT-2000**.

53. Even 4 years after WRC 2000, there is no country in the world that has chosen the mixed band plan of trying to combine the US (PCS) band with the IMT-2000 Core Band.

54. **It is also important for IMT-2000 / 3G to be dealt with separately from 2G. This is because IMT-2000 spectrum is clearly earmarked for 3G applications and u**se of this **band as a continuum of 2G,** would reduce the overall utility of the band, and the scope for 3G services, causing **severe disadvantages to Indian customers of throwing away the various and significant benefits of harmonization** of this band with the global IMT-2000 community.

55. **Further, we do not believe that there is** even one **country in the world where 3G has been treated as a continuum of 2G.**

56. Such an action would unfairly penalise GSM operators by denying them an upgrade path for evolution to 3G while CDMA operators by virtue of being **selectively and preferentially given spectrum from the IMT.** This would be clearly contrary to the TRAI's fundamental objectives of **maintaining a level playing field among all operators,** international practices, etc.

57. **Further, the licenses of operators** and the National Frequency Allocation Plan **clearly prescribe the 2G spectrum bands as 800/900/1800 MHZ bands.** A total of 2x75 **MHz has been earmarked for both GSM and CDMA operators in the 1800 MHz band – existing operators must thus be allocated spectrum from these bands only, for**

their 2G services. The **idea that GSM operators be allocated spectrum from 1800 MHz, while CDMA operators be allocated spectrum from the IMT-2000 band is distortive, discriminatory, unjust and unfair and should not be considered under any circumstances**.

58. While the imminent unified telecom license will allow operators to offer both 2G as well as 3G services, **IMT-2000 spectrum is undoubtedly reserved for 3G services & applications and should only be used for the same.**

G. OTHER IMPORTANT SUBMISSIONS

59. **Re-organization of frequencies towards more contiguous bands** is highly desirable because this makes the frequency blocks wider, **resulting in better network planning /optimal design besides improved spectral efficiency.** This **process** of re-organization /harmonization **is already underway under the aegis of WPC** and in fact contiguous spectrum has already been made available in Delhi. We **fully support this ongoing process and its intentions.**

60. **The 1880–1900 MHz band is already earmarked and is being extensively deployed by service providers, including BSNL for the operation of Cor-DECT**. NFAP 2000 and NFAP 2002 both have duly earmarked this band for micro-cellular deployment. **Given the important role being played by Cor-DECT in making telecommunication available to rural communities, we recommend no change whatsoever in the current dispensation.**

61. **The 1880–1900 MHz band should not be paired up with 1970–1990 MHz because the latter is part of the IMT 2000 paired band, and this would render its IMT 2000 pair useless.** It may also create the need for further guard bands to be introduced, thereby reducing the overall utility of the band further. **Given the amount of international effort that has gone into ensuring efficient compatibility between GSM1800, DECT and IMT 2000 allocations, it would be counter-productive to introduce a sub-optimal deviation**. Fragmenting and corrupting the IMT-2000 band would reduce its overall utility to operators and the resulting service and price benefits to customers.

62. **Re-farming of spectrum is very important to make adequate spectrum available to fuel / drive the aggressive growth of mobile services** in the country. It may be

pertinent to point out that that a Group of Ministers set up late last year has already taken an in-principle decision to free up 25 MHz of additional spectrum for mobile operators over the next 3 years. It had also been reported by media, that for freeing up these bands, a sum of nearly Rs. 900 crores is expected to be made available by the Finance Ministry.

63. **Users should only be refunded** where they have been asked to **surrender spectrum, in advance of the expiry of their licenses**, **or in cases where such surrender has become fait accompli as a result of a change in government policy** – such as the introduction of unified access licensing. No refunds should be considered in cases where licensees have chosen to exit their businesses.

64. The **amount of refund could be based upon return of entry fee pro rata for un-expired term of license / spectrum** taken from the time that the license became redundant – i.e. introduction of the unified access licensing policy or at the point when the licensee is asked to surrender his spectrum.

65. We believe that it is **premature to consider introducing spectrum trading in India.**

66. **There should be no requirement for a spectrum cap** as spectrum **allocated to the GSM operators has been paid for** through entry fee and incremental revenue share charges. Further, this **spectrum is assigned only after the operators provide full justification for each additional assignment**.