SSTL/REG/TRAI/1405/161
5th May 2014

The Advisor
The Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhavan,
Jawaharlal Nehru Marg,
New Delhi-110002

Kind Attn : Shri Sanjeev Banzal

Subject:- Response on Consultation Paper on Allocation and Pricing of Microwave Access (MWA) and Microwave Backbone (MWB) RF carriers

Dear Sir,

We are pleased to enclose SSTL's comments on Consultation paper on Allocation and Pricing of Microwave Access (MWA) and Microwave Backbone (MWB) RF carriers.

We request the Authority to consider our inputs.

Thanking you

Your faithfully
For **Sistema Shyam TeleServices Limited**

Sunil Gupta
Associate Director

Encl: As above

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MTS a step ahead

Consultation Paper on MW Access and Backhaul Spectrum

Preamble

1. MW Access and MW backbone spectrum is an essential component of mobile networks and is used to transmit data between cell sites and network backbone. There are alternatives technologies based on copper and fiber are available for backhaul connectivity but MW is the most widely used medium for the backhaul connectivity. Though MW does not have the matching capacity of fiber but it can cater to the bandwidth requirements in most cases.. As fiber deployment in many case unviable and time consuming, MW connectivity is preferable in most cases. MW backhaul is suitable for any terrain and it is only viable option in certain rural and remote locations. Relevance of MW is also increasing with lessening of inter-site distance. Government has specified more stringent rollout obligations and TSPs are now required to meet mandatory rollout upto BHQ level where MW access spectrum is only viable backhaul spectrum. Thus it is not possible for a service provider to rollout service without MW spectrum. Therefore, **MW spectrum should be allocated right in the beginning bundled with the initial allocation of access spectrum.**

2. The volume of mobile traffic in India is increasing exponentially and is likely to continue to do so. MTS is witnessing Mobile data usage growth due to the proliferation and use of Internet-connected wireless devices, higher throughput being supported on our wireless network, , the development and adoption of higher-bandwidth applications like Internet video. MTS also offer tariff plans that make mobile broadband usage even more affordable leading than wireline broadband resulting in even higher data traffic.

3. To meet the growing data demand additional backhaul spectrum would be required. The access to scalable backhaul facilities is key factor in promoting good quality of service. In fact, without sufficient and reasonably priced backhaul facilities, no service operator would be able to provide the types of mobile data and voice services that customers demand.

4. The TRAI should recommend to allocate atleast one 15 MHz carrier and one 18 MHz carrier of MW access spectrum for each TSP and additional requirement can be met from higher spectrum bands like 21 GHz/26 GHz/28GHz/32GHz/42 GHz to ensure that backhaul does not become a limiting factor in the delivery of mobile broadband services. The wireless backhaul is a primary requirement for mobile broadband and no effort should be spared to ensure that sufficient spectrum is available to meet the backhaul requirement..

5. Microwave access or backhaul spectrum is used for specific destinations between proverbial locations and not used for everywhere coverage like access spectrum. As MW access and backbone spectrum is used on link basis, there is no justification for its auction The microwave spectrum should be allocated administratively at reasonable rates else network rollout would be adversely affected.

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6. SSTL has following specific suggestions on MWA and MWN allocations and pricing:

(i) As networks cannot be rolled without MW spectrum, atleast 2 MWA carriers and 1 MWB carrier should be allocated right in the beginning bundled with the initial access spectrum

(ii) There should be equitable access to popular MW access spectrum in 15 GHz and 18 GHz bands. All access TSPs should be allocated atleast one carrier in 15 GHz and 18 GHz spectrum bands

(iii) To meet demand for growing data service addition MW spectrum should be allocated in 21 GHz band or higher spectrum bands.

(iv) MW spectrum should be allocated administratively and not auctioned .

(v) TRAI should also recommend early release of E band spectrum for providing MW access spectrum

(vi) MW Spectrum should be allocated on exclusive basis and allocated administratively

SSTL comments on specific issues raised in the consultation paper are given below

Q1. How many total Microwave Access and Backbone (MWA/MWB) carriers should be assigned to a TSP deploying:

a. 2G technology only.
b. 3G technology only.
c. BWA technology only.
d. Both 2G and 3G technologies.
e. 2G and BWA technologies.
f. 2G, 3G and BWA technologies.

Please give rationale & justification for your answer.

&

Q2. How many MWA/MWB carriers need to be assigned to TSPs in case of 2G, 3G and BWA at the start of their services[i.e. at beginning of rolling of services] Please justify your answer

SSTL Comments

(i) As we are moving towards technology neutral regulatory regime, it would not be correct to allocate MW spectrum on the basis of deployed technology. The line between various technologies is thin and therefore MW spectrum allocation on the basis of technology would result in disputes and unnecessary litigation.

(ii) We propose, minimum 2 MWA carriers may be allocated initially along with the access spectrum to enable TSP to rollout interference free backhaul network and to maintain threshold degradation level of 3 db. In addition to 2 MWA carriers, 1 MWB carrier should also be allocated. The initial 2 MWA carriers and 1 MWB carrier assignment should be irrespective of technology deployed and should be allocated right in the beginning bundled with the initial allocation of access spectrum.

(iii) **The 2 MWA carrier (2x28 MHz bandwidth) should be assigned one each in 15 GHz and 18 GHz bands. In case TSP needs additional MWA carrier depending on their requirement then same should also be allocated but in 21 MHz band or higher spectrum bands like .**

Q3. Should excess spectrum be withdrawn from existing TSPs?
&
Q4. If yes, what should be the criteria for withdrawal of excess allocation of MWA and MWB carriers, if any, allocated to the existing service providers?

SSTL Comments

(i) **Yes , excess MW Access spectrum in 15-18 GHz bands should be withdrawn immediately and re-assigned as mentioned above in our response under Q 1.**

(ii) **In 15 GHz Band – allocation beyond 1 carrier should be withdrawn**

(iii) **In 18 GHz. Band – allocation beyond 1 carriers should be withdrawn**

(iv) **Initial MW Access spectrum in 15-18 GHz bands should can be limited to max 2 carriers. In case service provider needing additional carrier then that should be allocated in 21 GHz or higher spectrum bands like 21 GHz/26 GHz/28GHz/32GHz/42 GHz .**

(iv) Backhaul spectrum, like access spectrum is also finite resources and is being consumed at rapid rate and therefore there is no reason to allow unlimited access to any TSP to MW spectrum in 15 GHz and 18 GHz spectrum bands. All of 15 carriers in the 15 GHz band have already been assigned and there is no carrier available in this band for allocation. As the effects of atmospheric attenuation (rain and oxygen absorption) increase as we move up the frequency spectrum, the rain and excessive humidity can cause reduction in signal strength even over a short distance. Therefore, to ensure level playing field all TSPs should be given 2 carriers in 15 GHz and 18 GHz bands.

(v) Equipment is also easily available in 15 GHz and 18 GHz bands compared to 21 GHz or higher spectrum bands and thus TSPs have economies of scale advantage for equipment in 15 GHz and 18 GHz bands.

(vi) **Thus atleast one MW access carrier in 15 GHz and 18 GHz bands should be assigned to all TSPs.**

Q5. What should be the preferred basis of assignment of MWA/MWB carriers to the TSPs i.e. 'exclusive basis assignment' or 'link-to-link based assignment'?

SSTL Comments

(i) There are lots of advantages of exclusive allocation of MWA and MWB spectrum. The exclusive use of spectrum block for backhaul would provide flexibility in network planning. Exclusive spectrum block is also better within the clutter deployments because of the dynamic propagation environment.

(ii) Exclusive allocation of MWA or MWB spectrum would require no coordination in WPC for link by link allocation which would be beneficial in terms of excessive coordinating cost.

(iii) **Therefore, it is suggested that Microwave Access and Backhaul spectrum should be allocated on exclusive basis.**

Q6. In case 'exclusive basis' assignment is preferred, whether MWA and MWB carriers should be assigned administratively or through auction. Please comment with full justifications.

SSTL Comments

(i) **MWA and MWB spectrum should not be auctioned even if assigned on exclusive basis.**

(ii) Auctioning of fixed microwave access or backhaul bandwidth would be inappropriate as it is fallacious to think that fixed point-to-point wireless backhaul bandwidth is comparable to that of mobile spectrum. Whereas the mobile operators have virtual monopoly on assigned spectrum which is used to send and receive signals omni-directionally at base stations. Access spectrum is expected to be present every where as is evident for stringent QoS regulations on call drops and t rollout obligations specified in the license.

(iii) On the other hand microwave access or backhaul spectrum is used for specific destinations between proverbial locations. Microwave spectrum is not used for everywhere coverage. The exclusive use only ensures that service providers would be able to link points without any interference and consumers will be getting good quality of service.

(iv) Auctioning of MWA spectrum would impede a vital and successful mode of radio communications which has helped service providers to rollout service at lightning speeds and infrastructure build out would stagnate.

(v) **In view of the above it is suggested that Microwave Spectrum even if allocated on exclusive basis should not be auctioned.**

Q7. In case 'link-to-link basis' assignment is preferred, how the carrier assignment for different links should be carried out, particularly in nearby locations?

SSTL Comments

(i) **We again request TRAI to allot MWA spectrum on exclusive basis so that spectrum could be used without any interference. The allocation of backhaul spectrum on exclusive basis would provide the service provider mobile with significant flexibility to manage their own deployments. Exclusive allocation would be more important for higher frequency band allocations for small cell backhaul .**

(ii) **Under no circumstances MW spectrum should be allocated through auction under the garb of exclusive allocation.**

Q8. Considering the fact that different TSPs may require additional carriers at different point of time, what should be the assignment criteria for allocation of additional carriers for MWA and MWB?

SSTL Comments

(i) The Microwave frequencies are reused extensively within a geographical area but the reuse pattern depends on the interference that these frequencies cause each other. This increase in interference decrease fade margin thereby increasing the threshold degradation value. The increase in threshold degradation means increase in threshold level which deteriorates the quality of the Microwave links.

(ii) For good quality of service it is crucial to maintain the threshold degradation level of 3 db. In case threshold degradation is more than 3 db additional carriers may be allocated subject to maximum 1 carrier each in 15 GHz and 18 GHz bands.

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Q9. How can it be ensured that spectrum carriers assigned are used optimally and the TSPs are encouraged to move towards the OFC?

SSTL Comments

(i) Microwave backhaul has an important ongoing role as it is dominant solution for providing point to point backhaul connectivity and will continue to be used in future. Even in the most advanced countries MWA is important solution for fixed point to point connectivity. At the same time we recognize that variety of technologies including OFC is required to connect high usage sites.

(ii) The main drawback of Fiber is that it is expensive, heavy government levies are imposed to provide RoW s and there are cumbersome approval procedures which hinders its deployment. To promote OFC deployment it is suggested that b:

- Single window and time bound ROW clearance at State level should be provided
- RoW charges particularly intra-city , railway crossing , Gas and Oil pipelines crossings etc should be reasonable
- Bandwidth charges(Leased line) paid to other operators should be allowed as pass thru charges in AGR.

Q10. Should an upfront charge be levied on the assignment of MWA or MWB carriers, apart from the annual spectrum charges?

SSTL Comments

There should not be any upfront charges on the assignment of MWA or MWB carriers. The existing charging mechanism on revenue share basis is working well from last many years and there I no justification to change it at this stage.

Q11. What should be the pricing mechanism for MWA and MWB carriers? Should the annual spectrum charges be levied as a percentage of AGR or on link-by-link basis or a combination of the two?

SSTL Comments

(i) This pricing methodology, based on the AGR is preferred as it is simple to implement and consistent with license and spectrum usage charges. The revenue share model is also preferable as payment liability in the initial network roll-out is less and increases with growth in revenue. The revenue share model helps service providers to address cash flow issues.

(ii) On the other hand Fixed fees charges are based on complex formulas like $R = (\sqrt{\ } M) * W * C * A * S * P * B$ and $M * W * C$ which are difficult to implement. The complex formulae are dependent on variable like distance of the link which are generally bone of contention between licensor and licensee and is subject to frequent litigations.

(iii) In view of the above it is suggested that MWA and MEN should be charged on the basis of AGR.

Q12. In case of percentage AGR based pricing, is there any need to change the existing slabs prescribed by the DoT in 2006 and 2008? Please justify your answer.

SSTL Comments

(i) Spectrum charges and other regulatory fees should be stable for a very long period of time as this allows investors to confidently make long-term investment decisions. The consistency in regulatory costs on business provides more certainty in the cash flows. Changing in regulatory policies frequently like MW charging regime would add risk and uncertainty in further investments. Telecom investments are essentially long-term contracts and it should ensured that there is no increase in regulatory related costs.

(ii) SSTL has recently bought 800 MHz band spectrum for 8 circles and its bid was based on cash flows as per MW charges notified in WPC orders issued from time. Any change in MW charges at this stage or requirement to pay upfront charges would have significant adverse impact on our business model and may impact our cash flows.

(iii) In view of the above it is requested that MW charges should not be reviewed and increased at this stage.

Q13. In case link-by-link based charging mechanism is adopted then:

Should the spectrum be priced differently for different MW spectrum bands (6GHz/7GHz/13GHz/15GHz/18GHz/21 GHz/26 GHz/28GHz/32GHz/42 GHz etc)? If yes, by what formula should these be charged?

What are the factors (viz as mentioned in para 3.22), that should appear in the formula? Please elaborate each and every factor suggested.

SSTL Comments

(i) We suggest that MW spectrum should be allocated on exclusive basis and it should not be charged as percentage of AGR. Link by Link and spectrum band by spectrum band charging is cumbersome and we suggest should not be followed.

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Q14. Should the option of assignment of MWA carriers in all the spectrum bands in 6-42 GHz range be explored in line with other countries? What are the likely issues in its assignment MWA carriers in these additional spectrum bands?

SSTL Comments

(i) The growth in demand for mobile broadband services, based on 3G/4G enabled dongles and smart phones, is driving operators to upgrade their radio networks to offer enhanced throughput to users. To overcome bottlenecks TSPs need to significantly upgrade not only RAN capacity but also backhaul capacity. We have submitted above that 15 GHz band is already saturated and there is need to identify and make available additional MWA to meet the growing data demand.

(ii) In Europe, US and Canada , the main wireless backhaul spectrum bands in use are 10.5, 13, 15, 18, 23, 26, 32 , 38 and 40 GHz bands. At present in India spectrum is allocated in 13, 15, 18 and 21 GHz bands only for MW Access. Therefore to meet the growing demand for high-capacity fixed links spectrum should also be made available in 23, 26, 32 , 38 and 40 GHz bands to meet the future demand. Internationally large amount of spectrum has been coordinated in these bands for point to point links as per the following table.

Frequency Bands	Available Spectrum (MHz)
23 GHz (21.8-22.4 GHz / 23.0-23.6 GHz)	1200
24 GHz (24.25-24.45 GHz / 25.05-25.25 GHz)	400
25 GHz (25.25-26.5 GHz)	1250
27 GHz (27.5-28.35 GHz)	850
38 GHz (38.6-40 GHz)	1400
70, 80 and 90 GHz (71-76, 81-86, 92-95 GHz)	12900

(iii) In view of the above TRAI is requested that MWA carriers should be made available in all the spectrum bands in 6-42 GHz range.

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Q15. In your opinion, what is the appropriate time for considering assignment of MWA carriers in higher frequency bands viz. E-band and V-band?

SSTL Comments

(i) The high speed data services using 4G technologies will require big channel size backhaul spectrum to support base stations so as to accommodate higher bandwidths. The LTE architecture will lead to greater use of small cells, leading to a greater volume of links. In E band and V band larger channel sizes can be made available and these bands support smaller cell sizes. Thus these bands are very attractive for high capacity 3G/4G backhaul applications.

(ii) As 3G and 4G services are being launched, thes spectrum should be made available at the earliest.

Q16. Should E-band be fully regulated or there should be light touch regulations?

SSTL Comments

(i) We suggest that there should be light touch regulation for E-band deployment and usage.

(ii) The WPC should coordinate allocation of E-band frequencies and specify technical assignment criteria for Channel Plan, Power, Antenna Gain etc.

Q17. What charging/pricing mechanism would be appropriate for these bands?

(i) The charges should be on the basis of AGR. These bands will have much bigger channel size but we suggest that spectrum should be charges at same rate specified for sub-21 Ghz bands.

Q18. Apart from Q1-Q17, stakeholders are requested to bring out any other issue, which needs to be examined, with justification