



**Telecom Regulatory Authority of India**



**Recommendations**  
**on**  
**Guidelines on Spectrum Sharing**

**New Delhi 21<sup>st</sup> July, 2014**

**Mahanagar Doorsanchar Bhawan,  
Jawahar Lal Nehru Marg, New Delhi-110002**

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## CHAPTER-I: BACKGROUND

- 1.1 In India, there are 7-13 licensees (2G, 3G and BWA) in a Licensed Service Area (LSA), which is a large number by any global standard<sup>1</sup>. As a result, spectrum holding per Telecom Service Provider (TSP) is small and fragmented. Spectrum fragmentation results in its less efficient utilisation. The basic objective of spectrum sharing is to provide an opportunity to the TSPs to pool their spectrum holdings and thereby improve spectral efficiency. Sharing can also provide additional network capacities in places where there is network congestion due to a spectrum crunch.
- 1.2 The gain in spectral efficiency increases non-linearly with the quantum of spectrum. As an example, with 5 MHz of paired spectrum (for GSM technology), it is possible to carry 33.03 Erlang traffic, whereas 10 MHz of paired spectrum can carry 138.6 Erlang traffic. Therefore two operators, having 5MHz spectrum each, can carry 33.03 Erlang traffic each (total 66.06 Erlang). If these operators share their spectrum with each-other, they will be able to carry 138.6 Erlangs of traffic which is more than double the sum of their individual capacities.
- 1.3 The Authority in its recommendations on 'Spectrum Management and Licensing Framework' dated 11<sup>th</sup> May, 2010, had recommended guidelines for spectrum sharing. In reference to the Department of Telecommunications' (DoT) response dated 10<sup>th</sup> October, 2011, on these recommendations, the Authority re-examined its earlier recommendations and modified its recommendations on spectrum sharing in November 2011, which are placed at **Annexure-I**.
- 1.4 Based on the recommendations of the Authority, the DoT, through a Press Statement dated 15<sup>th</sup> February 2012, had issued the following broad guidelines for sharing of 2G spectrum (800/900/1800 MHz bands):

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<sup>1</sup> Many countries have only 4-5 licensees such as UK-4, Denmark-4 and Sweden-5.

- a. Spectrum sharing will be permitted but, in each case, it will be in the same licence service area and will be with the prior permission of the licensor. A simple automatic approval process will be put in place for this purpose.
- b. Permission for spectrum sharing will be given initially for a period of 5 years. Government may renew the permission for a further one term of five years, on terms to be prescribed.
- c. Spectrum can be shared only between two spectrum holders both of which are holding spectrum either in 900/1800 MHz band or in 800 MHz band.
- d. Total quantum of spectrum, as a result of the spectrum sharing, shall not exceed the limit prescribed in case of mergers of licences.
- e. In respect of spectrum obtained through auction, spectrum sharing will be permitted only if the auction conditions provide for the same.
- f. Parties sharing the spectrum will be deemed to be sharing their entire spectrum for the purpose of charging.
- g. Both the parties shall fulfill individually the roll-out obligations as well as the Quality of Service (QoS) obligations prescribed under the licence.
- h. Spectrum usage charges will be levied on both the operators individually but on the total spectrum held by both the operators together. In other words, if an operator “X” having 4.4MHz of spectrum shares 4.4 MHz of spectrum of another operator “Y”, then both “X” and “Y” will be liable to pay spectrum usage charges applicable to 8.8 MHz of spectrum.
- i. Spectrum sharing would involve both the service providers utilising the spectrum. Leasing of spectrum is not permitted.
- j. Decision on matters related to pricing of spectrum, post-sharing, would be taken separately.

k. Spectrum sharing will not be permitted among licensees having 3G spectrum.

1.5 As per the NIA for the auction of spectrum in February 2014, *“Operators whose entire spectrum holding in a particular band (900MHz/1800MHz and 800MHz) is/has been liberalized would be permitted to share spectrum without any additional one time spectrum charge. Detailed guidelines regarding sharing of spectrum would be issued in due course.”* NIA for the auction of spectrum held in November 2012 and March 2013 contained similar clauses.

1.6 While the Authority was finalising its guidelines on spectrum trading, CEOs of some of the TSPs requested that, in order to ensure efficient use of spectrum, the Authority may also consider giving its recommendations on guidelines for spectrum sharing. Subsequently, the Authority constituted a Steering Committee of senior officers of TRAI and representatives from various TSPs viz. Aircel, Bharti Airtel, BSNL, Idea, Loop, MTNL, Quadrant, RCOM, Reliance-Jio, SSTL, TTSL, Telewings, Videocon and Vodafone for framing the working guidelines for spectrum sharing in the country. Detailed deliberations were held in a number of meetings and for Steering Committee members submitted their comments/views where there were differences of opinion. Afterwards draft guidelines on spectrum sharing were submitted to the Authority. The Authority held a meeting with the CEOs/CMDs of the telecom service providers to seek further inputs/comments before finalising these recommendations.

1.7 Based on the draft guidelines on spectrum sharing submitted by the Steering Committee, inputs given by the CEOs/CMDs of the TSPs, and its own analysis, the Authority has finalized these recommendations on ‘Guidelines on Spectrum Sharing’.

1.8 The basic objective of spectrum sharing is to enhance spectral efficiency by combining/pooling the spectrum holding of two licensees. If two licensees pool their spectrum holding in the same band as

mentioned in Para 1.2, spectral efficiency increases non-linearly. Therefore, the Authority has recommended that spectrum sharing be permitted between two access licensees (CMTS/UASL/UL (AS)/UL) in a LSA, where both licensees having access spectrum in the same band. Though some of the service providers have requested to allow inter-band spectrum sharing, the Authority, as of now, has not agreed to this because such arrangements will lead to Mobile Virtual Network Operators (MVNOs) like situation which is not permitted in the present licensing framework. The Authority would like to mention here that recently, the DoT has sent a reference to the Authority seeking recommendation on Virtual Network Operators and associated issues **(Annexure-II)**. Therefore, the Authority may later review its recommendation of permitting ‘only intra-band sharing’.

1.9 Chapter II contains the ‘Guidelines on spectrum sharing’.

## CHAPTER-II: GUIDELINES ON SPECTRUM SHARING

The Authority recommends following working guidelines on spectrum sharing:

- 2.1 Spectrum sharing refers to an arrangement between two access licensees (CMTS/UASL/UL (AS)/UL) in a LSA, where both licensees having access spectrum in the same band, pool their respective spectrum in that LSA for their simultaneous use, using a common Radio Access Network (RAN)<sup>2</sup>. The shared RAN will be connected to the core networks of each of the licensee. Both licensees will continue to hold their primary right over their own spectrum.
- 2.2 The basic objective of spectrum sharing is to provide an opportunity to the Telecom Service Providers (TSPs) to pool their spectrum holdings to enhance spectral efficiency. Spectrum sharing would involve both the TSPs utilising the spectrum. Leasing of spectrum is not permitted.
- 2.3 Only those sites shall be treated as spectrum-shared sites, where the spectrum resource of each of sharing licensees is used in the BTS. Both the licensees will be required to have a common RAN only in respect of sites being shared. It shall be up to the licensees to decide the actual area/BTSs in the LSA where they want to pool and share their spectrum resources as per their requirement and mutual agreement. However, it is simply not possible to monitor quantum of spectrum being shared at each site and to segregate the AGR site-wise/area-wise. Therefore, for the purpose of charging Spectrum Usage Charges (SUC), the licensor shall consider that the licensees are sharing their entire spectrum holding in the particular band in the entire LSA.

**Example 1:** Licensees 'A' and 'B' have 8 MHz and 5 MHz spectrum respectively in the 1800 MHz band in Delhi LSA. Each of them pool 4 MHz and builds a common RAN. This arrangement of spectrum sharing

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<sup>2</sup> RAN refers to access network up to BSC in 2G network, while in 3G networks, it refers to access network upto Radio Network Controller (RNC) and is known as Universal Terrestrial RAN (UTRAN).

is permissible. However, for the purpose of charging SUC, it will be considered that the licensee 'A' and 'B' are sharing their entire spectrum holding in 1800 MHz Band (i.e. 8 MHz and 5 MHz spectrum respectively).

**Example 2:** Licensees 'A' and 'B' have 8 MHz and 5 MHz spectrum respectively in the 1800 MHz band in Delhi LSA. Each of them pools their spectrum holding and builds a common RAN only in say Connaught Place area, whereas in other parts of the LSA, they do not share their spectrum. Such arrangement of spectrum sharing is permissible. However, for the purpose of charging SUC, it will be considered that the licensee 'A' and 'B' are sharing their entire spectrum holding in 1800 MHz Band in the entire Delhi LSA.

2.4 All access spectrum i.e. spectrum in the bands of 800/900/1800/2100/2300/2500 MHz will be sharable provided that both the licensees are having spectrum in the same band.

**Example:** It has been assumed that two Licensees 'A' and 'B' have spectrum holding in 900 MHz, 1800 MHz and 2100 MHz band as shown in Table below:

<b>Licensee</b>	<b>Licensee A</b>			<b>Licensee B</b>		
Spectrum Band	900 MHz	1800 MHz	2100 MHz	900 MHz	1800 MHz	2100 MHz
Spectrum holding (MHz)	6.2	3	0	0	4.4	5

These two licensees can share their spectrum holding in the 1800 MHz band because both of them have spectrum in this band. However, they cannot share spectrum in 900 MHz or 2100 MHz band because only one of them has spectrum in these bands.

2.5 The right to share the spectrum shall be subject to the fulfillment of the relevant license conditions and any other conditions that may be specified by the licensor/Government from time to time.

- 2.6 The licensor reserves the right to modify these guidelines from time to time as it may deem fit.
- 2.7 A licensee shall not be eligible to share its spectrum if it has been established that it is in breach of terms and conditions of the licence and the licensor has ordered for revocation/termination of its licence after giving appropriate opportunity.
- 2.8 Both the licensees, willing to share their spectrum, shall inform the licensor at the time of entering into spectrum sharing agreement. No permission will be required from the Government for spectrum sharing. However, the Government shall have the right to annul the spectrum sharing agreement, if found to be flouting prescribed guidelines after giving due opportunity to the licensees. (Process described in Para 2.15 to 2.19)
- 2.9 At present, there are many licensees having administratively assigned spectrum in the 800 MHz, 900 MHz and 1800 MHz band. If any one or both of the licensees, sharing their spectrum, have administratively assigned spectrum in that band, then, after sharing, they will be permitted to provide only those services which can be provided through the administratively held spectrum.

**Example:** If one of the licensees has liberalised spectrum in 1800MHz band and other licensee, sharing the spectrum, has some spectrum as administratively held spectrum and some spectrum as liberalised spectrum in the same (1800MHz) band, then, after sharing their spectrum they can provide only GSM based mobile services.

- 2.10 If both the licensees are sharing the spectrum in a band in which they have only that spectrum which is either acquired through an auction in the year 2010 or afterwards, or on which the licensee has already paid the prescribed market value<sup>3</sup> (as decided by the Government from time to time) to the Government, they can offer services using all those

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<sup>3</sup> The prescribed market value shall be payable to the Government for the entire administratively assigned spectrum in that band after adjusting the entry fee paid by the Licensee for acquiring the spectrum (bundled with licence) prorated for the remaining validity of spectrum

technologies (namely GSM, CDMA, WCDMA, LTE etc), which they can independently provide through their own spectrum holding. For this purpose, the licensees are required to own a certain minimum amount of spectrum in that band throughout the currency of sharing.

- 2.11 Both licensees shall ensure that they fulfill the specified roll-out obligations and specified QoS norms.
- 2.12 For sharing spectrum, a non-refundable processing fee @ Rs.50,000/- (Rs. Fifty Thousand) will be payable individually by each licensee for each LSA to WPC for administrative purposes.
- 2.13 Both licensees will be individually and collectively responsible for complying with the sharing guidelines, including interference norms.
- 2.14 Both licensees will give an undertaking that, in case any interference is arising due to sharing of their spectrum, they will resolve it within 30 days failing which they will stop sharing in the affected areas till the problem of interference is addressed.
- 2.15 Both licensees sharing the spectrum shall jointly give a prior intimation of 45 days before the effective date of the sharing to the WPC. The processing fee shall be paid individually by each licensee for each service area to WPC at the time of intimation. The intimation will be made to WPC in a prescribed format placed at **Annexure- III**
- 2.16 It will be the responsibility of both the licensees to ensure that they fulfill prescribed eligibility conditions. However, in case of any objection by WPC, it shall communicate the reasons of objection to the both the licensees in writing within a maximum period of 15 days from the date of intimation of spectrum sharing.
- 2.17 The licensees shall have to reply to the WPC within a maximum period of 15 days from the date of receipt of intimation regarding the objection from the WPC. The WPC will take a final decision and communicate within the next 15 days to the licensees. If WPC does not make any communication within the prescribed period, it will be assumed that the sharing agreement has become operational.

- 2.18 On receipt of intimation of proposed sharing, the WPC will place the details of the prospective sharing on its website, which will contain information about both the licensees (name, address), their license references, information about spectrum proposed to be shared (quantum of spectrum, frequencies), effective date of sharing as indicated by both the licensees and any other relevant details.
- 2.19 The WPC shall update its record regarding sharing of spectrum within a maximum time of 15 days after the effective date of sharing.
- 2.20 Intimation regarding the sharing shall be provided by both the licensees to the licensor, TRAI and any other relevant agencies prescribed by the Government from time to time within 30 days from the effective date of sharing of spectrum.
- 2.21 Spectrum sharing will be restricted to sharing by only two licensees subject to the condition that there will be at least two independent networks provided in the same band.

**SUC post-sharing:**

- 2.22 Spectrum sharing does not give exclusive rights of use to any one licensee. It helps create additional capacity that is useful mainly in those areas where anyone or both licensees are facing a capacity crunch. Therefore, the usefulness of gain in spectral efficiency due to pooling of spectrum resources will be limited only to those areas where there is congestion in the access network. Moreover, both licensees will be tied to each other and as such cannot plan the expansion of their shared network independently. Therefore, access to additional capacities created through spectrum sharing cannot be considered at par with that created through spectrum acquired through auction/trading. Sharing of spectrum by the two licensees will result in higher revenues for both of them. Therefore, both the licensee will also pay higher amount of SUC to the Government. However, considering the fact that spectrum sharing results in additional quantity of spectrum with both the licensees to serve

higher number of consumers, the SUC rate of each of the licensees post-sharing shall increase by 0.5% of AGR.

**Example:** It has been assumed that two Licensees ‘A’ and ‘B’ have spectrum holding in 900 MHz, 1800 MHz and 2100 MHz band as shown in Table below:

<b>Licensee</b>	<b>Licensee A</b>			<b>Licensee B</b>		
Spectrum Band	900 MHz	1800 MHz	2100 MHz	900 MHz	1800 MHz	2100 MHz
Spectrum holding (MHz)	6.2	3	5	0	4.4	5

Currently, both the Licensees ‘A’ and ‘B’ are liable to pay SUC as per the existing slab based rated on the basis of total spectrum holding in 900 MHz and 1800 MHz bands.

Post-sharing SUC rates applicable in following three scenarios are given the Table below:

Scenario I: They share their spectrum in the 1800 MHz band.

Scenarios II: They share their spectrum in the 2100 MHz band.

Scenario III: They share spectrum in both 1800 MHz and 2100 MHz bands.

SUC rate for Licensee A		SUC rate for Licensee B	
Prior to Sharing	SUC Post Sharing	Prior to Sharing	SUC Post Sharing
Scenario I: Sharing in only 1800 MHz Band			
6%	6.5%	3%	3.5%
Scenario II: Sharing in only 2100 MHz Band			
6%	6.5%	3%	3.5%
Scenario III: Sharing in both 1800 and 2100 MHz Band			
6%	6.5%	3%	3.5%

**Spectrum Caps:**

2.23 As discussed in Para 2.22, additional capacities created through spectrum sharing cannot be counted at par with those created through spectrum acquired through auction/trading. However, considering the fact that spectrum sharing results in better spectral efficiency, a portion

of additional capacity created needs to be counted for the purpose of applying the prescribed spectrum caps of 25% of total spectrum assigned and 50% in a band. For the limited purpose of applying the prescribed market caps, the spectrum holding of any licensee post-sharing shall be counted as given below:

50% of the spectrum held by the other licensee in the band being shared shall be counted as the additional spectrum being held by the licensee.

**Example:** Licensee ‘A’ and ‘B’ have spectrum in quantum X and Y respectively in a band, in which they decide to share their spectrum. The spectrum holding in that band subsequent to sharing, only for the purpose of applying the stipulated spectrum cap, shall be considered as per the following table.

	Quantum of spectrum in a band before sharing	Quantum of spectrum after sharing that will be counted as the spectrum being held in this band for the purpose of applying the stipulated spectrum cap
Licensee ‘A’	X	$X+(Y/2)$
Licensee ‘B’	Y	$Y+(X/2)$

**TRAI's recommendations dated 3<sup>rd</sup> November 2011 on  
Spectrum Sharing**

TRAI in its recommendations on Recommendation on 'Spectrum Management and Licensing Framework' dated 11th May 2010 had recommended guidelines for spectrum sharing. In reference to the DoT's response date 10th October 2011 on these recommendations, the Authority has re-examined its earlier recommendations and modified its recommendations on spectrum sharing in November 2011, which are given below.

- Spectrum sharing will be permitted but in each case, it will be in the same licence service area and will be with the prior permission of the licensor, strictly in accordance with the guidelines being laid out.
- Permission for Spectrum sharing will be permitted initially for a period of 5 years. Government may, in its discretion, renew the permission for a further one term of five years, on terms to be prescribed.
- Spectrum can be shared only between two spectrum holders. In other words, a non-licensee or licensee who has not been assigned access spectrum as yet cannot be a party to spectrum sharing.
- Spectrum sharing will be permitted subject to the condition, inter alia, that the total quantum of spectrum, as a result of the spectrum sharing, shall not be exceed the limit prescribed in case of mergers of licences.
- In respect of spectrum obtained through auction, spectrum sharing will be permitted only if the auction conditions provide for the same.
- Parties sharing the spectrum will be deemed to be sharing their entire spectrum. In other words, even if the licensees are sharing

partial spectrum, it will be taken as sharing of entire spectrum for the purpose of charging.

- Both the parties shall fulfil individually the roll out obligations prescribed under the licence.
- Both the parties, being licensees, shall fulfil individually the QOS obligations prescribed under the licence.
- Both the parties will pay to the Government the prorated Current Price for spectrum beyond 6.2/5 MHz (GSM/CDMA), in the ratio of the spectrum held by them individually.
- Spectrum usage charges will be levied on both the operators individually but on the total spectrum held by both the operators together. In other words, if an operator X having 4.4MHz of spectrum shares 4.4 MHz of spectrum of another operator Y, then both X and Y will be liable to pay spectrum usage charges applicable to 8.8 MHz of spectrum.
- Spectrum sharing would involve both the service providers utilising the spectrum. Leasing of spectrum is not permitted.

F.No.800-23/2011-VAS  
Ministry of Communication & IT  
Department of Telecommunication  
Sanchar Bhawan, New Delhi  
Access Services Wing

Dated the 7<sup>th</sup> July, 2014

To

The Secretary  
Telecom Regulatory Authority of India  
Mahanagar Doorsanchar Bhawan  
Jawaharlal Nehru Marg (Old Minto Road)  
New Delhi - 110002

**Subject:** Recommendations for delinking of licencing of networks on delivery of services by way of virtual network operators including associated issues of definition of Adjusted Gross Revenue under unified licencing regime.

Sir,

The Government has announced National Telecom Policy (NTP), 2012 which inter-alia stipulates:-

*"3.3. To move towards Unified Licence regime in order to exploit the attendant benefits of convergence, spectrum liberalisation and facilitate delinking of the licensing of Networks from the delivery of Services to the end users in order to enable operators to optimally and efficiently utilise their networks and spectrum by sharing active and passive infrastructure. This will enhance the quality of service, optimize investments and help address the issue of the digital divide. This new licensing regime will address the requirements of level playing field, rollout obligations, policy on merger & acquisition, non-discriminatory interconnection including interconnection at IP level etc. while ensuring adequate competition.*

*3.8 To facilitate resale at the service level under the proposed licensing regime – both wholesale and retail, for example, by introduction of virtual operators – in tune with the need for robust competition at consumer end while ensuring due compliance with security and other license related obligations."*

2. TRAI has given its recommendation namely, 'Guidelines for Unified Licences / Class Licences and Migration of existing Licensees' on 16.4.2012 which were deliberated by DoT in the context of NTP 2012.

3. DoT had decided in 2013 that Unified licence may be introduced in two phases with delinking of licensing of networks from delivery of services being taken up in a subsequent phase.

4. Accordingly, Telecom Regulatory Authority of India is requested to submit its recommendations for delinking of licensing of networks from delivery of services by way of virtual network operators etc. including associated issues such as Adjusted Gross Revenue , terms of sharing of passive & active infrastructure etc. under unified licensing regime.

Yours faithfully,

*P.K. Mittal*  
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**ANNEXURE-III****Sub: - Intimation for Sharing of Spectrum**

We wish to share the spectrum & the details are given below.

<b>S. No.</b>	<b>Item</b>	<b>Status</b>
1.	Name of the TSP1	
2.	License No. of the TSP1	
3.	Name of the TSP2	
4.	License No. of the TSP2	
5.	Name of Licensed Service Area where sharing is proposed	
6.	Band of the spectrum for Sharing	
7.	Total spectrum available with TSP1 in the LSA (band wise)	
8.	Total spectrum available with TSP2 in the LSA (band wise)	
9.	Amount of administrative spectrum with the TSP1, if any	
10.	Amount of administrative spectrum with the TSP2, if any	
11.	Amount of spectrum obtained by TSP1 through auction year wise	
12.	Amount of spectrum obtained by TSP2 through auction year wise	
13.	Effective date of Sharing	
14.	Period of Sharing ( Years/Months)	
15.	Present Use of Spectrum TSP1	
16.	Present Use of Spectrum TSP2	
17.	Intended Use of Spectrum by both TSPs	
18.	Payable fee to WPC for spectrum sharing TSP1 (@50,000 per band)	
19.	Payable fee to WPC for spectrum sharing TSP2 (@50,000 per band)	
20.	Any other relevant information.	

Date of Intimation to WPC .....

Certified that:

1. Authorization approved by POA/Board resolution of respective companies.
2. Both the licensees fulfil all the eligibility conditions for sharing the spectrum.
3. In case any interference is arising due to sharing of their spectrum, Licensees will resolved within 30 days failing which they will stop sharing in the affected areas till the problem of interference is addressed.

**TSP1**  
**(Authorized Signatory)**

**TSP2**  
**(Authorized Signatory)**

Copy to: **1. DoT**  
**2. TRAI**