



Telecom Regulatory Authority of India



Recommendations

On

Valuation and Reserve Price of Spectrum in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz bands

(Response to reference received from Department of
Telecommunications on recommendations dated
24th June 2016)

Dated 12th July 2016

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CHAPTER-I: INTRODUCTION

1. The Department of Telecommunications (DoT), through its letter dated 9th July 2015, requested the Authority to provide recommendations on applicable reserve price for auction of spectrum in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz bands for all service areas under the terms of clause 11(1)(a) of TRAI Act 1997 as amended. DoT also referred to its earlier reference dated 16th October 2014 and requested the Authority to expedite the recommendations on applicable reserve price for 2300 MHz and 2500 MHz bands for all the service areas. DoT vide its letter dated 06th November 2015, sent another reference and sought the recommendations of the Authority on the liberalization of administratively allotted spectrum in the 900 MHz band.
2. The Authority gave its recommendations on 27th January 2016 on “Valuation and Reserve Price of Spectrum in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz Bands”.
3. Some of the recommendations (including on spectrum usage charges) were referred back to the Authority by the DoT through its letter dated 1st April 2016 for clarification/reconsideration. The Authority sent its response (including on spectrum usage charges) to DoT on 18th April 2016.
4. After receipt of reconsidered opinion of TRAI on 18th April, 2016, a reference was made to Learned (Ld.) Attorney General (AG) by the DoT. After considering the reconsidered opinion of TRAI, the Government has not taken a final decision on the issue of SUC and has decided to make a reference to TRAI vide its letter dated 24th June 2016 bringing to its notice the opinion of the Ld. AG and other relevant facts. Clarifications were sought by TRAI from DoT vide letter No. 15-01/2013-F&EA (Vol.IV) dated 4th July 2016 and DoT sent its reply vide letter No. L-14010/03/2016-NTG (Vol.II) dated 6th July, 2016.
5. The current reference sent by DoT vide its letter dated 24th June 2016 has been examined in detail keeping in view the earlier recommendations of the Authority and other facts. The response of the Authority thereon is given in Chapter II.

CHAPTER-II: RESPONSE OF THE TRAI

- 2.1** While giving its Recommendations of 27th January 2016, the Authority had reiterated its recommendations of 9th September 2013 on 'Valuation and Reserve price of Spectrum' (Para 5.31, 5.33, 5.35 and 5.37) on Spectrum Usage Charges for all the spectrum bands in the forthcoming auction in para 4.30 of the recommendations.
- 2.2** Regarding the request of DoT in April 2016 to the Authority to reconsider its recommendations given in January 2016 on Spectrum Usage Charges (SUC) for all the spectrum bands, the Authority noted that in the present reference, "DoT has already conveyed its decision on the subject as given in Para 11 (c) (i) to (iii). In view of the same, the Authority has no further comments to offer".
- 2.3 DoT's current reference dated 24th June 2016:** Taking into account the opinion of Ld. Attorney General and the recommendations of Telecom Commission as decided in its meeting held on 7.6.2016, it has been proposed by DoT to prescribe the rates of SUC as detailed below :-
- (i) Spectrum acquired in forthcoming auction in 700,800,900,1800,2100,2300 & 2500 MHz band is to be charged at the rate of 3% of AGR excluding the revenue from wire line services.
 - (ii) The weighted average of SUC rates across all spectrum assigned to an operator (whether assigned administratively or through auction or through trading) in all access spectrum bands including BWA spectrum obtained in 2010 auction shall be applied for charging SUC. The weighted average is to be derived by sum of product of spectrum holdings and applicable SUC rate divided by total spectrum holding. The Weighted Average Rate should be determined operator wise for each service area. The method of calculation of weighted average rate for SUC is as detailed in Annexure-I.
 - (iii) The amount of SUC payable by the operators during 2015-16 at weighted average derived after taking into consideration the spectrum acquired in the coming auction excluding spectrum held in 2300

MHz/2500 MHz band prior to 2016 auction be treated as the floor amount of the SUC to be paid by the operators. Further, in case there is a reduction in AGR of the service provider, the floor amount of SUC shall be reduced proportionately.

(iv) The floor amount of SUC payable shall be calculated as detailed below:

(a)	AGR (excluding the revenue from wire line services) in 2015-16 (in Rs)	Rs. A
(b)	Weighted Average of rate of SUC for 2016-17 after taking into consideration the spectrum acquired in the coming auction but excluding spectrum held in 2300 MHz/2500 MHz prior to 2016 Auction	B%
(c)	AGR (excluding the revenue from wire line services) in 2016-17 (in Rs) or subsequent years	Rs. C
(d)	Floor amount of SUC (only in case C is less than A)	$(C/A) \times [(A \times B) / 100]$
(e)	Floor amount of SUC in case C is equal to or greater than A	$(A \times B) / 100$

Response of TRAI

2.4 In the reference dated 24th June 2016, DoT has referred back the Authority's January 2016 Recommendations and Response of April 2016 to DoT's reference back to the SUC enclosing Report of the Internal Committee of DoT on Revenue Segregation for BWA Spectrum (Annexure-I), TEC Report (Annexure-II) and the opinion of the Ld. AG on the subject: "Revision of Spectrum Usage Charge (SUC)" given on 30.05.2016 and 02.06.2016 (Annexure IV). DoT has

requested the Authority to provide recommendation on SUC in the context of valuation and reserve price of spectrum in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz spectrum bands.

2.5 Before the Authority embarks upon examining the reference received from the Government, it would be worthwhile to have a look at the present SUC regime that is in vogue on account of the various orders issued from time to time by the DoT.

- (i) The Central Government has prescribed a charge for the use of spectrum, which was earlier based on formula and was later revised to a percentage of revenue earned w.e.f 1.8.1999. Before March 2014, SUC rates in 800/900/1800 and 2100 MHz bands were governed by a slab rate¹ where rates varied from 3 to 8% based upon quantum of spectrum held by the Telecom Service Provider (TSP).**
- (ii) In the case of BWA spectrum (2300 MHz) acquired through auction in 2010, SUC rate is 1% of AGR and the TSPs are required to separately report the revenue earned from the band and be responsible for putting in place a system for independently monitoring and verifying the revenue earned from BWA spectrum. In the case of 3G spectrum (2100 MHz) acquired through auction 2010, GSM and CDMA operators that are successful in the 3G Auction shall pay SUC on combined revenue from 2G services and 3G services as per applicable rate (slab based system) for their GSM/CDMA spectrum holding. Standalone 3G operators to pay SUC @ 3% of AGR.**
- (iii) From 2014² onwards spectrum acquired through auctions is charged at a flat rate of 5%. In case of combination of the spectrum in 800/900/1800 and 2100 MHz bands acquired at different points of time, SUC is determined based on weighted**

¹ DoT order no.P-11014/18/2008-PP dated 25th February 2010

² DoT order no. P-14010/01/2014-NTG dated 31st October 2014 and DoT order no. P-14010/01/2014 dated 5th February 2015

average. The weighted average is calculated as the sum of (a) spectrum acquired through auctions held in 2014 and 2015 multiplied by five percent and (b) spectrum acquired prior to 2014 auctions multiplied by applicable rates as per order dated 25.02.2010 and then dividing the sum of (a) and (b) by total spectrum holding.

- 2.6 From the above, it is evident that the current SUC regime is complex. It was also recognized in the paras 5.2 to 5.15 of the September 2013 recommendations of TRAI. Therefore, the Authority in its recommendations of September 2013, which were subsequently explained and illustrated in the response to reference back on Recommendations sent to DoT on 23rd October 2013 recommended a flat SUC regime.
- 2.7 The trading of spectrum is now happening and in due course would gain momentum. In near future, merger and acquisition would also take place in the sector as per recent media reports. All this would make SUC regime more complex and would need an intricate and large system for smooth implementation.
- 2.8 In view of the above issues, the Authority would like to reiterate its consistent position that the SUC regime must transition from a slab-based regime to a flat ad valorem regime. The ease of implementation, level playing field, encouragement to bidders to participate in the auction are key rationales for such a position being taken.
- 2.9 The current SUC regime is based on the basic premise that it is possible to segregate the revenues of different spectrum bands acquired at different points of time. Once the premise of feasibility of segregation does not hold good, there is no way to precisely compute the SUC payable by an operator in a given year for a given LSA. Hence, one is left with no option but to look for some alternative

methods of estimating the revenue contribution of each band. The weighted average method is one such proposed solution.

2.10 As far as the weighted average method for calculating SUC is concerned, it is important to note that neither DoT has sought the opinion/recommendation of TRAI on this matter in the past nor has there been any consultation on it. Though the practice has been in vogue since 2014, the Government's stated objective for its introduction has been to suggest that it is a migration path for ultimately arriving at a flat rate.³

2.11 In response to a query by the DoT, as to whether the rate of 1% of SUC for BWA spectrum band as notified in the NIA of 2010 could be modified, the Ld. Attorney-General has opined that "the contract which emerged after the 2010 auction and which is legally binding on both parties, does not permit the Government to change the SUC for BWA unilaterally." As the Revenue cannot be segregated for each band, there is difficulty in finding a multiplicand for the SUC rate for that band. As an alternate solution, the Ld. Attorney General has recommended that the Weighted Average of SUC rates across all spectrum bands, including BWA Spectrum obtained in the 2010 auction, should be employed on an operator-wise basis to calculate the SUC in a legally valid manner.

2.12 Taking all these views into account, the DoT has proposed a Weighted Average Rate for SUC for all spectrum assigned to operators across various bands. To quote from the Letter dated 24th June 2016 of the DoT:

"The weighted average of SUC rates across all spectrum assigned to an operator (whether assigned administratively or through auction or through tradition) in all access spectrum bands including BWA spectrum obtained in 2010 auction shall be applied for charging SUC. The weighted average is to be

³ Press release from Press Information Bureau, Government of India (Cabinet) dated 31st January 2014

derived by sum of product of spectrum holdings and applicable SUC rate divided by total spectrum holding. The Weighted Average Rate should be determined operator wise for each service area. The method of calculation of weighted average rate for SUC is as detailed in Annexure.”

2.13 While the optimal solution in the view of the Authority is to move to a flat rate regime, we are constrained to limit ourselves to examine the weighted average solution as suggested by Ld. AG and proposed by DoT.

2.14 The weighted average formula of DoT uses the quantum of spectrum held by an operator as a proxy for the revenue earned by the operator from that spectrum band. In the absence of a method for revenue segregation of various bands and in order to conform to the legal framework, while some proxy for revenue would have to be used, the current approach creates a distortion on account of following reasons—

(a) Firstly, it makes an implicit assumption that the contribution of revenue from particular spectrum holdings is proportionate to the amount of spectrum held in that band. While quantum of spectrum will certainly be a factor in any weighted average formula, this may not be the sole factor to estimate the revenue from a given band. It is widely accepted that currently some spectrum bands generate greater revenue than others even if the holding is smaller than in other bands.

(b) Secondly, the over-all SUC rate arrived at by the weighted average formula is also impacted by SUC rate fixed for each band. As a result, it leads to higher SUCs for TSPs which have larger spectrum holdings in bands which have high rates and lower SUCs for TSPs which may have equally large spectrum holdings in bands which have low rates. This may have a significant impact on the overall spectrum usage charge that is payable to the Government.

2.15 In view of the above, the Authority is of the view that taking the spectrum quantity in a band as the sole weightage in the weighted average formula may lead to certain shortcomings. Part of this shortcoming is based on the fundamental difficulty of using a proxy—any proxy, on which a weighted average computation is based, will not exactly map the revenue earned by each TSP from each band.

2.16 Each spectrum band has its characteristics in terms of range, penetration, capacity, eco-system etc. Accordingly, if DoT chooses to adopt weighted average rate of SUC, then it would be appropriate for it to carefully explore alternate proxies which may be used for computing the weighted average like technical efficiency factor and the market-determined price for such spectrum band etc. TSPs bid for the various spectrum bands based on their requirement and the revenue potential that they foresee accruing from that band. DoT also in its note dated 6th May 2016 to the Ld. AG has noted that “difference in characteristics of various bands including the availability of ecosystem can be stated to be reflected in the upfront bid quoted by the various operators”. As bid values are a reflection of how the TSP values the band, taking into account market determined price based on bid values might lead to a result that more closely approximates the result, were it possible to segregate revenues as envisaged by the NIA. In other words, some normalization factor, applied to the spectrum quantity in the formula may result in better approximations of the revenue attributable to a given band.

2.17 We give below two illustrative examples of the normalization factor on the computation of SUC for an operator in a given LSA.

Scenario 1

There is an operator A with a holding of 5 MHz (paired) with average 4% SUC rate (non-BWA spectrum) and 20 MHz in BWA spectrum (unpaired) with 1% SUC rate. Based on the simple weighted approach, the overall SUC will become 2%. If we assume that out of an AGR of Rs. 100 in a current year, Rs 80 is contributed by non-

BWA bands and Rs 20 by BWA band (currently this assumption regarding contribution from BWA band may be on higher side), then effective SUC rate based on actual income contribution will be 3.4%. If we introduce a normalization factor of 3 for non-BWA bands based on market determined price, then the SUC rate will become 2.8%. Though this percentage is still lower than actual SUC, it is closer to reality (based on revenue contribution) than the results obtained using weighted average formula suggested by the DoT. Annexure II shows the detailed calculations for operator A and similar SUC rate computation for two other operators namely 'B' and 'C' with different spectrum holdings in BWA and Non- BWA bands.

Scenario 2

There is an operator A with a holding of 5 MHz (paired) of 900 MHz with 5% SUC rate, another 5 MHz (paired) of 1800 MHz with 5% SUC rate and 20 MHz in BWA (2300 MHz) spectrum (unpaired) with 1% SUC rate. Based on the simple weighted approach, the overall SUC will become 3%. If we assume that out of AGR in current year of Rs. 100, Rs. 50 is contributed by 900 MHz spectrum band, Rs. 30 from 1800 MHz spectrum and Rs. 20 by BWA spectrum. Then effective SUC rate based on actual income contribution will be 4.2%. If we introduce a normalization factor of 4.56 for 900 MHz and 1.35 for 1800 MHz with respect to BWA band based on market determined prices, then the resultant SUC rate will become 3.99%. Though this percentage is lower than actual SUC, it is closer to reality (based on revenue contribution) than the weighted average. Annexure III shows the detailed calculations for operator A and similar SUC rate computation for two other operators namely 'B' and 'C' with different spectrum holdings in 900 MHz, 1800 MHz and BWA band.

2.18 It must however be noted that any proxy that is considered will provide a solution that is only an approximation. Thus, a thorough comparative assessment of all such alternate proxies may be

undertaken from the perspective of theoretical soundness, implementation feasibility, monitoring etc. While introduction of normalization factor will still result in reduction of SUC in case of some operators holding BWA spectrum, this gap will be less than that produced by DoT suggested formula. DoT may take a call on the issue of imposing floor amount to cover the revenue shortfall.

2.19 In addition, the Authority is of the view that any solution based on Weighted Average Rate, irrespective of the proxy that is used, is at best a temporary solution. As has been recognised by the Government of India in its press release dated 31st January, 2014, “as a matter of policy, it is desirable to move to a flat rate SUC and adoption of weighted average could provide a path to such transition.” While taking a view on this matter, all possible steps should be considered by the DOT to move to a simple, transparent and flat ad valorem SUC regime in accordance with law.

Method of Calculation of Weighted Average Rate for SUC for each LSA

(a)	Administratively allotted spectrum in 800 MHz band	A MHz
(b)	Rate of SUC for (a) above (this shall be as prescribed by DOT order dated 25.2.2010)	B%
(c)	Administratively allotted spectrum in 900/1800 MHz band	C MHz
(d)	Rate of SUC for (c) above (this shall be as prescribed by DOT order dated 25.2.2010)	D%
(e)	Spectrum allotted in 2100 MHz in 2010	E MHz
(f)	Rate of SUC for (e) above (this shall be as prescribed in NIA of 2010 for licensees whose license has not expired. For licensees, whose license has expired, the rate of SUC shall be 5% of AGR subject to final outcome of the court case on this issue).	F%
(g)	Spectrum allotted in 2300/2500 MHz in 2010	G MHz
(h)	Rate of SUC for (g) above (this shall be as prescribed in NIA of 2010. This rate is 1% of AGR from 2300/2500 MHz).	H%
(i)	Spectrum allotted in 1800 MHz in 2012	I MHz
(j)	Rate of SUC for (i) above (this shall be as prescribed in NIA of 2012)	J%
(k)	Spectrum allotted in 800 MHz in 2013	K MHz
(l)	Rate of SUC for (k) above (this shall be as prescribed in NIA of 2013)	L%
(m)	Spectrum allotted in 800 MHz/900 MHz/1800 MHz/2100 MHz in 2014/2015	M MHz
(n)	Rate of SUC for (m) above (this shall be as prescribed in NIA of 2014/2015. This is 5% of AGR)	N%

(o)	Spectrum allotted in 700 MHz/800 MHz/900 MHz/1800 MHz/2100 MHz/2300 MHz/2500 MHz in 2016	O MHz
(p)	Rate of SUC for (o) above (this shall be as prescribed in NIA of 2016. This is proposed to be 3% of AGR)	P%

Weighted Average rate of SUC:

$$\left[\frac{(A \times B)}{100} + \frac{(C \times D)}{100} + \frac{(E \times F)}{100} + \frac{(G \times H)}{100} + \frac{(I \times J)}{100} + \frac{(K \times L)}{100} + \frac{(M \times N)}{100} + \frac{(O \times P)}{100} \right] / (A+C+E+G+I+K+M+O)$$

Note:

For the above calculation of Weighted Average Rate of SUC, spectrum holding shall be calculated as detailed below:

- (a) In Frequency Division Duplex (FDD) bands (i.e. 700 MHz, 800 MHz, 900 MHz, 1800 MHz and 2100 MHz): Spectrum Holding is equal to sum of quantum of uplink and downlink frequency holding in the band.
- (b) In Time Division Duplex (TDD) bands (i.e. 2300 MHz and 2500 MHz): Spectrum holding is equal to the quantum of frequency allotted in the band.

Annexure II

Operator	Spectrum holding-Non-BWA bands (4%)	Spectrum holding-BWA (1%)	Considering revenue contribution (See Note 1)	%SUC-NWA	%SUC-WA
				(See Note 2)	
A	10 (2x5 MHz)	20 (unpaired)	3.4	2.8	2
B	10 (2x5 MHz)	0	4	4	4
C	5 (2x2.5 MHz)	20 (unpaired)	2.8	2.29	1.6

Note 1:- SUC rate based on weighted average of quantity, revenue contribution and applicable SUC rate. For Operator 'A', revenue contribution has been assumed at 80% and 20% for Non BWA spectrum band and BWA spectrum band respectively. For operator 'B', 100% revenue from Non BWA spectrum. In case of operator 'C', revenue contribution has been changed to 60% and 40% for Non BWA spectrum band and BWA spectrum band respectively in view of change in spectrum mix. As per the current scenario, the assumed contribution of BWA spectrum band may be on higher side.

Note 2:- SUC NWA refers to the rate based on weighted average of quantity, normalisation factor based on auction determined price of different spectrum bands and applicable SUC rate. The normalisation factor based on average auction determined price has been assumed at 3:1 for Non BWA spectrum band and BWA spectrum band.

SUC-WA refers to the rate computed by weighted average formula suggested by DoT where quantum of spectrum alone has been taken as weight.

Calculation (operator A):

Based on DoT Weighted Average: $\frac{10*4\%+20*1\%}{30} = 2\%$

Based on revenue contribution: $\frac{80*4\%+20*1\%}{100} = 3.4\%$

Based on normalization factor: $\frac{10*3*4\%+20*1*1\%}{10*3+20*1} = 2.8\%$

Similarly, calculations can be done for operators B & C in the example.

Annexure III

Operator	Spectrum holding- 900 MHz (SUC 5%)	Spectrum holding- 1800 MHz (SUC 5%)	Spectrum holding- BWA (SUC 1%)	Considering revenue contribution (See Note 1)	%SUC-NWA (See Note 2)	%SUC-WA (See Note 3)
A	10 (2x5 MHz)	10 (2x5 MHz)	20 (unpaired)	4.20	3.99	3.00
B	10 (2x5 MHz)	8 (2x4 MHz)	20 (unpaired)	4.20	3.95	2.89
C	20 (2x10 MHz)	10 (2x5 MHz)	20 (unpaired)	4.60	4.36	3.40

Note 1:- SUC rate based on weighted average of quantity, revenue contribution and applicable SUC rate. For Operator 'A', revenue contribution has been assumed as: Rs. 50 is contributed by 900 MHz spectrum band, Rs. 30 from 1800 MHz spectrum and Rs. 20 by BWA spectrum. For Operator 'B' Rs. 55 is contributed by 900 MHz spectrum band, Rs. 25 from 1800 MHz spectrum and Rs. 20 by BWA spectrum. In case of operator 'C', revenue contribution has been changed to Rs. 50 is contributed by 900 MHz spectrum band, Rs. 30 from 1800 MHz spectrum and Rs. 20 by BWA spectrum band in view of change in spectrum mix.

Note 2:- SUC rate based on weighted average of quantity, normalisation factor based on auction determined price of different spectrum bands and applicable SUC rate. The normalisation factor based on average auction determined price has been assumed at 4.56 for 900 MHz and 1.35 for 1800 MHz with respect to BWA band based on their market determined price.

Note 3:- SUC rate based on weighted average of quantity and applicable SUC rate.