

Impact of TRAI's spectrum recommendations on consumers and industry

PwC Assessment
of TRAI Recommendations

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pwc



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Executive Summary

The draft NTP 2011 emphasises the role of telecoms in “accelerated equitable and inclusive economic growth by laying special emphasis on providing affordable and quality telecommunication services..” In light of these aspirations we assess TRAI’s ‘Recommendations on Auction of Spectrum’ published on 23rd April 2012, in particular because TRAI discusses consumer impact and we wish to understand the possible effects on tariffs and on the telecoms industry. This study has been commissioned by Cellular Operators Association of India.

TRAI’s computed cost increase per minute at a national level is 4.4 paisa per minute (for 2013). However, due to numerous considerations we have found that the impact on cost per minute is likely to be far greater, in a range between 24 paisa and 28 paisa per minute. The impact in Metros would be even more prominent, with cost per minute increasing by 90 paisa. We have also found that operators are unlikely to have further capacity to absorb such cost increases and that therefore we may see significant tariff increases.

In this paper we focus on four topics concerning the spectrum auction recommendation:

- assess the quantum of subscriber cost impact of TRAI’s recommendations and recalculate accordingly
- discuss wider considerations which must be taken into account to gain a full and fair view of the likely cost impacts
- look at the likely effects on the telecom industry’s financial performance focusing on the implications of a heavier debt burden and already declining operator margins
- estimate the range of tariff increases that operators may be forced to make in order to service additional financing of spectrum.

The quantum of cost impact of the TRAI recommendations

TRAI’s workings omit three considerations based on applying common economic principles of regulation in arriving at incremental cost per minute for a subscriber:

- TRAI underestimates the cost per minute impact by around 50% by counting both incoming and outgoing MOU in its calculations rather than just the outgoing MOU which are charged
- TRAI does not consider the further cost of extension of licenses for renewed usage of spectrum which are at present in use for servicing current customer needs

TRAI omits the additional spectrum that will be required to service the huge growth in voice and data traffic implied by TRAI’s workings, which estimate MOU growth of 2.58 X over the 20 year period we have recalculated TRAI’s cost estimates per subscriber to reflect the three issues above. On the third issue, we note that the workings assume voice and data growth but no spectrum growth and therefore underestimate the full spectrum cost per minute to the subscriber. To be consistent, we have calculated the cost per minute impact from the spectrum being auctioned now by holding today’s traffic levels constant through the 20 year period.

An overview of this recalculation to TRAI’s estimates in Annexure 7 of its document

PwC assessment of Cost of spectrum (paisa): selected years 2011-2032	FY13	FY19	FY25	FY31
TRAI estimate on cost per minute	4.4	2.8	2.2	1.8
Impact of holding MOU constant, due to additional spectrum non-availability (refer section 1.3) ¹	0.0	1.5	2.3	2.7
Impact due to license extension of existing spectrum (refer section 1.1) ²	8.2	8.2	8.2	8.2
Adjusting for calculating impact on chargeable (outgoing) MOU only (refer section 1.2) ³	13.4	13.3	13.6	13.6
Estimated cost per minute (refer table 10)	26.1	25.9	26.4	26.3

Source: Recommendations on Auction of Spectrum, TRAI; PwC analysis

Note:

1. To be consistent, we have recalibrated TRAI’s cost estimates per subscriber by holding today’s traffic levels constant going forwards through the 20 year period, so that the traffic consideration is more in line with the spectrum being costed for carrying it.
2. The workings only factor 576.2 MHz of spectrum to service the MOUs and omit the cost of license extension of usage of already allocated spectrum that would continue to be required to service the current level of MOU
3. The total MOU figures used are a sum of both the incoming and outgoing minutes. However, since subscribers are charged only for outgoing minutes, the per minute cost impact should be computed based on outgoing minutes so that it may be more readily compared to potential tariff changes
4. Computation explained after Table 10.

Wider considerations which would have a further cost impact

There are further considerations with respect to cost impacts which we note below but have not factored into the PwC recalculations. All of these points have a bearing on the TRAI workings, would make the cost impact higher, and question the consistency of the workings with established market paradigms in India and other markets:

- In its operator estimate (Annexure 8) MOU per subscriber is assumed by TRAI to grow by 83% in the 20 year period, while in the last four years MOU per subscriber has declined by 13% per annum
- Price increase as a result of cost rises as set out by TRAI could result in lower usage, not higher usage as TRAI forecasts
- TRAI predicts rapid voice usage growth, and even faster data usage growth. This contradicts international experience, where data usually grows at the expense of voice growth
- India is unlikely to see data usage as 50% of revenue by 2020-21 as estimated by TRAI, and would also require a significant increase in spectrum to carry the additional traffic

Impact on operators' financial performance

Whilst Indian mobile operators have absorbed cost increases in the past, including after the 3G auctions of 2010, due to the erosion of margins in the past few years we do not believe the industry has the capability to do so further due to the following findings:

- operators' PAT margins have been falling for several years and have reached single digits or negative across all but one of the reporting operators by 2012
- Indian telecom operators' average EBITDA margins are now by some way the lowest in Emerging Asia, standing at 28.9% compared to a regional average of 40.0%
- operators' debt service burden will become too heavy; this is usually indicated by Total Debt/EBITDA rising to above 3.0 and we expect operators' Debt/EBITDA ratio alone to rise to 7.4 by 2016

Range of expected tariff impacts on Indian consumers

It is likely that operators will be forced to impose tariff increases as a result of the cost increases. We have calculated the tariff impact from a simple pass-through of the cost to the operator, and this results in a tariff increase in the range of 29 to 34 paisa, reflecting the extra spectrum costs plus added impacts of licence fees, taxes and levies.

PwC approach

We have assessed the results contained in Annexure 7 of the TRAI document based on:

- Understanding and validating TRAI's workings and assumptions
- Recalculating results where necessary to remove inconsistencies
- Applying historic, current and forecast market indicators from India and elsewhere

The table below provides a comprehensive view of aspects assessed by PwC. Note that all impacts are calculated on a standalone basis.

Table 1: TRAI Assumptions and PwC Observations

TRAI Assumptions (Annexure 7)	Assessed by PwC
Projected growth in minutes of usage (MOU)	Analyzed the MOU growth assumption basis the following: <ol style="list-style-type: none"> 1. Treatment of incoming and outgoing MOU 2. Basis of TRAI's estimates for MOU growth 3. How TRAI may have approached MOU per subscriber based on past data
Total projected MOUs	<ol style="list-style-type: none"> 1. Reviewed base number for FY2012-13 2. Validated calculations for subsequent years based on MOU growth cost assumptions (2012-13 to 2031-32)
Auction Fee (Spectrum Cost)	<ol style="list-style-type: none"> 1. Reviewed assumption on quantum of spectrum 2. Validated the computation of the total auction fee
Annualized EMI for Auction Fee	Reviewed computation
Annualized EMI per MOU	Reviewed computation
EMI per minute amortized from revenue from non-voice services	<ol style="list-style-type: none"> 1. Reviewed computation 2. Validated assumption on growth of non-voice revenues based on past and global data
EMI per minute amortized from revenue from voice services	Reviewed computation

Our findings

1. Quantum of impact

Projected growth in MOU & total projected MOU

TRAI has assumed that the total MOU of the Indian telecom market (GSM only) will increase from 3,40,260 Crore minutes in 2012-13 to 8,80,566 Crore minutes in 2031-32 (refer Annexure 7 of TRAI recommendations). This is an increase of 2.58x the current level over the 20 year time period (refer Table 2).

Table 2: Calculation of increase in MOU

Year	2012-13	2031-32	Ratio
Total MOU (million minutes per year)	3,402,600	8,808,560	2.58
MOU (minutes per month per subscriber)	328	602	1.83
Subscriber (GSM) in mn*	865	1219	1.40

Source: TRAI, PwC analysis. Total MOUs are as per TRAI document. The GSM subscribers are projected using rate of growth of subscribers used by TRAI in Annexure 8.

We have the following observations on the key assumptions on account of the following:

1.1 Cost of license extension of existing spectrum omitted

Spectrum requirement understated

The workings only factor 576.2 MHz of spectrum to service the MOUs and omit the cost of license extension of usage of already allocated spectrum that would continue to be required to service the current level of MOU needs to be taken into consideration. Our recalculations address the additional costs of these license extensions.

Cost of spectrum underestimated

Further, the cost for the spectrum has been calculated based on proposed reserve prices for the 1800 MHz band. However, the quantum of spectrum required to service the current volumes would not be fully available in the 1800 MHz band. The total quantum of spectrum would need to be assigned in both 900 MHz and 1800 MHz band. Accordingly, the price for both 900 MHz and 1800 MHz will need to be accounted for.

Assuming that all reallocation and license extension of spectrum is at the proposed reserve price the total outflow for cost of the spectrum would be approximately Rs 651,000 Crores over the next 20 years as compared to Rs 93,672 crores as per the TRAI calculation (refer Table 11) which is based on the 576.2 MHz of spectrum currently proposed to be auctioned only. The cost per minute increase after taking into consideration the cost of license extension (at present value) would be nearly 2.87x the TRAI estimate (refer table 10)

1.2 TRAI underestimates by more than 50% the possible consumer cost impact by counting both incoming and outgoing MOU, rather than just outgoing MOU

The total MOU figures used are a sum of both the incoming and outgoing minutes. However, since subscribers are charged only for outgoing minutes, the per minute cost impact should be computed based on outgoing minutes so that it may be more readily compared to potential tariff changes. Accordingly, the effective cost impact will be more than double TRAI's estimate as only 48% of the minutes of the total MOUs are outgoing minutes (refer Table 3).

Table 3: Components of Total MOU

MOU (Incoming and Outgoing) - GSM (Minute per month)	Dec 2011
Incoming (minutes per month per subscriber)	171
Outgoing (minutes per month per subscriber)	161
Total (minutes per month per subscriber)	332

Source: TRAI- "Indian Telecom Services Performance Indicator Report" for the Quarter ending December 2011.

The incremental impact on cost per minute would therefore be 13.4 paisa per minute for FY 2012-13 (refer Table 10 for computation explanation).

1.3 TRAI estimates ignore the need for more spectrum to satisfy growth in voice and data traffic

TRAI forecasts a 2.58x growth of MOU over the 20 year period yet does not refer to any plans to increase the quantum of spectrum available to operators to carry this traffic. This renders the outlook on voice and data growth incompatible with the spectrum allocation covered in the TRAI recommendations, and therefore significantly underestimates the spectrum cost per minute to the subscriber. Data from the Wireless Planning Commission indicates that operators already have limited capacity to carry more traffic: there is 353.6 MHz of spectrum applications outstanding today, of which 171.0 MHz is for spectrum in Metros and Circle A. (refer table 4 and table 13).

Table 4: Outstanding applications for spectrum by circle categories (Nov 2011)

Category	MHz
Metro and Circle A	171.0
Circle B	124.8
Circle C	57.8
Total	353.6

Source: WPC, November 2011

To be consistent, we have recalibrated TRAI's cost estimates per subscriber by holding today's traffic levels constant going forwards through the 20 year period, so that the traffic consideration is more in line with the spectrum being costed for carrying it.

1.4 Cost impacts at a national level do not reflect circle reality- impacts on metros / Circle A subscribers may be significantly higher

The workings have been done at a national level and accordingly do not sufficiently reflect the differences that would be seen at the circle level. The incremental cost per minute on account of the proposed changes would vary across circles on account of differential spectrum cost and volume of minutes, as indicated in Table 5 which shows the Circle type and Metro level impact in contrast to the average impact.

Table 5: Impact of proposed spectrum fee by category of circles

Category of Circle	MOUs (Crores)	Spectrum Cost (Crores)	EMI per year	EMI (impact per MOU (Rs) (Outgoing + Incoming)	EMI Impact per MOU (Rs) (Outgoing only)	Ratio to average impact
Metros	417,10	113,557	18,142	0.46	0.90	344%
Circle A	119059	118,110	18,869	0.16	0.38	125%
Circle B	126559	32,541	5,180	0.04	0.08	32%
Circle C	52932	5,254	839	0.02	0.03	13%
Total	340,260	269,341	43,030	0.13	0.26	100%

Source: TRAI, PwC analysis

Metro subscribers will experience the most substantial tariff increase, up to 90 paisa per minute, compared to other subscribers because the current spectrum reserve prices are almost 20x times higher than Circle C reserve prices. TRAI's analysis is shown as national averages, and this masks the significant differences between geographies.

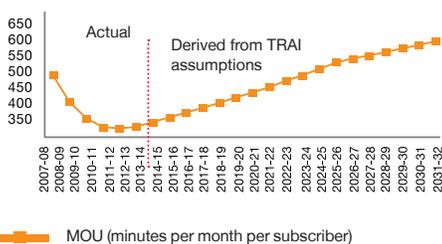
2. Additional considerations

There are further considerations with respect to cost impacts which we detail below but have not factored into the PwC recalculations. All of these points have a bearing on the TRAI workings, would make the cost impact higher, and question the consistency of the workings with established market paradigms in India and other markets.

2.1 MOU per subscriber is assumed to grow by 83% in the 20 year period while in the last four years MOU per subscriber has declined by 13% per annum

TRAI's Annexure 8 assumes that number of subscribers for a typical operator would grow by 40% between FY 2012-13 and FY 2031-32, while the total MOU would increase by 258% during the same period. By calculation this implies that MOU per subscriber increases by 83%. This is not in line with current trends wherein there has been a year on year reduction in MOU per subscriber between 2008 and 2011 (Refer Chart 1). Such MOU increases are inconceivable based on India's already high MOU and past trend.

Chart 1: Historical MOU (2007-2011) and estimated MOU (2012-32)



Source: TRAI, PwC analysis

2.2 Price increases as a result of forecast cost rises as set out by TRAI could result in lower usage, not higher usage as TRAI forecasts

In context of the established precedents RPM increases are associated with decline in MOU per subscriber due to price elasticity of demand on an individual customer basis. Data from the recent past reflects the demand elasticity clearly. For instance, a 2% increase in call costs across the industry in Q2, 2011 resulted in a decline of 1.45% in the MOU per subscriber between Q1 to Q2, 2011.

2.3 TRAI predicts rapid voice usage growth, and even faster data usage growth. This contradicts international experience, where data usually grows at the expense of voice growth

TRAI assumes that data revenue as a percentage of total revenue will grow to reach 50% by FY 2020-21. Such data growth is inconsistent with simultaneous rapid voice growth. For instance in the US and France (refer Table 6), where data contributes 33.2% and 25.7% of the mobile industry revenue respectively, minutes of use have fallen by 3.20% and 2.30% respectively in 2009-10.

Table 6: Comparison of change in data usage with change in MOU (2010)

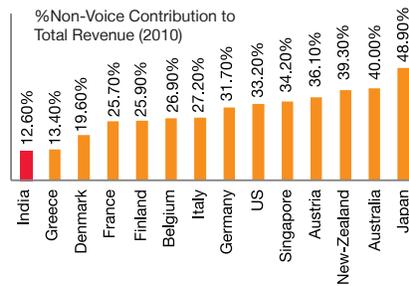
Country	GDP per Capita (\$)	MOU - (Min.) YoY	Data % - (US\$) YoY of ARPU	Average Spectrum per operator (MHz)	Spectrum Assigned for commercial wireless use	Potentially usable spectrum/ in pipeline	New spectrum to be allocated as % of current
Japan	40,281	-1.20%	48.9%	87	347	400	115.27%
US	33,790	-3.20%	33.2%	82	409.5	50	12.21%
Canada	36,058	-5.40%	25.4%	54	270	200	74.07%
France	39,658	-2.30%	25.7%	125	375	250	66.67%
South Korea	45,416	-2.50%	21.7%	90	270	120	44.44%
Spain	35,245	-1.10%	19.0%	90	415	270	65.06%

Source: BoFA ML Wireless Matrix Q1 2011, Plum consulting, blog.ctia.org/2011/07/26/spectrum-availability-for-wireless-how-do-we-compare/

2.4 India is unlikely to see data usage as 50% of revenue by 2020

TRAI assumes share of non-voice services as a percentage of revenue for 2012-13 at 18% and forecasts them growing to 50% in 2020-21. At present in 2011-12 the non-voice revenues as a percentage of total revenues is only 14%. Of the 14%, message based services contribute about 9% and non-message i.e. pure data services contribute nearly 5%. It is highly unlikely that data usage revenues will grow from current levels of around 14% to 50% as assumed in the calculations. Even in mature telecom markets such as Denmark, Italy and US the contribution of data services to the revenue was only 19.6%, 27.2% & 33.20% respectively (refer Chart 2) in 2010. In fact, not even Japan has 50% data revenues as a proportion of total revenues today.

Chart 2: Non-Voice Contribution to Total Revenue by Country



Source: BofA ML Wireless Matrix Q1 2011

Global experience in the past few years has shown that mobile operators' costs are rising faster than revenue. Recent analysis undertaken in the North America market shows that the cost of data may fall from \$20/Gb in 2010 to \$7 in 2015, whereas revenue per user may fall from \$25/Gb to only \$5 (source Arlington Economics, LLC).



3. Implications on operators' financial performance

Whilst in some cases operators have been known to absorb cost increases without passing them on to customers in the form of price rises, the key determinant is the financial health of the operators. Since 2008, with the entry of additional operators in the Indian mobile market, and rapid per minute price declines, operator margins have been declining rapidly. This has been compounded by the additional cost burdens of 3G roll out since 2010. Examining the factors below we therefore expect the industry's financial health and sustainability to be undermined further by the impact of the spectrum recommendations.

Declining operator returns

The decline in operator financial performance has been significant since 2007, as shown in Table 7 which shows how PAT margins have declined to single figures for all but one of the reporting operators from 2007 to 2012, to negative in some cases.

Table 7: PAT Margins of selected Operators, FY 2007-FY 2012

	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012
Vodafone	17%	11%	0%	-3%	0.01%	NA
Idea Cellular	11%	15%	9%	8%	4%	4%
Aircel	35%	9%	-8%	-66%	-42%	NA
Reliance	22%	29%	27%	22%	7%	5%
Bharti	23%	25%	24%	26%	20%	14%
TTSL	-46%	-35%	-33%	-21%	-41%	NA
TTML	-22%	-7%	-8%	-14%	4%	-21%
Shyam Sistema	-53%	-158%	-620%	-616%	-310%	NA
HFCL Infotel	-42%	-57%	-96%	-11%	-93%	NA
MTNL	14%	12%	4%	-68%	-71%	-101%
BSNL	20%	8%	2%	-6%	-22%	NA

Source: Annual Filings of Operators with the Registrar of Companies, Capitaline, India Infoline, Company Websites. Reliance and MTNL FY 12 figures are based on 3 quarters.

Indian telecoms has the lowest average EBITDA margins amongst emerging Asia countries, with the average EBITDA margin in India dropping from 39.4% in 2006 to 28.9% in 2012. This industry average masks far lower margins of some operators during this period.

Table 8: Emerging Asia Telecoms EBITDA margins (2004 to 2012)

(%)	2004	2005	2006	2007	2008	2009	2010	2011	2012
Emerging Asia	47.50%	47.80%	46.90%	45.70%	43.90%	42.80%	42.10%	35.90%	36.10%
Bangladesh	47.30%	25.20%	39.70%	27.90%	32.80%	48.70%	41.90%	47.30%	47.10%
China	50.60%	50.10%	50.00%	50.70%	48.50%	45.40%	42.80%	40.90%	40.90%
India	33.30%	35.70%	39.40%	38.40%	33.80%	32.30%	29.50%	28.20%	28.90%
Indonesia	67.60%	66.20%	63.00%	57.80%	59.00%	55.30%	54.30%	53.20%	54.20%
Korea	37.30%	39.30%	36.40%	31.30%	30.10%	31.90%	31.80%	32.00%	33.20%
Malaysia	49.40%	52.70%	49.50%	48.40%	48.10%	46.60%	47.50%	47.10%	46.60%
Pakistan	48.70%	30.40%	29.40%	36.00%	32.10%	31.90%	34.60%	36.70%	37.60%
Philippines	63.70%	63.60%	64.90%	65.60%	64.80%	63.00%	62.90%	61.80%	62.00%
Thailand	54.00%	49.00%	44.70%	36.70%	37.30%	38.70%	41.60%	42.30%	41.50%

Source: Bank of America Merrill Lynch Wireless Matrix (4Q 2011)

Unsustainable Industry Debts

The debt burden of the Indian telecoms industry has increased significantly since 2009 to reach at Rs 185,720 Cr as on March 2012. (refer table 9)

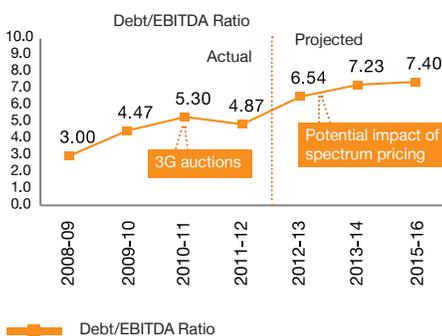
Table 9 : Debt burden of Indian telecom sector (2009 to 2012)

	2008-09	2009-10	2010-11	2011-12
Domestic Debt (Rs Cr)	46,980.00	80,807.00	94,319.00	93,594.00
External Debt in other currencies (USD Mn)	7,331.00	9,208.67	14,222.27	18,425.27
Exchange Rate (Rs per USD)	48.76	46.66	46.15	50.00
Total Debt (Rs Cr)	82,725.96	123,774.65	159,954.78	185,720.35

Source: RBI, Bank of America Merrill Lynch Wireless Matrix (4Q 2011)

In our experience once Debt/EBITDA ratios exceed 3.0 in the telecom sector, it becomes difficult for operators to satisfy creditworthiness to banks for further lending. Further, the industry outlook, past NPAs from the industry determines the interest rates and their lenders willingness to lend. Including domestic and external debt, the Debt /EBITDA ratio in Indian telecoms has risen from 3.00 in 2009 to 4.87 in 2012 (see Chart 3). Assuming the spectrum acquisitions going forward will be debt-funded, the Debt/EBITDA ratio impact *due only to spectrum auctioning*, will further rise to 7-8x by 2015-16 (refer to table 12). *This excludes the additional funding* that may be required for major activities such as network expansion, or indeed costs associated with implementing spectrum reforming.

Chart 3: Indian telecom sector Debt/EBITDA ratios 2008-2015



Source: RBI, BofA Merrill Lynch 4Q 2011, PwC analysis

Current debt includes borrowings that could potentially become non-performing for lenders, due to cancellation of licenses or operator exits from the market. We expect that such outcomes for the industry may result in further difficulties for existing telecom operators to borrow more, since risk factors associated with lending to the industry would rise.

Assuming the spectrum acquisitions as set out by TRAI in its recommendations are debt-funded, we estimate that the industry will need to further increase its current debt burden of INR 185,720 Cr by approximately 272,000 INR Cr over the next 5 years (refer table 11). The immediate financial performance impacts of this are likely to be negative, and coming on the back of the heavy impacts of 3G on industry borrowing, would add a grave additional debt burden on the sector.

4. Cost per minute to translate to higher tariffs

Indian mobile operators have been struggling to maintain profitability, a fact that we have documented clearly in previous analysis (see our report of September 2011). In our assessment of recent operator Profit After Tax (PAT) and EBITDA margin performance, it is clear that there is no room for operators to absorb further cost increases. Our assessment in this paper has shown that the cost increases associated with TRAI's proposed spectrum policy will be significant and that they will have immediate and long-term financial impacts.

It is therefore unlikely that the industry will be in any position to absorb any such cost burdens. In our view it is likely that operators will be forced to impose tariff increases as a result of the cost increases.

The potential tariff impact can be assessed in various ways, but simply put we have calculated the tariff impact from a simple pass-through of the cost to the operator. This results in a cost increase from spectrum of 26 paisa per minute resulting in a tariff increase of 34 paisa, reflecting the added impacts of spectrum license fees and service tax.

When calculated using the EMI method adopted by TRAI, the impact of the additional spectrum cost in the 20 year period from 2012-13 to 2031-32 is Rs 2,69,000 Crores (calculated at present value with 15% discount rate) instead of Rs 93,721 Crores as estimated by TRAI. Accordingly incremental cost per minute assessed/ estimated should be nearly 2.87 times the estimate on account of this.

Table 10: Impact of TRAI recommendations on cost per minute

All values in INR

Description	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
As per TRAI (voice and data)	0.044	0.040	0.036	0.033	0.031	0.029	0.028	0.027	0.026	0.024	0.024	0.022	0.022	0.020	0.020	0.018	0.018	0.018	0.018	0.016
Adjustment for MOU Projections overstated	0.000	0.004	0.008	0.011	0.012	0.014	0.015	0.017	0.018	0.019	0.021	0.021	0.023	0.023	0.025	0.023	0.025	0.026	0.027	0.025
Cost of spectrum adjustment to service the current MOU volume	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082
Add adjustment for excluding incoming minutes	0.134	0.134	0.134	0.134	0.134	0.133	0.133	0.134	0.134	0.133	0.135	0.134	0.136	0.134	0.135	0.132	0.133	0.134	0.136	0.132
Estimate of Cost per Minute (post adjustment for inconsistent outlook/ assumption)	0.261	0.261	0.260	0.261	0.259	0.258	0.259	0.260	0.261	0.258	0.263	0.259	0.264	0.259	0.262	0.255	0.258	0.261	0.263	0.255

Source: TRAI, PwC Analysis

- MOU are likely to decline as per past trend, data revenues grow and also as marginal subscribers are added with increase in penetration. On a conservative basis we have assumed a no growth scenario
- The spectrum cost included in annexure 7 of the document is understated as explained in point 1.1 of this report. The adjustment made in the above table pertains to arriving at the cost of spectrum required to service the current volumes and also growth in Volume of Minutes at reserve prices.
- The Minutes as mentioned in annexure 7 of the document include outgoing and incoming minutes refer point 1.2 of the report. We have accordingly adjusted for exclusion of the incoming minutes, based on data for Dec 2011.
- The additional spectrum cost on license extension has been taken on a pro-rata basis for the period covered in the table and computed an EMI based on net present value basis using the TRAI given rate of 15%.

We explain the computation of impacts taking FY 14 as an illustration:

Line 1: TRAI cost impact= 4.0 paisa	4.0
Line 2: Formula: (TRAI projected MoU/ FY 13 MoU) x TRAI cost impact) – TRAI cost impact Computation: (374286 Cr Mins / 340286 Cr Mins) x 4.0) – 4.0 = 0.4 paisa	0.4
Line 3: Formula: (PV of spectrum for all spectrum extensions for 20 years / TRAI recommendation spectrum valuation) x TRAI cost impact) – TRAI cost impact Computation: (269,341 Cr/93,721 Cr) x 4.4) – 4.4 = 8.2 paisa	8.2
Line 4: Formula: (MOU per sub per month/ MOU per sub per month) x Total cost impact)– TRAI cost impact Computation: (332/161) x (4.0 + 0.4 + 8.2)) – (4.4 + 0.4 + 8.2)= 13.4 paisa	13.4

Table 11: Spectrum license extension cost at TRAI base price

All values in INR Crores

Description	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28
Spectrum cost for 122 cancelled licenses	93,722	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cost of license extension of 900 MHz spectrum	-	59,293	46,232	16,449	28,323	8,957	-	62,856	10,172	-	-	14,662	-	-	-	-
Cost of license extension of 1800 MHz spectrum	-	6,898	4,086	1,272	16,302	1,702	-	16,747	100,649	-	-	3,422	-	83,119	1,300	75,456
Total for each year	93,722	66,192	50,318	17,722	44,625	10,659	-	79,603	110,822	-	-	18,084	-	83,119	1,300	75,456
Total cost in period FY13 to FY 17	272,578															
Total cost in period FY 13 to FY 32	651,620															

Source: TRAI, PwC Analysis

Table 12: Debt to EBITDA ratio of Indian telecom sector

The Debt to EBITDA ratio of Indian telecom sector is expected to increase on account of the additional debt burden due to higher spectrum charges.

All values in INR Crores

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2015-16
Domestic Debt	46,980.00	80,807.00	94,319.00	93,594.00			
External Debt in other currencies	7,331.00	9,208.67	14,222.27	18,425.27			
Exchange Rate	48.76	46.66	46.15	50.00			
Spectrum Auction Debt					93,721.87	66,191.54	50,317.71
Total Debt	82,725.96	123,774.65	159,954.78	185,720.35	279,442.22	345,633.76	395,951.46
EBITDA	27,561.59	27,667.05	30,193.18	38,148.00	42,707.90	47,812.84	53,528.00
Debt/EBITDA Ratio	3.00	4.47	5.30	4.87	6.54	7.23	7.40

Source: RBI, Bank of America Merrill Lynch Wireless Matrix (4Q 2011), PwC Analysis

Note

1. No forex escalations have been considered for year beyond March 2012
2. It has been assumed that 100% of spectrum license extension fees will be serviced through debt
3. The EBITDA growth has been estimated at 12% based on the previous three years CAGR (2010-2012)

Table 13: Circle wise pending applications for spectrum

Circle Name	Pending applications (MHz)
Andhra Pradesh	21.2
Assam	6.4
Bihar	36.4
Delhi	50.4
Gujarat	19.2
Haryana	3.6
Jammu & Kashmir	2.8
Karnataka	19.4
Kerala	5.8
Kolkata	6.8
Madhya Pradesh	17.4
Maharashtra	19.4
Mumbai	9.2
North East	1.8
Orissa	10.4
Punjab	9.6
Rajasthan	16.6
Tamil Nadu	25.4
Uttar Pradesh (East)	41
Uttar Pradesh (West)	16.4
West Bengal	14.4
Total	353.6

Source: WPC, November 2011



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This study has been commissioned by the Cellular Operators Association of India. The data used for the study has been collected from various public sources and the audited reports available with the Registrar of Companies (RoC).

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