Impact of TRAI's recommendations on Auction of Spectrum on operator cost and consumer tariffs
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Executive summary

TRAI’s recommendations on “Auction of Spectrum” include the methodology of future spectrum allocations and analysis of the impact of auction price on operator cost per minute. TRAI has estimated that the total impact will be 4.4 paise for 2012-13 (for voice and non-voice services) and 3.6 paise (for voice services).

We have assessed the assumptions made by TRAI in computing the impact of the auction prices on operator cost (given in Annexure VII and VIII of the report) and consumer tariffs (assuming margin neutrality). In addition, we have analyzed other relevant factors that should have been considered in assessing the overall impact on the cost burden and end-user tariff.

Based on our analysis, we believe the following factors have been underestimated by TRAI, and when included, will result in higher operator cost per minute and consumer tariffs than that computed by TRAI.

1. Minutes of usage

1.1. TRAI has incorrectly assumed total incoming and outgoing minutes for calculation of the impact on operator cost, since only ~48% of the total number of Minutes of Usage (MOU) are outgoing and are chargeable. Taking into consideration only the outgoing minutes, the minimum impact on consumer tariff on account of this factor will be twice the impact computed by TRAI (given all other assumptions made by TRAI).

1.2. The average growth rate in MOU assumed by TRAI is aggressive. Assuming an average growth rate of 5% in MOU over the next five years (industry analyst projections) against the 10% growth assumed by TRAI, the impact on operator cost and consumer tariff in 2013 due to this factor would be 6%-8% more than that computed by the regulator.

1.3. An MOU growth rate of ~160% over a period of 20 years, assumed by TRAI in Annexure VII, is unrealistic. Given this growth rate, MOU per sub will increase by 84% over 20 years, which is contrary to historical trends indicating year on year decline in MOU per subscriber since 2008.

1.4. The impact on operator cost may be understated since the MOU growth assumed by TRAI does not include the effect of price elasticity. As the cost per minute, and hence tariffs, rise, the growth in MOU will be less than that assumed by TRAI.

2. Spectrum considered by TRAI to calculate impact

2.1. The impact of INR93,721 crore (on account of 576.2 MHz of spectrum in 1800 MHz band) computed by TRAI is understated since the actual spectrum cost to the industry should include the cost associated with extension of license in addition to the cost of spectrum to be auctioned. Given the costs mentioned above, the impact on operator cost due to underestimation of the spectrum cost is likely to be approximately three times - at INR280,000 crore – the impact computed by TRAI.

2.2. The cost of additional spectrum and/or network coverage required to service the MOU growth projected by TRAI has not been included by it in computing the overall impact on operator cost.

2.3. The additional spectrum costs will increase the financial risk of operators and their ability to raise debt, the cost of debt and their ability to service debt.
3. **Share of non-voice services**

3.1. TRAI’s assumption of non-voice revenues contributing 50% to total revenues is aggressive. Globally, the contribution of non-voice revenue to total revenue stands at 34%, with there being very few markets where non-voice revenue contributes 50% of the industry revenue.

3.2. The impact computed by TRAI does not include the cost of deploying high-speed data networks to achieve the 50% non-voice revenue share assumed by it. Furthermore, it does not include the cost of existing operators extending the license to achieve the projected growth in non-voice revenue. This may lead to high data tariffs, depriving the Indian consumer of the benefit of affordable high-speed data services.

4. **Other factors impacting industry cost and consumer tariffs**

4.1. TRAI has recommended auction of minimum 5 MHz spectrum in the 1800MHz band, i.e., ~20% of the available spectrum, which would result in artificial scarcity. This may drive up prices and increase the overall operator cost.

4.2. Furthermore, since the reserve price for future spectrum auctions will be benchmarked to the current auction price, this may inflate the reserve price for future auctions as well.

4.3. TRAI has incorrectly linked the reserve price to the 3G bid price and has assumed that the revenue or cash flow profile resulting from using the auctioned spectrum will be similar to that from using broadband networks. This kind of revenue or cash profile may not be feasible, given the current state of the LTE ecosystem and the fact that existing operators neither have sufficient spectrum nor are likely to receive adequate spectrum during the forthcoming auction.

4.4. An analysis of the annual EMI for all spectrum-related costs as a percentage of annualized ARPU in 2013 indicates that spectrum-related payments are likely to be as high as 133% in the metros and 45% at an all-India level. This highlights the fact that there would be wide variations across circles and that national averages do not reflect circle-specific differences.

4.5. The impact on regulatory cost, and hence cost per minute, will significantly vary among operators, depending on whether an operator is a new entrant, is an existing operator seeking extension of license or one who is not seeking extension of license in the near future. The differential impact is expected to destroy the level playing field between different operators.
Impact of TRAI’s recommendations on Auction of Spectrum: Annexure VII

<table>
<thead>
<tr>
<th>Impact of Auction Fees on wireless (GSM) services segment (using EMI method)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Projected Growth in MOU</strong></td>
</tr>
<tr>
<td>5%</td>
</tr>
<tr>
<td><strong>Total projected MNOAR for wireless (GSM) services</strong></td>
</tr>
<tr>
<td>340,056</td>
</tr>
<tr>
<td><strong>Auction fee for 1 MHz (Rs. core)</strong></td>
</tr>
<tr>
<td>3022</td>
</tr>
<tr>
<td><strong>Auction fee for 75.2 MHz on plan basis (Rs. in crore)</strong></td>
</tr>
<tr>
<td>9372</td>
</tr>
<tr>
<td><strong>Annualised ARPU (Rs. in crore) for auction fee i.e., Rs.30721 crore after considering interest at 15%</strong></td>
</tr>
<tr>
<td>1400388</td>
</tr>
<tr>
<td><strong>Impact of EMI (per minute) i.e., Annualised EMI/ARPU</strong></td>
</tr>
<tr>
<td>0.044</td>
</tr>
<tr>
<td><strong>Net per minute amortised from revenue from non-voice services</strong></td>
</tr>
<tr>
<td>0.008</td>
</tr>
<tr>
<td><strong>Net per minute amortised from revenue from voice services</strong></td>
</tr>
<tr>
<td>0.036</td>
</tr>
</tbody>
</table>

*Note: The impact, wherever stated, is in comparison with the impact of 4.4 paise per minute computed by TRAI.*

- Incorrect assumption of total incoming and outgoing minutes
- MOU growth of ~160% over 2012–2032 unrealistic
- Average growth rate in MOU very high; impact 6% higher
- Cost per minute to be higher on account of price elasticity
- Reserve price incorrectly linked to 3G price
- Material differences in impact across circles/operators
- Annual EMI per sub as a percentage of ARPU at 133% in the metros in 2013
- Total spectrum cost three times higher at ~INR280,000
- 50% share of the revenue from non-voice services unrealistic
- Cost associated with deploying high-speed network for data not included

Based on the analysis given above, the impact on operator cost will be on an average at least six times more than that computed by TRAI, when corrected for two factors, i.e., the additional spectrum cost and accounting for only outgoing minutes. Furthermore, factors such as price elasticity, the share of non-voice revenue, additional network costs and MOU growth could have an additional impact on operator cost and consumer tariffs.
1. Introduction

TRAI issued its recommendations related to Auction of Spectrum on 23rd April 2012. The key issues covered as part of its recommendations include the methodology for future spectrum allocations, the establishment of the reserve prices for different spectrum bands, spectrum re-farming and auction-related aspects including auction timelines, extension of license, validity of spectrum, spectrum usage charges, payment mechanism and rolling out of obligations.

In its recommendations, TRAI has also analyzed the impact of the auction price on per minute cost to operators over a period of 20 years (2012-2032). The analysis has been carried out by using the Equated Monthly Installment (EMI) method and considering two cases, one that shows the impact on the overall GSM services segment (Annexure VII) and the other that shows the impact on a hypothetical GSM operator (Annexure VIII).

The impact on operator cost per minute as computed by TRAI is 4.4 paise per minute for 2012-13.

2. Key assumptions made by TRAI to compute impact of auction price on operator cost per minute

Auction pricing will have an impact on the overall industry cost structure. We have analyzed Annexure VII and VIII, in which TRAI has computed the impact on the overall GSM services segment and on a hypothetical service provider. The key assumptions made by TRAI are given below:

2.1. MOU: Actual data on total GSM MOU, incoming and outgoing, for 2010-11 has been taken as the base for future projection of MOUs for 20 years (from 2012-13 to 2031-32). The growth rates assumed for the different time periods are provided below:

<table>
<thead>
<tr>
<th>Years</th>
<th>2011-13</th>
<th>2013-16</th>
<th>2016-2026</th>
<th>2026-32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall MOU Growth rates (%)</td>
<td>15%</td>
<td>10%</td>
<td>5%</td>
<td>3%</td>
</tr>
</tbody>
</table>

2.2. Reserve price per MHz of 1800 MHz spectrum: The reserve price per MHz is based on 3G auction prices per MHz for different service areas in 2010-11, which are indexed to 2011-12, using the State Bank of India (SBI) average PLR rate @ 12.63%. This has been adjusted further with an efficiency factor of 1.2 for 1800 MHz over the 2.1GHz band and 80% of the computed value has been adopted as the reserve price of INR3,622 crore per MHz.

2.3. Total spectrum considered to calculate impact of auction prices on operator costs: The spectrum available in the 1800 MHz band (576.20 MHz) has been considered. It comprises:

- 365.2 MHz spectrum available from cancelled licenses (total spectrum available from cancelled licenses is 413.6 MHz out of which 48.4 MHz is available in less than 75% of LSA, and hence, has not been considered for auction)
- 211 MHz already available with Wireless Planning Commission (WPC)

2.4. EMI computation of total auction price paid: The annualized EMI for the auction price, based on reserve price, has been calculated for 20 years, taking an interest rate of 15% per annum.

2.5. Share of non-voice services in overall EMI: The share of annualized EMI, met out of the revenue generated from non-voice services, has been increased from 18% in 2012-13 to 30% in 2016-17, 40% in 2018-19 and 50% from 2020-21 onwards.
3. Critique on key assumptions made by TRAI on impact of auction price on operator cost

3.1. Our approach

- We have analyzed the key assumptions made by TRAI in Annexure VII and VIII of the report on computing the impact of auction prices on operator cost.
- In addition, we have assessed other relevant factors that should be considered to gauge the overall impact on the cost burden and end-user tariff:
  - Additional spectrum costs due to extension of license
  - Purchase of 900 MHz spectrum for business continuity
  - Overall impact on financing of spectrum, the key one being the impact of the additional debt burden on telecom operators as well as the exposure of the banking system to spectrum financing
- Thereafter, we have computed the impact on the operator cost, based on our revised assumptions.

3.2. Assessment of key assumptions made by TRAI

A. Growth and composition of MOU

1. Incoming and outgoing minutes included; impact on consumer tariff underestimates by factor of 2

TRAI has assumed incoming and outgoing minutes for computation of the impact on operator cost. However, only 48% of the total MOU assumed by TRAI are outgoing ones, as given below:

<table>
<thead>
<tr>
<th>MOU - GSM (minutes per month – Dec 2011)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Incoming</td>
<td>171</td>
</tr>
<tr>
<td>Outgoing</td>
<td>161</td>
</tr>
<tr>
<td>Total</td>
<td>332</td>
</tr>
</tbody>
</table>

Source: "Telecom Services Performance Indicator Report", Quarter ending Dec 2011

Given that only outgoing minutes are chargeable, the impact on operator cost should only be computed on the basis of these.

To illustrate this, while the claimed per minute cost in year one for the industry will increase by INR 0.04, if this cost is to be margin neutral to the industry, the impact on consumer tariff will be twice of this (assuming only outgoing minutes and given that all other TRAI assumptions hold).

2. Average projected growth rate in MOU very high

TRAI has estimated that the average projected growth in MOU will be 10% over the next five years, against 5% projected by industry analysts. This is depicted in Figure 1 below:

1 Source: TRAI
Assuming an average growth rate of 5% from 2013-17, the impact on operator cost and consumer tariff in 2013 will be 6% more than that computed by TRAI.

3. TRAI’s assumption on increase in MoU per subscriber in contrast to the historical trend

TRAI has assumed that MOU will grow ~160% over a period of 20 years (2012-2032), as detailed in Annexure VII. Given the GSM subscriber growth (41%) assumed by TRAI in Annexure VIII and the MOU growth in Annexure VII, the MOU per subscriber will increase by 84% over the next 20 years, from 337 in 2012-13 to 618 in 2031-32. This is contrary to historical trends, which indicate that MOU/sub have been falling over the last few years.

Furthermore, if we assume that the MOU/sub remain at the current level, then the subscriber growth required to achieve the MOU growth mentioned above – reaching ~2.159 million subscribers in 2032 with penetration level of 141% – seems unrealistic.

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2 Source: Annexure VIII of TRAI recommendations on auction of spectrum, 23 April 2012.
3 Source: Annexure VII of TRAI recommendations on auction of spectrum, 23 April 2012.
4 Source for Population projection: World Bank estimate.
Impact of TRAI’s recommendations on Auction of Spectrum on operator cost and consumer tariffs

4. Possibility of impact on operator cost being understated since effect of price elasticity is not considered

TRAI has not considered the impact of price elasticity on the average MOU consumed by a user, i.e., as the cost per minute, and hence tariffs rise, the growth in MOU will be less than that assumed by TRAI. Industry reports\(^5\) indicate that an average tariff increase of ~20% by leading Indian operators in 2Q2011 resulted in a sharp decline in MOU (2.6-6.9%), with price elasticity ranging from 1.3 to 5.

B. Reserve price per MHz of 1800 MHz spectrum

1. Reserve price incorrectly linked to 3G price

By linking the reserve price to the 3G bid price, TRAI has made an assumption that the revenue or cash flow profile resulting from using this spectrum will be similar to that from using broadband networks. Given the current state of the LTE ecosystem, it seems unlikely that LTE networks will be deployed at this stage by any new operator.

Existing operators are unlikely to get adequate spectrum during the forthcoming auctions (refer to point 3.22 and 3.24 of TRAI’s report) to roll out LTE in this band. Moreover, they do not have sufficient spectrum to service their existing 2G and/or 2.5G subscribers, especially in areas where the need for LTE may have arisen earlier. Therefore, it is highly likely that this spectrum will be used to offer 2G and/or 2.5G services. The revenue and cash flow profile of such services cannot support the price per MHz suggested by TRAI.

2. Auction of ~20% spectrum in 1800 MHz band resulting in artificial scarcity

TRAI has recommended the auction of a minimum of 5 MHz spectrum in the 1800 MHz band, i.e., ~20% of the available spectrum. This will create artificial scarcity and drive prices higher, which will in turn increase the overall cost per minute of the operator.

3. TRAI attempting to set reserve price close to clearing price and not allowing market forces to determine true value of spectrum

As observed in the case of 3G and/or BWA auctions, the clearing price significantly exceeded the reserve price of the spectrum (~5.8 and 7.3 times, respectively). This was a function of the level at which the price was set and the market demand.

In its recommendations, TRAI has factored in the high demand for spectrum in setting the reserve price. This is contrary to the principle of market-determined pricing.

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\(^5\) Ambit Capital: December 2011.
4. **Material differences in impact across circles**

An analysis of the annual EMI for all spectrum-related costs\(^6\) as a percentage of revenues on an all India basis suggests that 45% of the revenues would go toward payment of spectrum-related costs. The impact is as high as 133% in the metros and highlights the fact that national averages do not reflect circle-specific differences.

<table>
<thead>
<tr>
<th>Category of Circle</th>
<th>GSM ARPU FY 13 (INR)</th>
<th>Annualized GSM ARPU (INR/year)</th>
<th>GSM Subscribers FY 13 (Mn)</th>
<th>EMI per year (Crores)</th>
<th>EMI per Sub (INR/Sub)</th>
<th>EMI per Sub as % of annulalized ARPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro</td>
<td>118</td>
<td>1,416</td>
<td>98</td>
<td>18,455</td>
<td>1,878</td>
<td>133%</td>
</tr>
<tr>
<td>Circle A</td>
<td>101</td>
<td>1,212</td>
<td>307</td>
<td>18,745</td>
<td>611</td>
<td>50%</td>
</tr>
<tr>
<td>Circle B</td>
<td>82</td>
<td>984</td>
<td>345</td>
<td>5,244</td>
<td>152</td>
<td>15%</td>
</tr>
<tr>
<td>Circle C</td>
<td>85</td>
<td>1,020</td>
<td>120</td>
<td>838</td>
<td>70</td>
<td>7%</td>
</tr>
<tr>
<td>All India Average</td>
<td>93</td>
<td>1,116</td>
<td>871</td>
<td>43,281</td>
<td>497</td>
<td>49%</td>
</tr>
</tbody>
</table>


Note: The calculations given above include the spectrum cost of 576.2 MHz spectrum in the 1800 MHz band proposed to be auctioned and the extension-linked cost of 900 MHz and 1800 MHz spectrum currently held by all operators.

5. **Material differences in impact across operators**

The impact will vary materially, depending on whether the operator is a new entrant, an existing operator seeking extension of license or an existing operator who is not seeking extension of license in the near future. This can be witnessed in TRAI’s computation in Annexure VII and Annexure VIII and indicates that at an industry level, the EMI per minute in year one is INR0.04, but for a single operator the EMI is as high as INR0.14.

For a new operator in a circle where economics are weak (as mentioned above), the overall cost may be prohibitive. Apart from this, TRAI’s computations have not differentiated between an existing operator seeking extension of license and one not seeking this in the near future. The variable impact across different categories of operators is expected to destroy the level playing field in the industry.

C. **Share of non-voice services in overall EMI to increase from 18% in 2013 to 50% in 2021**

1. **Current non-voice revenue at 12%-14%**

While TRAI has estimated that the current non-voice revenue in the industry is 18%, industry estimates indicate that they only contribute between 12%-14% of the telecom industry’s revenues, the bulk of which is generated from SMS or ring tones, with mobile broadband services accounting for a very small share.

2. **Limited telecom markets where non-voice revenue contributes 50% of the industry’s revenue**

Most of these markets have achieved such a high contribution from non-voice services due to the availability of high-speed networks and uptake of mobile broadband access.

In fact, the global average share of non-voice revenue in the segment’s total revenue is 34%, as depicted in Figure 3 below. Therefore, it is unlikely that the share of non-voice revenue will increase to 50% by 2021 as assumed by TRAI.

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\(^6\) Cost of 576.2 MHz of 1800 MHz spectrum proposed to be auctioned and the extension-related cost of the 900 MHz and 1800 MHz spectrum currently used by operators
3. TRAI’s assumption that a large share of the revenue will come from non-voice services unrealistic

1. Such a high percentage of non-voice revenue is unlikely to come from usage of 2G or 2.5G networks.
2. High-speed data networks will need to be deployed to achieve this revenue profile.
3. Currently, the LTE ecosystem is under-developed.
4. The cost associated with deploying such networks is not included in TRAI’s computation.

This will have a significant impact on the cost per unit (data or voice) and may result in very high data tariffs. This will deprive the Indian consumer of the benefit of affordable high-speed data services.

4. Other relevant factors to be considered for computation of impact

A. Spectrum to be considered for calculating impact

1. Total spectrum cost underestimated

TRAI’s computation in Annexure VII indicates that impact on operator cost is based on auction of 576 MHz of spectrum (1800 MHz band) for INR93,721 crore. However, the actual spectrum cost to the industry is not limited to that incurred during this auction, but must also include the cost associated with extension of licenses, which is benchmarked to the current auction price. We believe that the total spectrum cost is ~INR280,000 crore, compared with INR93,721 crore computed by TRAI. The break-up is as follows:

- Auction of 576 MHz: INR93,721 crore
- Extension of license of existing operators (1800 MHz): INR57,000 crore
- Purchase of 900 MHz spectrum for business continuity: INR129,000 crore

Therefore, given the cost calculated above and using TRAI’s EMI methodology, the true impact on operator cost and consumer tariffs in 2015 will be approximately three times that computed by TRAI.

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7 Spectrum cost is prorated up to 2032. The absolute spectrum cost for the entire license-extension duration of 20 years will be higher.
2. **Additional spectrum and/or network cost not considered**

The cost of additional spectrum and/or network coverage required to service the MOU growth projected by TRAI needs to be included in computation of the overall impact on operator cost.

3. **License extension charges not included in impact of reduced Spectrum Usage Charges (SUC)**

The SUC on spectrum bought through the auction or by extension of license will be 3% of the Adjusted Gross Revenue (AGR) (versus 3%-8%, based on spectrum held). This implies that existing operators can only benefit from reduced SUC after payment of license-extension charges that are linked to the current reserve price. This needs to be included in computing operator cost.

**B. Impact on operator financials and funding**

1. **Operator balance sheets already stressed with Net Debt/EBITDA of more than 3.0X**

Before 2010, Indian telecom players\(^8\) were under-leveraged, as compared to global players, with a Net Debt/EBITDA of 1.5x, as compared to the global average of 2.1x. However, after the recently held auction of 3G and BWA spectrum, the average Net Debt/EBITDA of domestic telecom players has crossed 3.0x, as depicted in Figure 4 below:

![Figure 5: Net debt/EBITDA\(^9\)](image)


Additional spectrum costs will only further exacerbate these ratios, and thereby increase the financial risk of operators.

2. **Operator ability to raise and service debt to be constrained**

The total outflow of spectrum at the reserve price will be ~INR280,000 crore. Assuming that 70% of this outflow will be funded by banks, ~INR196,000 crore will be required over the next few years. The already large exposure of banks to the telecom sector (with a gross credit exposure of INR100,000 crore as on June, 2011, with INR23,000 crore accounted for by SBI alone)\(^10\) and the negative view of the industry (due to cancellation of licenses and statements by leading global telecom operators desiring to withdraw from the Indian market) will make it difficult for operators to raise and service debt. Moreover, the cost of debt is also likely to go up.

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\(^8\) Based on information relating to publicly listed telecom players in India

\(^9\) As on March 31, 2010 and 2011.

5. Conclusion

Our analysis of the key assumptions made by TRAI in its computation of the impact on operator cost highlights the fact that several factors have been underestimated, and when included, will result in increased operator cost per minute and consumer tariffs.

Based on the analysis given above, the impact on operator cost, on an average, will be at least six times more than that computed by TRAI, when the two factors – additional spectrum cost and accounting for only outgoing minutes – are corrected.

Furthermore, as highlighted in the report, factors such as price elasticity, the share of non-voice revenue, additional network costs and MOU growth could have an additional impact on consumer tariffs. These factors should be analyzed further to determine the overall impact on operator cost and consumer tariff.
Our offices

Ahmedabad
2nd floor, Shivalik Ishaan
Near. C.N Vidhyalaya
Ambawadi,
Ahmedabad - 380 015
Tel: + 91 79 6608 3800
Fax: + 91 79 6608 3900

Bengaluru
12th & 13th floor
“U B City” Canberra Block
No.24, Vittal Mallya Road
Bengaluru - 560 001
Tel: + 91 80 4027 5000
+ 91 80 6727 5000
Fax: + 91 80 2210 6000 (12th floor)
Fax: + 91 80 2224 0695 (13th floor)

Chandigarh
1st Floor
SCO: 166-167
Sector 9-C, Madhya Marg
Chandigarh - 160 009
Tel: + 91 22 6192 0000

Chennai
Tidel Park,
6th & 7th Floor
A Block (Module 601,701-702)
No.4, Rajiv Gandhi Salai
Taramani
Chennai - 600 113
Tel: + 91 44 6654 8100
Fax: + 91 44 2254 0120

Hyderabad
Oval Office
18, iLabs Centre,
Hitech City, Madhapur,
Hyderabad - 500 081
Tel: + 91 40 6736 2000
Fax: + 91 40 6736 2200

Kochi
9th Floor “ABAD Nucleus”
NH-49, Maradu PO,
Kochi - 682 304
Tel: + 91 484 304 4000
Fax: + 91 484 270 5393

Kolkata
22, Camac Street
3rd Floor, Block C
Kolkata - 700 016
Tel: + 91 33 6615 3400
Fax: + 91 33 2281 7750

Mumbai
6th Floor Express Towers
Nariman Point
Mumbai - 400 021
Tel: + 91 22 6192 0000
Fax: + 91 22 6192 2000

14th Floor, The Ruby
29 Senapati Bapat Marg
Dadar (west)
Mumbai - 400 028
Tel + 91 22 6192 0000
Fax + 91 22 6192 1000

5th Floor Block B-2,
Nirion Knowledge Park
Off. Western Express Highway
Goregaon (E)
Mumbai - 400 063
Tel: + 91 22 6192 0000
Fax: + 91 22 6192 3000

NCR
Golf View Corporate
Tower - B
Near DLF Golf Course,
Sector 42
Gurgaon - 122 002
Tel: + 91 124 464 4000
Fax: + 91 124 464 4050

6th floor, HT House
18-20 Kasturba Gandhi Marg
New Delhi - 110 001
Tel: + 91 11 4363 3000
Fax: + 91 11 4363 3200

Pune
C-401, 4th floor
Panchshil Tech Park
Yerwada (Near Don Bosco School)
Pune - 411 006
Tel: + 91 20 6603 6000
Fax: + 91 20 6601 5900
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