Recommendations on the Consultation Paper

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Introduction

We are providing our consultation as mobile services consumers. Our concern is to prevent monopolistic market and pursue for a healthy competition in the mobile market. We would like to have a customer driven market rather than an operator one. There should be enough number of plans offer in the market with latest technologies to pick from. Also, we don't want existing customers to suffer.

The purpose of the auction should be:

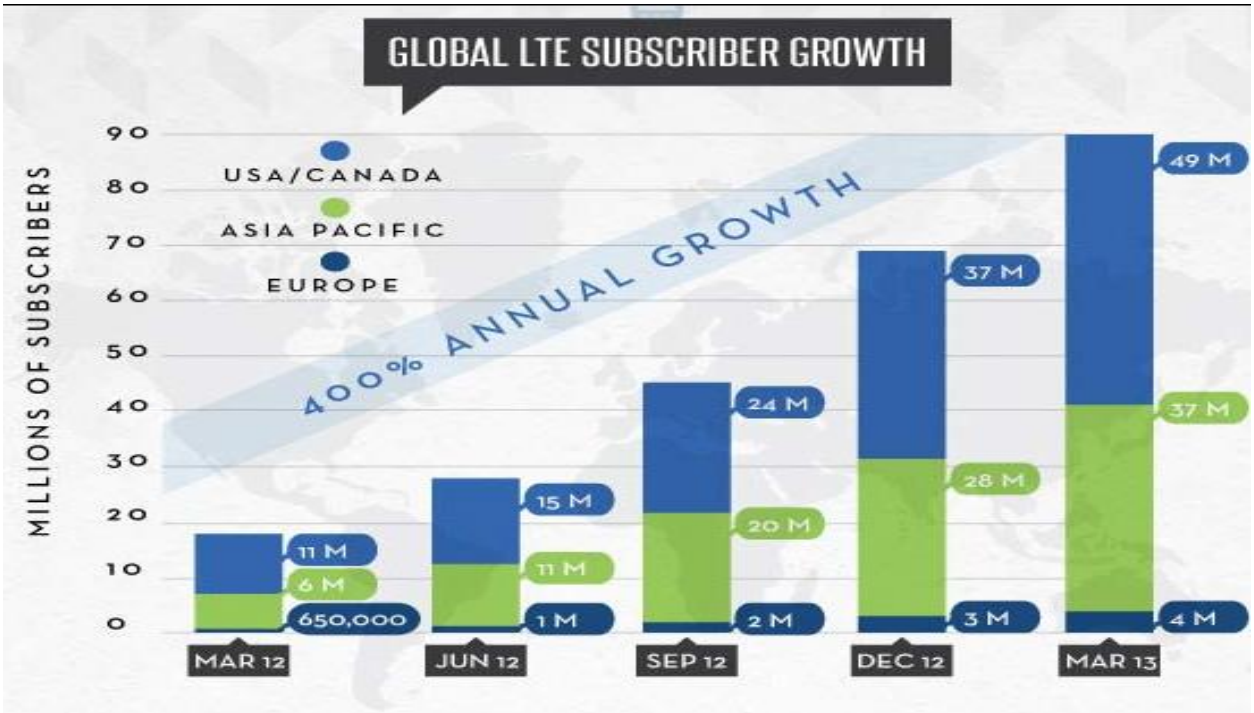
1. Promoting strong competition in the 4G mobile market
2. Faster mobile broadband speed
3. Lower Prices
4. Better frequency usage
5. Greater Innovation
6. New Investment
7. Better Coverage
8. New players could opt for the auction

Spectrum is a public resource and we would like it to be auctioned at maximum possible price. Our concern is to prevent any hoarding of spectrum as well as to prevent any undue advantage to any operator. As we can earn revenues from spectrum once in 20 years, therefore, the auction should be timed suitably to maximize our return.

800MHz spectrum is also known as the digital dividend spectrum and one of most sought after, therefore, while deciding the valuation of the same, we need to be extra cautious. Also, we need to carefully decide on the licensing conditions on coverage and roll-out while deciding the auctioning price and the annual fees of the spectrum.

There are some global trends which we would like to highlight:

1. LTE is the fastest network deployment in mobile telecommunications history
2. LTE users consume 1.5 GB of data per month on average - almost twice the average amount consumed by non-LTE users
3. In developing economies, operators have noted that LTE users can generate ARPU seven to 20 times greater than non-LTE users, while in developed markets operators have found that LTE can generate an ARPU uplift ranging from 10% to 40%
4. Four out of five mobile operators that have acquired 'new' spectrum since January 2010 have been allocated airwaves aimed at supporting the launch of LTE networks
5. LTE networks worldwide have been deployed in 12 different frequency bands to date, although four out of five live LTE networks today are deployed in one of four bands: 700 MHz, 800 MHz, 1800 MHz or 2600 MHz


GLOBAL LTE SUBSCRIBER GROWTH
MILLIONS OF SUBSCRIBERS
90
80
70
60
50
40
30
20
10
0
USA/CANADA
ASIA PACIFIC
EUROPE
400% ANNUAL GROWTH
11 M
6 M
650,000
15 M
11 M
1 M
24 M
20 M
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37 M
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3 M
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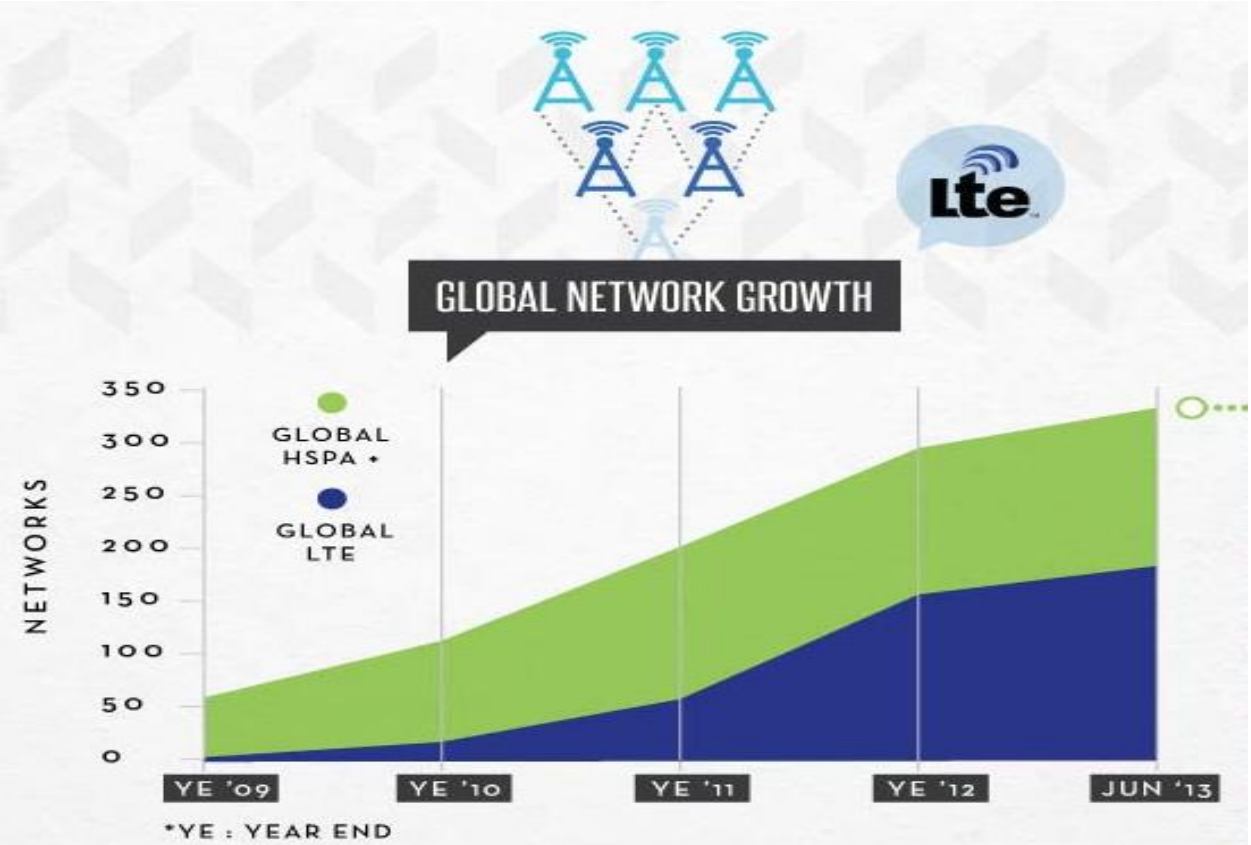
37 M
4 M
MAR 12
JUN 12
SEP 12
DEC 12
MAR 13


Lte
GLOBAL NETWORK GROWTH
NETWORKS
350
300
250
200
150
100
50
0
GLOBAL HSPA +
GLOBAL LTE
YE '09
YE '10
YE '11
YE '12
JUN '13
*YE : YEAR END

In India as well, Airtel has already launched 4G data plans. Reliance Jio Infotel is preparing its network for launch of LTE and will be offering both Broadband and Voice over LTE.

Looking at the international growth figures of LTE and carrier band size to launch LTE, it would not be prudent to auction the 800 MHz spectrum at this point of time. Going forward, our focus should be on efficient frequency usage as frequency is a scarce resource, minimize the guard band and try to push operators to offer latest technology in the market.

Also, TRAI need to come out with the performance differences between 3G and 4G. This will be broken down by operator and will assess the average mobile broadband speeds received by 3G and 4G customers. It will be designed to help consumers understand the performance benefits of 4G over 3G mobile services and assist them in making informed purchasing decisions.

Questions 1 & 2

Q.1. What should be the quantum of spectrum in the 800 MHz band that should be put up for auction?

Q.2. What should be the block size in the 800 MHz band?

As per the consultations by TRAI as on 9th September, 2013, it was recommended that *"there is no need for determining a valuation or corresponding reserve price for 800 MHz spectrum at present."*
The idealistic approach would be to wait for certain duration for the Telecom market to mature in 3G and sufficient return on investment is made so that TSPs are in a good position to weigh their options and have deeper pockets to invest in additional 800MHZ band spectrum. Also the future technology (LTE) would be at a more acceptable stage to be launched in India.

Considering the current options, the following factors can be considered in deciding the quantum and block of spectrum that can be put up for auction:-

1. **Use of Spectrum for eGSM services :-**

TRAI has already recommended that the feasibility of adoption of E-GSM in this band should be explored and the auction in this band should not be held presently. However, as mentioned in the consultation paper, the DoT also informed the Authority that "The consultation with the Ministry of Defence on the feasibility of shifting their existing frequency assignments from 925-935 MHz band to 834-844 MHz band was undertaken. Defence has intimated that due to their operational requirements, it is not feasible to migrate the equipment to other bands in a definite time frame."

So putting up the auction for spectrum which can be used for eGSM is currently ruled out.

2. **Existing CDMA Operators**

TRAI has already mentioned in the consultation paper that "the subscriber base of CDMA had diminished by around 30% over a period of three years. "

Reliance has shown monthly growth (in October 2013) of 0.39%, Sistema 0.16%, and BSNL 0.04% according to the report by TRAI on 13th December, 2013 while Tata & MTNL showing negative growth rate.

Therefore, looking at the trends in CDMA, it is really difficult to accept that any of the incumbent operators would spend on the spectrum just for sake of increasing customer base.

They would only purchase the spectrum to launch future technologies. As Reliance and Sistema already has 3/4 carriers in most of the circles, they will just need 2/1 more carriers to launch LTE in 5MHz spectrum.

Thus it would destroy the fair play policy for operators who will be new entrants in the 800 MHz band.

3. New Operators:

At this stage of telecom evolution, no operator would be interested in purchasing the spectrum for launching CDMA services. They can only invest in the spectrum if there is an opportunity to use the spectrum for launching LTE.

4. Ideal Block size of spectrum for LTE

AS mentioned in the consultation paper:

"Long Term Evolution (LTE) technology can be deployed in different carrier sizes viz.1.4 MHz, 3 MHz, 5 MHz, 10 MHz and 20 MHz. However, better spectral efficiencies can be achieved only with larger carrier sizes. Fragmented spectrum results in reduced efficiency, increased requirement of inter operator guard bands and availability of lesser amount of spectrum for productive use. In its recommendations on 'Auction of Spectrum' dated 23rd April 2012, the Authority observed that 5 MHz is the minimum amount of spectrum required to ensure that any technology can be deployed with the allocated spectrum. "

Thus LTE can be effectively launched in a 5MHz band block.

5. 3G services

In order to make optimal and more revenue churning mechanism of the critical 800MHz band, the spectrum can be sized in such a way that WCDMA services can also be provided in this band. This also gives the TSPs who missed out on the earlier 3G auction a second chance to gain spectrum to provide 3G services.

Considering the above factors, the only viable options left for the current auction of 800MHz are:-

1. Auction only 5MHz band blocks of spectrum so that the TSPs can look to deploy LTE and WCDMA (3G) in it.
2. For the period before LTE is launched, other services like data using EVDO can be launched to maintain the revenue flow until the LTE is deployed.
3. Looking at the current blocks of available spectrum we can have two scenarios :-
    A. Circles having continuous 5MHz band(4 carriers)

    Following Circles meet the above criteria:-

    i. Mumbai
    ii. Maharashtra
    iii. MP
    iv. Assam
    v. Himachal Pradesh
    vi. J&K
    vii. North East

    B. Circles having non continuous band of 5Mhz
    C. Circles having less than 4 available carriers (less than 5 MHz)

Only Kolkata and Rajasthan fall in this category, hence these circles will not be eligible for the current auction.

LSA	Total No of carriers likely to be available	Continuous 4 carrier blocks (5MHz)
Delhi	4	No
Mumbai	7	Yes
Kolkata	3	No
Maharashtra	7	Yes
Gujarat	5	No
Andhra Pradesh	6	No
Karnataka	4	No
Tamil Nadu	4	No
Kerala	4	No
Punjab	5	No
Haryana	8	No
UP (West)	4	No
UP(East)	7	No
Rajasthan	2	No
Madhya Pradesh	6	Yes
West Bengal	5	No
Himachal Pradesh	9	Yes
Bihar	7	No
Orissa	8	No
Assam	10	Yes
North East	10	Yes
J&K	10	Yes
Grand Total	**135**	

We recommend the auctioning with a block size of 5 MHz, i.e., 4 carrier blocks. In the LSAs where 4 continuous blocks are not available, TRAI should convince the existing operators in the 800 MHz band to rearrange their carrier bands so that continuous four blocks would be available.

Therefore, even if we go ahead with the auctioning process, the final allocation of the frequency band to the winners would only be possible once the existing operators will re-align their carrier band. In addition to making available the band for LTE/ UMTS, it will ensure better frequency usage.

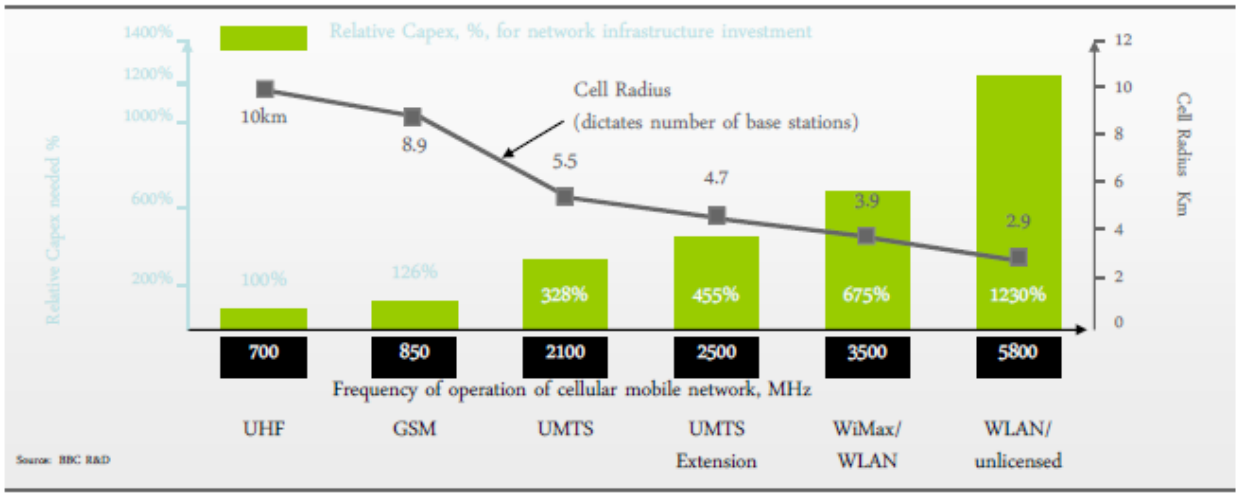
Questions 3 & 4

Q.3. Should the value of 800 MHz spectrum be derived on the basis of the value of 1800 MHz spectrum using technical efficiency factors?

Q4. Is there any case for application of a lower efficiency factor (1.3) over the valuation of 1800 MHz spectrum, for determining the valuation of 800 MHz, as was done in the previous auction? If yes, give detailed reasons for the same.

As we are aware of the fact that in the last auctioning process in the 1800 MHz spectrum, none of the operator has participated. One of the reason for this is uncertain market conditions, however, it also highlights that there is some flaw in the pricing of 1800 MHz. Therefore, we suggest instead of going by the 1800 MHz pricing we should refer the 2100 MHz pricing which was used for deployment of 3G (WCDMA) in India.

According to a Report by Dr.Károly Fiala (Head of Spectrum Management WG, IVSZ), the capex required to rollout mobile services in 800 MHz is proportionally very less compared to higher bands.



Broadcast UHF spectrum allows mobile broadband rollout at a third of capex compared to UMTS spectrum.

IVSZ

Here are some of the recommendations by Dr. Karoly:-

"The 800 MHz DD band is the most significant spectrum extension possibility below 1 GHz offering a long term solution for providing MBB coverage in rural areas helping bridge the digital divide for underdeveloped areas.

The future of mobile broadband is NGMN/LTE, which has the best technology capabilities.

The industry requests the Hungarian Ministry/NRA to take the necessary steps in order to accelerate the process of making the 800 MHz DD band available for MBB by 2013. Late availability of the 800 MHz DD band for MBB will significantly reduce the value of the band."

	Frequency band	Band average price per MHz per pop (Nov 2011 Euros)	Relative band value
Italy	800MHz	€0.70	0.32
	1800MHz	€0.23	
Greece	900MHz	€0.44	0.44
	1800MHz	€0.19	
Portugal	800MHz and 900MHz	€0.40	0.091
	1800MHz	€0.036	

From the above table taken from 'A DotEcon and Aetha Report for Ofcom on Spectrum value of 800MHz, 1800MHz and 2.6GHz' in July 2012, it is clear that the value of 800 MHz is twice/thrice the value of 1800 MHz

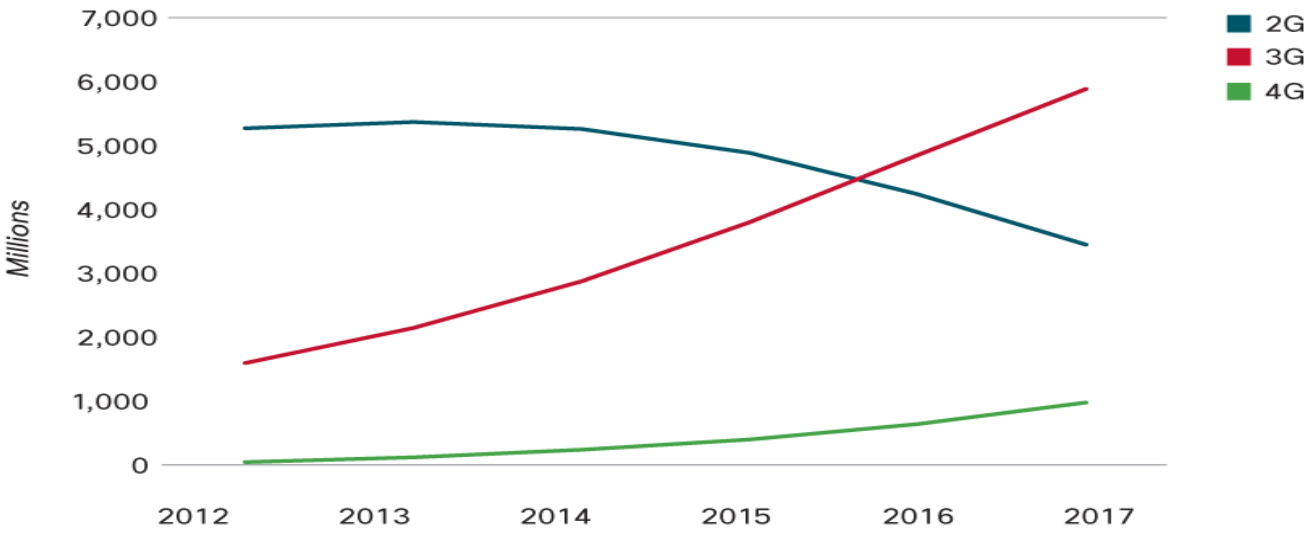
Thus there should be technical efficiency factor but it should be applied to 2100 MHz band pricing rather than 1800 MHz band pricing. Looking at the international experience as shown above, the technical efficiency should be at least two times.

Question 5

Q.5. Should the value to be paid for 800 MHz spectrum be based upon the potential growth in data services? If yes, please state whether you agree with the assumptions made.

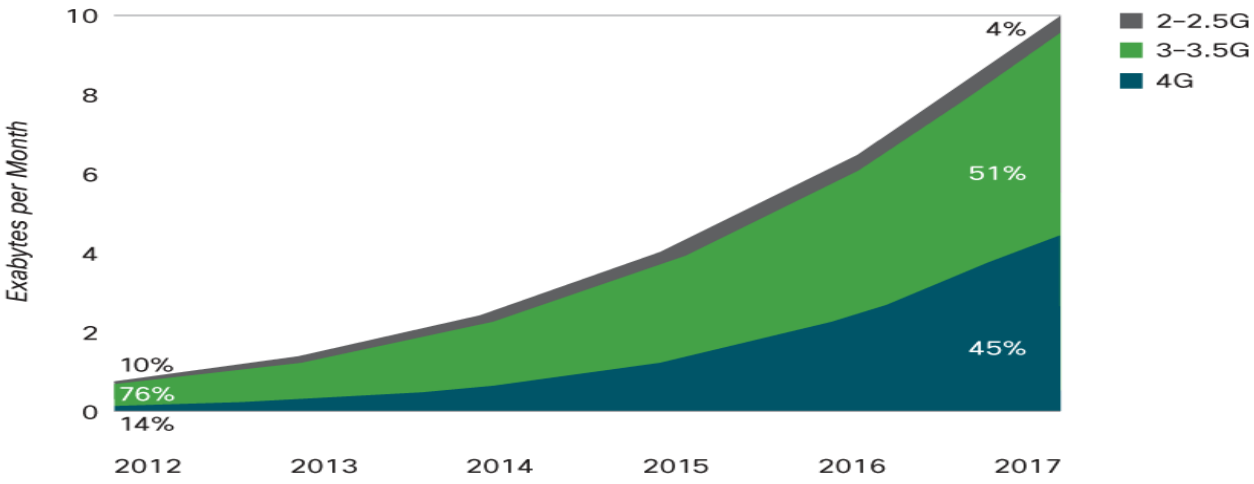
A data forecast report published by Cisco Networks clearly shows the growing trend of 3G and 4G services and decline for 2G services with regards to data traffic.

Reference:



Source: Cisco VNI Mobile Forecast, 2013

The same report also showcases the clear estimates that 4G services by the end of 2017 would have accounted for 45% of the mobile data traffic. This is when 4G services would have accounted for only 14 % of total mobile connections. Clearly, 4G services are thing for future when we need to talk about data services.



Source: Cisco VNI Mobile Forecast, 2013

It is clear from the consultation paper *that 800 MHz band can be used for other technologies such as UMTS and LTE*. When such compelling technologies like LTE and UMTS can be provided using sub GHz spectrum, then instead of using the spectrum for providing voice services, TSP will be inclined in providing data services to the end customer. Voice services will mostly be GSM services .The reason for this is the availability of matured eco system for GSM services in India for providing voice. Though 800 MHz will still be utilized for providing voice services, it will be mainly used as bundle service with TSPs concentrating on data services. Consultation paper clearly mentions the fact that:

The share of the 800 MHz band in the total revenue from data services will be around 25% in each LSA. Data download per subscriber will grow, initially at a high rate of 10% in 2014-15 and subsequently at a tapering rate over the next 20 years.

These assumptions would hold true if estimates from various sources are taken into account.

This will help us conclude that growth in revenue from data services is the combined effect of subscriber growth and data download growth. The total expected revenue from 800 MHz spectrum minus network operating and maintenance costs represents the potential net revenue earnings for the TSP.

Looking at such promising figures, TSPs would be tempted to acquire licenses in 800 MHz range and still be willing to pay premium for acquiring the spectrum. TSP who do not provide voice services currently would also be inclined to acquire the spectrum in 800 MHz band. Spectrum being scare resource, the demand would be more while the supply will be limited. The government exchequer would be expecting large amount be asking for a premium over the auction of the 800 MHz spectrum.

Question 6

Q.6. Should the value of spectrum in the 800 MHz band be assessed on the basis of producer surplus on account of additional spectrum? If you are in the favor of this method, please furnish the detailed calculations and relevant data along with results.

Producer surplus is a calculation methodology wherein the basic assumption is that the TSP's (Telecom Service Provider) total expenditure on network reduces as the quantity of spectrum utilized for the providing services increases. The total expenditure includes both capital as well the operational expenditure invested for providing and maintain certain QoS (Quality of Service) to the end customer.

The consultation paper highlights a point that, " *the allocation of additional spectrum in the 800 MHz band to an existing TSP operating in the 800 MHz band will create a producer surplus in the form of costs saved on RAN".* The producer surplus comes into picture only for an incumbent operator who is already having certain spectrum allotted to it by the DOT.

The producer surplus on account of additional spectrum of 'a' (over and above the existing) MHz in 800 MHz band may be estimated as below:
Producer surplus on account of additional spectrum of 'a' MHz in 800 MHz band
= (Present value of the expenditure on the network during the next 'y' years without additional spectrum of 'a' MHz) – (Present value of the expenditure on the network during the next 'y' years with additional spectrum of 'a' MHz in 800 MHz)

Let us try to address the thought process of including the principle of producer surplus while deciding on the value of spectrum in 800 MHz by making use of an example. We will consider the example of Mumbai Metro Circle. As of today, there are three incumbent operators:

Operator	Number of Blocks
TTML	4
MTNL	2
RCL	4

For Mumbai circle there are 4 blocks of spectrum which are up for grabs during the next auction. If the value of spectrum to be auctioned is dependent on producer surplus, then it would not be level playing field for TSPs other than the incumbent ones. To clarify further, SSTL if wants to buy any amount of blocks (1-4) depending on its requirements will have to pay a price which was set keeping in view the producer surplus for incumbent operator. So the basic pretext on which the value for spectrum has been set will be questioned.

Even if we presume that the same rule applies to all the circles where in incumbent of Mumbai circle may not be present and then will have to shell out more money to get the auctioned block, it will not be acceptable to the green field operator who has LSA but does not have any spectrum but wishes to participate in the upcoming auctions and launch new services.

The producer surplus should not be recovered from the TSP through the increased value of spectrum but should be left with the TSP so that the same surplus can be utilized for improving the QoS or launching new services which in long run help the Indian Exchequer in form or the other.

Question 7

Q.7. Should the value of spectrum in the LSAs in India for 800 MHz be determined by utilizing the data on international prices? What other variables do you suggest for arriving at robust value estimates using the multiple regression approach? Is there any alternate approach for valuation of spectrum in 800 MHz using the data on international auctions?

Pricing of spectrum is to a high degree determined by national and regional characteristics. The factors which influence spectrum pricing can be manifold and countries apply them very differently. To mention a few factors that may be relevant for a spectrum pricing: bandwidth, frequency range, area covered, antenna height, power, exclusivity, technology, congestion, and population density. It seems that many countries regard a regional benchmark as the most important guideline for pricing of spectrum.

We don't propose to use data on international prices to determine the value of spectrum. There are many reasons for the same:

1. In the sample of values shared in the consultation paper, there is a huge difference in the realized prices of different countries. It is really difficult to find out any common list of parameters when differences are so large.
2. The highest price in the list is only 420 crore per MHz in 2010 while we have already done with one round of auctioning in the same band with price of Rs 1820 MHz in March, 2013

The telecom scenario is very different in India when compared to the international market. We have one of the lowest tariffs, however, we have one of the highest prices of spectrum across whole world.

So the additional parameters that need to be focused are:

1. Growth rate of data users
2. Growth rate of data usage
3. Growth rate of smart phones
4. Growth rate in share of smart phones
5. Growth rate of 3G subscribers

However, there is another perspective of looking at the same. We may not consider the absolute values of the spectrum but we should definitely look at the percentage increase in the pricing from 2G to 3G to LTE. As already mentioned in the introduction, spectrum in 800 MHz band is known as digital dividend and is a premium band. 800 MHz band is many countries have been priced 2-3 times when compare to 1800 MHz band. Also, we have used some of the examples from international experience during our recommendations.

Therefore, we could use the international experience as a baseline to start with and then apply the local factors to finally decide the pricing.

Question 8

Q.8. Apart from the approaches discussed in the paper, is there any alternate approach for valuation of spectrum in 800 MHz that you would suggest? Please support your answer with detailed data and methodology.

In a statement in July 2012, Ofcom published its thinking on how to estimate full market value of spectrum it was about to auction in 900 MHz and 1 GHz range. Ofcom stated that it intended to consider results from applying the linear reference price methodology (LRPM) and the additional spectrum methodology (ASM) to the UK 4G auction.

We would like to recommend the same Additional Spectrum Methodology for valuation of spectrum during the auctioning process in India.

Additional Spectrum Methodology:

The additional spectrum methodology is based on the idea of a shadow price. In this methodology we hypothetically make one additional lot available in a category and then re-determine the winning bids; the total value of winning bids can only increase by making one extra lot available, with the increase in value being the shadow price of that lot category.

The hypothetical question is if we increase the supply of lots in the auction by the spectrum that is held by a specific operator, then what value could have been generated for other bidders.

Calculation method

The following description is a more formal summary of the mechanics of the calculation. To determine the additional value generated by the current holdings of a specific operator, we proceed as follows:

i. Determine the baseline bid amount as the total amount of winning bids of all winners other than the specific operator being considered;
ii. Determine the baseline spectrum on offer. This comprises of all the spectrum on offer in the auction less the amount of spectrum won by the specific operator being considered;
iii. The total spectrum available to all other bidders in the re-optimization of winning bids is then the baseline spectrum plus the current holdings of the specific operator, treated as additional spectrum
iv. We then determine the highest value combination of bids that could be achieved by allocating this total spectrum to all other bidders based on the bids they submitted. This re-optimization excludes the bids of the bidder we are considering.
v. The additional amount that other bidders would have been willing to pay for the current holdings of the specific operator is then the difference between this new total value and the original baseline total bid amount.

The FCC intends to use a new form of auction called incentive auction which also provides incentives for broadcasting companies to vacate spectrum. If we could possibly wait for now in auctioning the spectrum in the 800 MHz band, we could possibly follow this auctioning process. It would ensure better frequency usage. The steps would be as follows:

1. Identify the bands in which LTE can be launched and we have a minimum block of 5MHz to auction.
2. Identify the blocks of spectrum which are not getting used efficiently and need to be reallocated
3. By combining all leftover spectrum blocks, try to auction at least 4 blocks of 5MHz at a time for a competitive bidding and fair play for all the bidders.

Question 9

Q.9. What should be the ratio adopted between the reserve price for the auction and the valuation of the spectrum? Would it be optimal to fix reserve price equal to valuation of spectrum?

Reserve prices affect participation and may impact demand for spectrum in the auction. Although reserve prices should normally not affect final auction prices and outcomes, setting them at a level that is substantially below market value can produce inefficient outcomes because with starting prices that are substantially below market value bidders may have a stronger incentive to behave strategically to prevent prices from increasing.

Also, as we have learnt from the last auction that there may be circumstances in which spectrum could be sold at the base price only. **Therefore, it would be prudent to fix the reserve price equal to the valuation of spectrum.**

As such there is no urgency to sell off the spectrum. However, it would be a great injustice to people of the nation, who are most important stakeholders to any public goods, if we auction the spectrum below its actual valuation.

There is a trade-off between the value of benefits which 4G will provide to the consumers and the valuation of spectrum 1-2 years down the line. Looking at the current telecom scenario in India, there is no doubt that data & broadband usage is increasing. However, it is highly doubtful that LTE broadband usage would pick up in next couple of years.

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