

Response to TRAI's consultation on 'Valuation and Reserve Price of Spectrum'

Summary

We welcome the opportunity to comment on the TRAI stakeholder consultation on 'Valuation and Reserve Price of Spectrum'. Given the significance of this consultation and its long-term impact on the telecoms industry landscape in India, we believe it is imperative to ensure that the approach for estimating the market price and setting the reserve price is aligned to the technology and competitive situation specific to the Indian telecoms market, with global experience and best practices used only for guidance, as appropriate.

We have two specific suggestions on the estimation of market price and setting of reserve price for the 900MHz and 1800MHz spectrum band, as detailed below:

a) The reserve price for 1800MHz cannot be used directly for setting up the reserve price for 900MHz, given the policy objective and excess demand scenario for the two bands is different

The primary issue that we would like to focus on is the setting of reserve price for the 900MHz and 1800MHz bands, and the distinction between reserve price setting and market price estimation – the reserve price setting is determined by policy objective and the excess demand situation for the spectrum band, as compared to estimation of market price which is driven by the project value of the band (cost avoidance and incremental revenues), as well as the option value (flexibility to hold spectrum and deploy at an appropriate time)¹.

The current approach of deriving the reserve price of 900MHz based on the reserve price of 1800MHz, although being used in international auction design, is not appropriate for the current auctions as the competitive dynamics for the two bands in India is very different.

Given the current spectrum holding situation of operators (for 900MHz and 1800MHz bands), the expected multi-technology models of technology deployment for mobile broadband services, the necessity of protecting revenues from established subscriber base, and the requirement of data-only entrants to have a fall back spectrum band to offer voice services, is expected to result in the 900MHz spectrum band having a much higher excess demand as compared to the 1800MHz band. The 1800MHz operators typically have a much lower revenue market share in their areas of operation, and more importantly, although the spectrum is theoretically liberalized, it can not be used for deploying FD LTE for the next four to five years due to issues around spectrum contiguity, reportedly limited availability of narrowband devices (operating in 1.4 MHz, 3 MHz and 5 MHz) and the requirement to support GSM traffic. In the most likely scenario, operators will be deploying HSPA+ on 900MHz, or DC HSPA+ on 900MHz+2100MHz, while using 1800MHz for GSM traffic - operators will have to support existing GSM traffic using some band, and cannot deploy HSPA and LTE services on all their spectrum bands.

This market situation, and the experience of last two auctions for 1800MHz spectrum needs to be reflected in setting up the reserve price irrespective of the market price of the spectrum band.

¹ Based on a review of global NRA consultations, Plum Consulting

Global NRAs (National Regulatory Authorities) use three broad approaches for setting up the reserve price, as illustrated in Figure 1, along with an indicative range of reserve price to market price ratio that reflects the economic objective that the NRA is trying to achieve. The range of the ratio may vary marginally, but directionally the reserve price reflects the objective of the NRA and the excess demand situation in the market for that particular band.

Figure 1: Approaches for setting reserve prices based on excess demand scenarios²

Approach	Description	Ratio RP/ MP	Pros	Cons
1 Low but non-trivial	Reserve price much much lower than (or not related to) the expected market price; Used for lots of low/uncertain value	Reserve price set at 1% to 10% of market price, or set arbitrarily	<ul style="list-style-type: none"> Exclude frivolous bidders Auction concludes quickly Used in recent European auctions 	<ul style="list-style-type: none"> Bidders can acquire spectrum at very low prices in a limited competition scenario
2 Minimum expected return	Reserve price set at a discount to expected market price, but at a level which will ensure significant revenue if all licences are sold	Reserve price set at 30% to 50% of market price	<ul style="list-style-type: none"> Recover the administrative costs of clearing and auctioning the spectrum Used in scenarios of reasonable level of excess demand 	<ul style="list-style-type: none"> Risk of unsold lots if the discount applied is low
3 Revenue maximization	Reserve price set at a level close to the expected market price	Reserve price set at 60% to 80% of market price	<ul style="list-style-type: none"> Revenue maximization even if there is no excess demand Minimize strategic bidding and collusion 	<ul style="list-style-type: none"> Choke demand from serious bidders resulting in unsold spectrum Difficult for new entrants to participate in auctions

Given the market and policy context as outlined in the earlier page, we believe that setting the reserve price for 900MHz using model 2 in the above table, and setting the reserve price for 1800MHz using model 3 in the above table will be more appropriate and efficient.

If the higher reserve price for 900MHz spectrum is driven by the regulator’s concern about the possibility of strategic bidding and collusion among operators, then a robust auction design and use of mechanisms such as spectrum caps appear to be more suitable, rather than setting the reserve price for 900MHz at a very high level which will also defeat the overall objective of re-farming of 900MHz spectrum to set up a level playing field and allow potential entry of new operators.

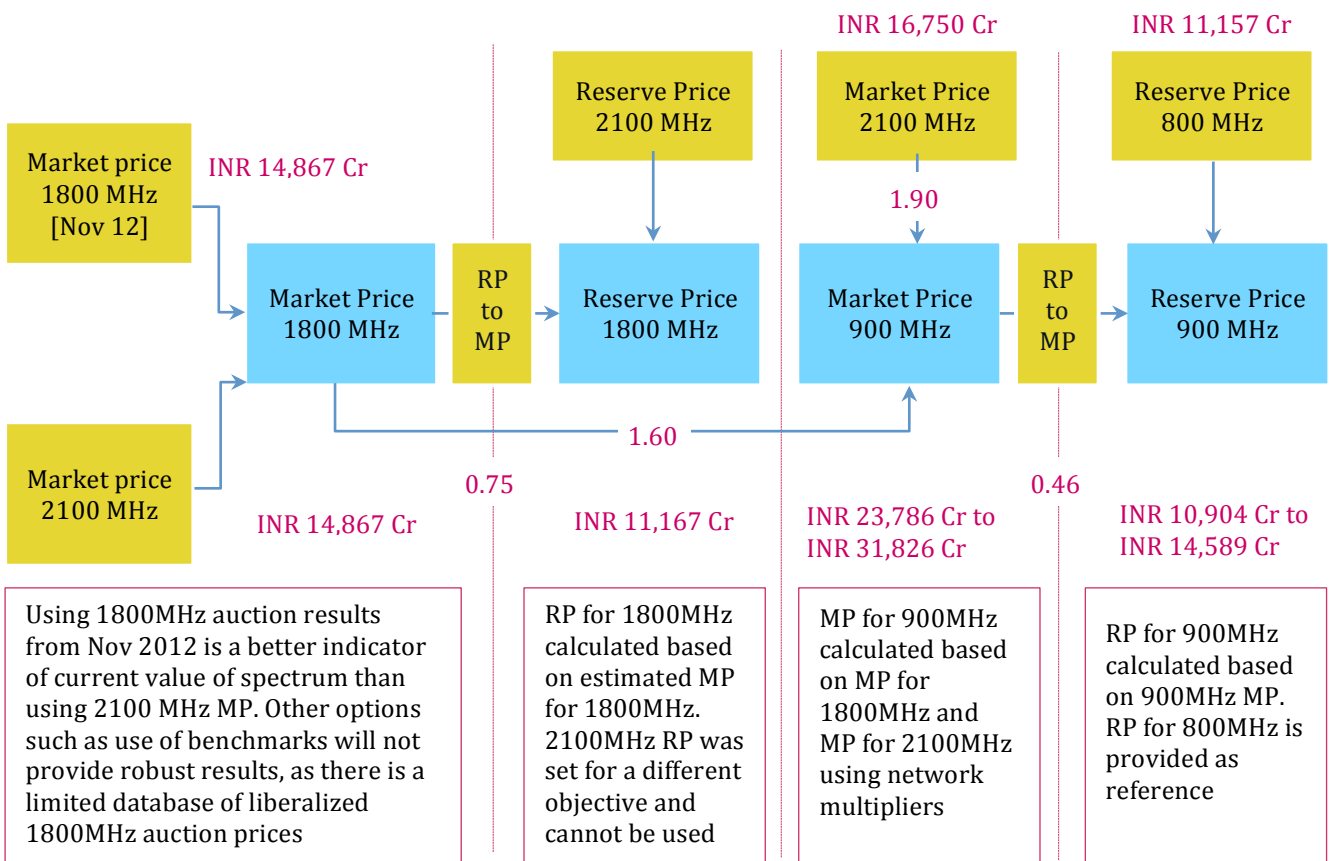
² Source: Review of NRA consultations (ComReg, OFCOM, ANCOM), Aetha and NERA report for BIPT Oct12

b) The market price for the bands should be linked using cost avoidance / incremental revenue models, and the market price should then in turn be used to set the reserve price using the appropriate policy objective and excess demand situation

Linking the market price for spectrum bands such as 900MHz and 1800MHz, or 900MHz and 2100MHz using approaches of cost avoidance and incremental revenues can provide a reasonable estimate of the relative market value of 900MHz. This is especially robust if the base line valuation used for calculating the 900MHz market price is linked to market determined values of 1800MHz and 2100MHz spectrum. The market price for 1800MHz band can be derived using the values determined in the latest auctions (November 2012), with values for unsold circles derived using multiple regression models using the relevant demand variables.

Using the above considerations, the actual realized market values for spectrum auctions in India as well as benchmarks from global auctions; we propose the approach as detailed in Figure 2 for calculation of the reserve price and market prices of 5MHz of pan-India 900MHz and 1800MHz spectrum.

Figure 2: Proposed approach for estimating the Market Price (MP) and setting up the Reserve Price (RP) of 900MHz and 1800MHz spectrum³



³ Source: Capitel Partners, TRAI consultation paper, NRA consultations (BIPT, ComReg, OFCOM)

Using the above approach we estimate the values of reserve and market price for 900MHz and 1800MHz spectrum as illustrated in Figure 3:

Figure 3: Estimated market price and reserve price for 900MHz and 1800MHz spectrum

Spectrum	Reserve Price (5MHz All India)	Market Price (5MHz All India)
900 MHz	INR 10,904 Cr to INR 14,589 Cr ⁴	INR 23,786 Cr to INR 31,826 Cr
1800 MHz	INR 11,167 Cr	INR 14,867 Cr

The 900MHz reserve price comes out to be close to the reserve price set for 800MHz spectrum in the last round of auctions (March 2013), which is in alignment with the sub-1GHz price parity used in global auctions.

The multiplier of reserve price to market price needs to be further refined so that it is aligned with the reserve price set for specific auctions in global markets where the excess demand was expected to be high vs. low.

We use the above approach and assumptions to address specific questions in the consultation paper in the following pages, and remain available for any further information that you may request regarding this submission at pankaj.agrawal@capitelpartners.com (+919958901085) and neha.aggarwal@capitelpartners.com.

Sincerely yours

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Q1. What method should be adopted for refarming of the 900 MHz band so that the TSPs whose licences are expiring in 2014 onwards get adequate spectrum in 900/1800 MHz band for continuity of services provided by them?

We do not have any views and comments on this issue.

Q2. In case spectrum is to be “reserved” for such TSPs, should it be restricted to licences expiring in 2014 (metros) or include licences expiring afterwards (LSAs other than metros)?

We do not have any views and comments on this issue.

Q3. Is any restriction required to be imposed on the eligibility for participation in the proposed auction?

⁴ The reserve price for 900MHz will need to be set higher than the reserve price for 1800MHz spectrum (INR 11,167 Crores) to be in alignment with global spectrum auction designs for multi-band spectrum

We do not have any views and comments on this issue.

Q4. Should India adopt E-GSM band, in view of the diminishing interest in the CDMA services? If yes,

- a) How much spectrum in the 800 MHz band should be retained for CDMA technology?**
- b) What are the issues that need to be addressed in the process?**
- c) What process should be adopted for migration considering the various issues involved?**

We do not have any views and comments on this issue.

Q5. Should roll out obligations for new/existing/renewal/quashed licenses be different? Please give justification in support of your answer.

We do not have any views and comments on this issue.

Q6. Is there a need to prescribe additional roll-out obligations for a TSP who acquires spectrum in the auction even if it has already fulfilled the prescribed roll-out obligations earlier?

We do not have any views and comments on this issue.

Q7. What should be the framework for conversion of existing spectrum holdings into liberalised spectrum?

We do not have any views and comments on this issue.

Q8. Is it right time to permit spectrum trading in India? If yes, what should be the legal, regulatory and technical framework required for trading?

We do not have any views and comments on this issue.

Q9. Would it be appropriate to use prices obtained in the auction of 3G spectrum as the basis for the valuation in 2013? In case the prices obtained in the auction of 3G spectrum are to be used as the basis, what qualifications would be necessary?

The market prices for 900MHz spectrum can be calculated using the market price for 2100MHz spectrum, given that both technologies will be deployed for HSPA in the near term and for FD LTE in the longer term. The appropriate multiplier based on cost avoidance can be used for calculating the estimated market price for 900MHz spectrum. There is an option of using the 2100MHz price for calculation of 1800MHz market price, however the market context of operator bidding for 2100MHz was driven by protection of high value subscribers and revenue market shares in key LSAs, which is not the case for 1800MHz spectrum, as is evident from unsold spectrum in the Delhi, Mumbai LSAs in the previous auctions. We believe that the market prices realized in the recent auctions of 1800MHz are a better indicator – although given that almost all LSAs were sold at the reserve price (except Bihar) and spectrum in some of the LSAs was unsold, the reserve price for 1800MHz should be set at 70% to 80% of such market price so as to avoid any unsold lots.

Q10. Should the value of spectrum for individual LSA be derived in a top-down manner starting with pan-India valuation or should valuation of spectrum for each LSA be done individually?

We believe that the valuation should be done in a top down manner starting with pan-India valuation, as the multipliers used for relative valuation are determined by parameters such as cost avoidance (radii of 900MHz vs. 1800MHz) and will remain constant across LSAs. The bottoms-up valuation will give a different result only in the situation of a project (discounted cash flow) valuation for the 1800MHz spectrum on a LSA basis. However, the demand and share assumptions and outlook will vary by operator, and the Capex estimates will depend significantly based on their current spectrum holdings (frequency band and quantum) and such estimates will be more suitable for internal valuation exercises of operators.

Q11. Is indexation of 2001 prices of 1800 MHz spectrum an appropriate method for valuing spectrum in 2013? If yes, what is the indexation factor that should be used?

We believe that given the significant change in market dynamics from 2001 and the possibility of use of the 1800MHz spectrum for FD LTE deployment in the next 4 to 5 years means that the 2001 prices will not be representative of the current market value, and should not be used.

Q12. Should the value of spectrum in the areas where spectrum was not sold in the latest auctions of November 2012 and March 2013 be estimated by correlating the sale prices achieved in similar LSAs with known relevant variables? Can multiple regression analysis be used for this purpose?

Yes, for these LSAs multiple regression analysis can be used for determining the estimated market value of 1800MHz spectrum.

Q13. Should the value of spectrum be assessed on the basis of producer surplus on account of additional spectrum? Please support your response with justification. If you are in favour of this method, please furnish the calculation and relevant data along with results.

We do not have any views and comments on this issue.

Q14. Should the value of spectrum in the 1800 MHz band be derived by estimating a production function on the assumption that spectrum and BTS are substitutable resources? Please support your response with justification. If you are in favour of this method, please furnish the calculation and relevant data along with results.

We do not have any views and comments on this issue.

Q15. Apart from the approaches discussed in the foregoing section, is there any alternate approach for valuation of spectrum that you would suggest? Please support your answer with detailed data and methodology.

Yes, as mentioned in the introduction to this response, we propose that the setting of reserve price for each band needs to be decided based on the excess demand scenario for that band.

We have two specific suggestions on the estimation of market price and setting of reserve price for the 900MHz and 1800MHz spectrum band, as detailed below:

a) The reserve price for 1800MHz cannot be used directly for setting up the reserve price for 900MHz, given the policy objective and excess demand scenario for the two bands is different

The primary issue that we would like to focus on is the setting of reserve price for the 900MHz and 1800MHz bands, and the distinction between reserve price setting and market price estimation – the reserve price setting is determined by policy objective and the excess demand situation for the spectrum band, as compared to estimation of market price which is driven by the project value of the band (cost avoidance and incremental revenues), as well as the option value (flexibility to hold spectrum and deploy at an appropriate time)⁵.

The current approach of deriving the reserve price of 900MHz based on the reserve price of 1800MHz, although being used in international auction design, is not appropriate for the current auctions as the competitive dynamics for the two bands in India is very different.

Given the current spectrum holding situation of operators (for 900MHz and 1800MHz bands), the expected multi-technology models of technology deployment for mobile broadband services, the necessity of protecting revenues from established subscriber base, and the requirement of data-only entrants to have a fall back spectrum band to offer voice services, is expected to result in the 900MHz spectrum band having a much higher excess demand as compared to the 1800MHz band. The 1800MHz operators typically have a much lower revenue market share in their areas of operation, and more importantly, although the spectrum is theoretically liberalized, it can not be used for deploying FD LTE for the next four to five years due to issues around spectrum contiguity, reportedly limited availability of narrowband devices (operating in 1.4 MHz, 3 MHz and 5 MHz) and the requirement to support GSM traffic. In the most likely scenario, operators will be deploying HSPA+ on 900MHz, or DC HSPA+ on 900MHz+2100MHz, while using 1800MHz for GSM traffic - operators will have to support existing GSM traffic using some band, and cannot deploy HSPA and LTE services on all their spectrum bands.

This market situation, and the experience of last two auctions for 1800MHz spectrum needs to be reflected in setting up the reserve price irrespective of the market price of the spectrum band.

Global NRAs (National Regulatory Authorities) use three broad approaches for setting up the reserve price, as illustrated in Figure 4, along with an indicative range of reserve price to market price ratio that reflects the economic objective that the NRA is trying to achieve. The range of the ratio may vary marginally, but directionally the reserve price reflects the objective of the NRA and the excess demand situation in the market for that particular band.

⁵ Based on a review of global NRA consultations, Plum Consulting

Figure 4: Approaches for setting reserve prices based on excess demand scenarios⁶

Approach	Description	Ratio RP/ MP	Pros	Cons
1 Low but non-trivial	Reserve price much much lower than (or not related to) the expected market price; Used for lots of low/uncertain value	Reserve price set at 1% to 10% of market price, or set arbitrarily	<ul style="list-style-type: none"> Exclude frivolous bidders Auction concludes quickly Used in recent European auctions 	<ul style="list-style-type: none"> Bidders can acquire spectrum at very low prices in a limited competition scenario
2 Minimum expected return	Reserve price set at a discount to expected market price, but at a level which will ensure significant revenue if all licences are sold	Reserve price set at 30% to 50% of market price	<ul style="list-style-type: none"> Recover the administrative costs of clearing and auctioning the spectrum Used in scenarios of reasonable level of excess demand 	<ul style="list-style-type: none"> Risk of unsold lots if the discount applied is low
3 Revenue maximization	Reserve price set at a level close to the expected market price	Reserve price set at 60% to 80% of market price	<ul style="list-style-type: none"> Revenue maximization even if there is no excess demand Minimize strategic bidding and collusion 	<ul style="list-style-type: none"> Choke demand from serious bidders resulting in unsold spectrum Difficult for new entrants to participate in auctions

Given the market and policy context as outlined in the earlier page, we believe that setting the reserve price for 900MHz using model 2 in the above table, and setting the reserve price for 1800MHz using model 3 in the above table will be more appropriate and efficient.

If the higher reserve price for 900MHz spectrum is driven by the regulator’s concern about the possibility of strategic bidding and collusion among operators, then a robust auction design and use of mechanisms such as spectrum caps appear to be more suitable, rather than setting the reserve price for 900MHz at a very high level which will also defeat the overall objective of re-farming of 900MHz spectrum to set up a level playing field and allow potential entry of new operators.

b) The market price for the bands should be linked using cost avoidance / incremental revenue models, and the market price should then in turn be used to set the reserve price using the appropriate policy objective and excess demand situation

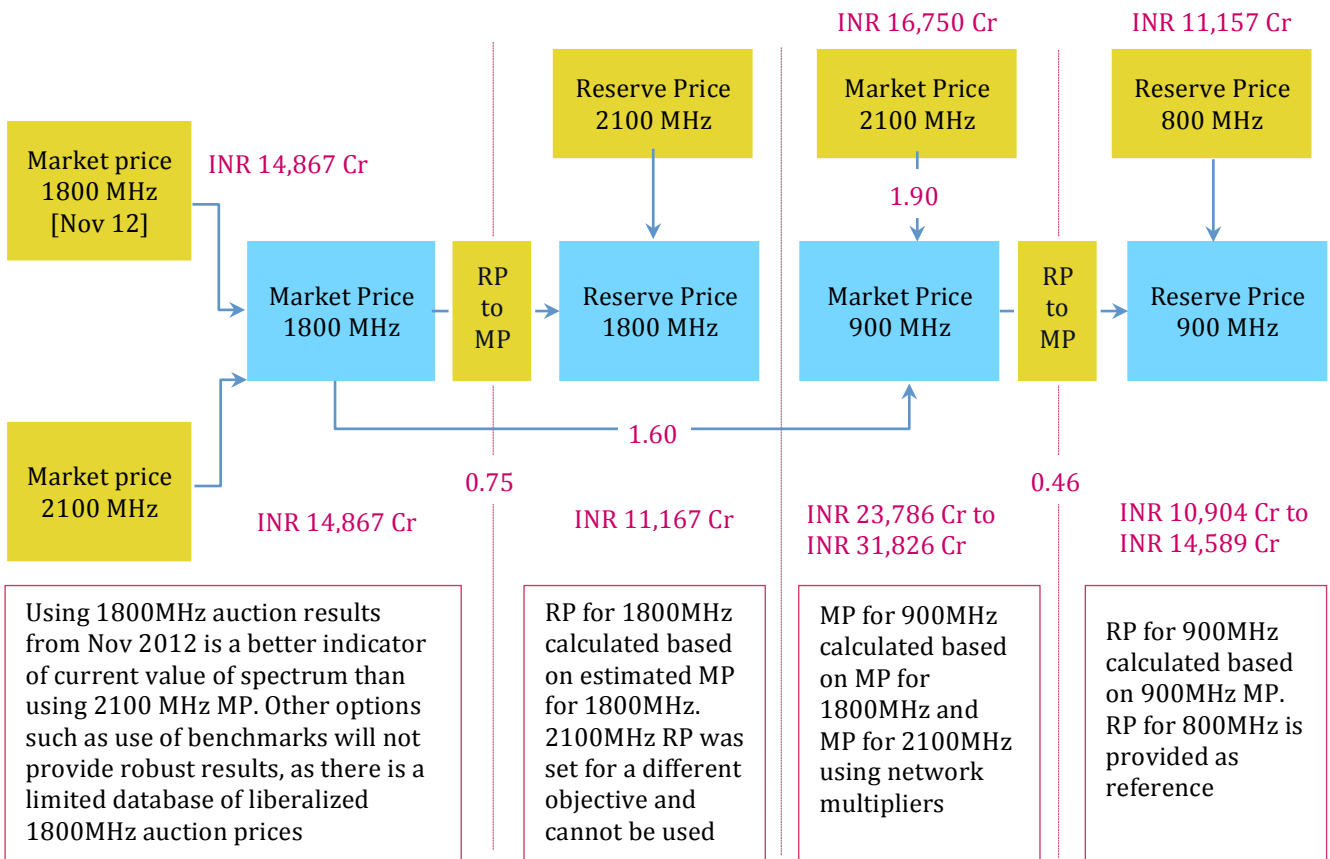
Linking the market price for spectrum bands such as 900MHz and 1800MHz, or 900MHz and 2100MHz using approaches of cost avoidance and incremental revenues can provide a reasonable estimate of the relative market value of 900MHz. This is especially robust if the base line valuation

⁶ Source: Review of NRA consultations (ComReg, OFCOM, ANCOM), Aetha and NERA report for BIPT Oct12

used for calculating the 900MHz market price is linked to market determined values of 1800MHz and 2100MHz spectrum. The market price for 1800MHz band can be derived using the values determined in the latest auctions (November 2012), with values for unsold circles derived using multiple regression models using the relevant demand variables.

Using the above considerations, the actual realized market values for spectrum auctions in India as well as benchmarks from global auctions; we propose the approach as detailed in Figure 5 for calculation of the reserve price and market prices of 5MHz of pan-India 900MHz and 1800MHz spectrum.

Figure 5: Proposed approach for estimating the Market Price (MP) and setting up the Reserve Price (RP) of 900MHz and 1800MHz spectrum⁷



Using the above approach we estimate the values of reserve and market price for 900MHz and 1800MHz spectrum as illustrated in Figure 6:

⁷ Source: Capitel Partners, TRAI consultation paper, NRA consultations (BIPT, ComReg, OFCOM)

Figure 6: Estimated market price and reserve price for 900MHz and 1800MHz spectrum

Spectrum	Reserve Price (5MHz All India)	Market Price (5MHz All India)
900 MHz	INR 10,904 Cr to INR 14,589 Cr ⁸	INR 23,786 Cr to INR 31,826 Cr
1800 MHz	INR 11,167 Cr	INR 14,867 Cr

The 900MHz reserve price comes out to be close to the reserve price set for 800MHz spectrum in the last round of auctions (March 2013), which is in alignment with the sub-1GHz price parity used in global auctions.

The multiplier of reserve price to market price needs to be further refined so that it is aligned with the reserve price set for specific auctions in global markets where the excess demand was expected to be high vs. low.

Q16. Should the premium to be paid for the 900MHz and liberalised 800MHz spectrum be based on the additional CAPEX and OPEX that would be incurred on a shift from these bands to the 1800MHz band?

The premium to be paid for the 900MHz band should be based on the cost avoidance model, considering the savings in network Capex and Opex by shifting the traffic to a better coverage spectrum, as compared to 1800MHz or a 2100MHz deployment. However, the cost avoidance approach cannot be applied to the 1800MHz spectrum as it is a higher frequency spectrum, and in addition to the capacity benefit from in-fill sites, the primary driver for 1800MHz premium should be the incremental revenue generated from providing data services on this band. As there is a clear requirement for operators to support existing GSM traffic, there is reportedly a limited availability of narrowband devices on 1800MHz FD LTE, and also issues of contiguous spectrum availability, we believe that the current valuation of 1800MHz should be based on the market determined price in March 2013, rather than using a derived approach.

Q17. Should the valuation of spectrum and fixing of reserve price in the current exercise be restricted to the unsold LSAs in the 1800 MHz band, or should it apply to all LSAs?

We believe that arriving at a valuation and reserve price now will help operators plan their long term data and spectrum roadmaps and provide policy certainty. The valuation and reserve price should be fixed for all the LSAs

Q18. a) Should annual spectrum usage charges be a percentage of AGR or is there a need to adopt some other method for levying spectrum usage charges? If another method is suggested, all details may be furnished.

b) In case annual spectrum usage charges are levied as a percentage of AGR, should annual spectrum charges escalate with the amount of spectrum holding, as at present, or should a fixed percentage of AGR be applicable?

c) If your response favours a flat percentage of AGR, what should that percentage be?

⁸ The reserve price for 900MHz will need to be set higher than the reserve price for 1800MHz spectrum (INR 11,167 Crores) to be in alignment with global spectrum auction designs for multi-band spectrum

We do not have any views and comments on this issue.

Q19. What should be the ratio adopted between the reserve price for the auction and the valuation of the spectrum?

As detailed above, the ratio should be defined based on the excess demand for the spectrum band as well as the policy objectives, while also aligning the overall process with global best practices. The ratios calculated by us are as specified below in Figure 7:

Figure 7: Estimated ratio of reserve price to market price for 900MHz and 1800MHz spectrum⁹

Spectrum	Ratio of reserve price to market price
900 MHz	0.46
1800 MHz	0.75

___End of Submission___

⁹ Source: Capitel Partners, TRAI consultation paper, NRA consultations (BIPT, ComReg, OFCOM)