

**LM/TRAI -03**  
**14<sup>th</sup> August 2013**

**Mr Arvind Kumar**  
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Telecom Regulatory Authority of India  
Mahanagar Door Sanchar Bhawan  
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New Delhi 110 002.

**Sub: TRAI Consultation Paper on "Valuation and Reserve Price of Spectrum".**

Dear Sir,

This is with reference to Consultation Paper on "Review of Valuation and Reserve Price of Spectrum" issued by TRAI, seeking comments from the stakeholders on the issues involved.

In this connection, please find our comments/suggestions as under:

**Introduction**

The consultation paper discusses the various issues involved in fixing reserve prices for auction of spectrum and other related topics across the following key areas:

- Re-farming of spectrum in the 800/900/1800 MHz bands
- Roll out obligations in the LSAs post spectrum assignment
- Reserve price for spectrum being auctioned
- Spectrum trading by Telcos

Loop Mobile India Limited (LMIL) believes that issues/ aspects covered in the consultation paper have far reaching implications on the long term health of the Indian mobile sector. We strongly believe that this consultation paper is extremely important and critical which will form the basis of future policy(ies) in the **Telecom Sector** which is presently going through extremely turbulent and uncertain phase due to various

factors in the regulatory environment leading to decline in profitability, financial viability of the sector and thereby leading to erosion of investors' confidence. So it is extremely important that TRAI formulates its recommendations after evaluating the present issues which are impacting the industry in order to enable the industry to reboot and re-enter a phase of robust growth in order to enable to serve the customers at large and achieve the desired voice and data penetration as per the guidelines of National Telecom Policy 2012. Our specific comments have been summarized below:

1. LMIL strongly believes that currently there is no necessity and justification for refarming of the spectrum. There is also a need for clarity in policy on aspects such as spectrum liberalization and technology neutrality. However, given that the Authority has requested for specific comments on the way-forward for spectrum re-farming, we believe that any attempt to refarm the 900 MHz, if absolutely necessary, shall be incomplete **until the E-GSM band is also made available during the current rounds of auction** - so that there is adequate spectrum available for market players to bid and to avoid a situation where there can be a perceived spectrum scarcity. This is also a deterrent to industry growth and may eventually lead to steep increase in customer tariffs.
2. Once the Authority assures the availability of the E-GSM band of frequencies in the current round of auction, all incumbent players should be reserved a bandwidth of a **minimum of 5 MHz instead of 2.5 MHz** (as per current proposal). A band of 2.5 MHz is inadequate; especially in high density LSAs (like metros). Operators have invested a lot of capital in existing network based on allotted frequencies and any attempt to disturb the existing network in high density LSAs will lead to service disruption leading to customer dissatisfaction.
3. The reserve price for spectrum should be maintained at a zero/ minimum levels to ensure accurate price discovery, as recent attempts (November 2012 and March 2013) to set a high base price on the spectrum have reduced operator participation in the auctions. In a competitive market such as India,

the price of the spectrum should be left completely to the market forces to discover and decide.

4. For operators who have had their spectrum holdings altered as an outcome of the forth coming auctions, the government should give a cut-over period of 2 years (with phase wise spectrum submission/ allotment targets) for operators to migrate from their existing bands to new bands. This is to ensure minimum service quality disruptions.
5. We also believe that spectrum trading should be encouraged by the Authority with necessary conditions to limit instances of spectrum hoarding by large operators. We believe that this shall result in an overall improvement in spectrum utilization.

Detailed responses and views have been outlined in the subsequent sections of this document.

**Q1. What method should be adopted for re-farming 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?**

**Our Views:**

- We would firstly like to draw your attention to the fact that our license provides for '**extension**' and not '**renewal**' as being addressed by TRAI. Hence, we request you to consider to note that 'extension' of the license should not be construed as surrender of spectrum by us, followed by redistribution. Retaining the spectrum in 900 MHz band is our legal right till our license expiry and for a further period 10 years extended license period. Hence, **we strongly recommend against re-farming of spectrum in the 900 MHz band.**
- Existing operators which have already invested in the 900MHz networks based on the promise / expectation of extension as provided in the license

agreement will not be in a position to fully recover the costs already incurred by and investments already made by them - there is also a high risk of partial/ complete write-off of existing investments in network as the base stations need to be modified to cater to change in frequency allocations.

- As per our estimates, retention of 5Mhz and surrendering 3MHz in 900 band and 2 MHz in 1800 band will result in an increased CAPEX for deploying at least 20% more sites to cover the same geographic area and an additional 21% increase in OPEX due to the new sites added.
- As per some industry estimates, the Pan India costs incurred by the licensees in network modification are expected to result in an incremental CAPEX of INR 550 billion<sup>1</sup> (for replacement of existing sites and addition of new sites) and incremental annual OPEX to the tune of INR 118 billion<sup>1</sup>.
- The new CAPEX will be required to procure new base stations apart from expenses related to procurement of new towers and write-off costs of existing base station equipments (which are operating at a different frequency). This shall in-turn have a negative impact on subscriber tariffs and industry estimates suggest a net increase of at least INR 0.5 per minute<sup>1</sup>.
- Important public interest issues such as disruption of service, leverage of existing investments, impact of rural consumers, bridging the digital divide, out-go of further foreign exchange etc. need deeper evaluation prior to taking a decision on spectrum re-farming.
- We would like to highlight here that, the concept proposed by DoT on complete seizure of current spectrum allotted to operators is globally considered unwelcome by both the customers (due to risks related to service disruption or temporary service quality degradation) and investors (due to value erosion arising out of additional CAPEX requirements)
- However, on considering various re-farming options, including the references published in several consultation papers of TRAI and evaluating those in-lieu

of prevailing market conditions, if the regulator is strongly inclined to go ahead with re-farming, in such a scenario, though our primary view is that the re-farming is a net-negative for the industry, we suggest adoption of 'one time partial re-farming' in best consumer interests as a secondary option (Refer Annexure 1 for more details).

- In case of redistribution of the existing spectrum due to re-farming, we strongly advocate that the Authority should recommend the inclusion of E-GSM spectrum bands to make available sufficient spectrum during the auctions, thereby preventing over bidding due to artificial scarcity.
- We also express strong reservations regarding the earlier recommendation made by TRAI allowing existing users to retain a maximum 2.5 MHz of spectrum in 900 MHz band and another band of 2.5 MHz to be accumulated through auction through a raking mechanism. We believe that this measure is a net negative for the telecom sector as it will lead to a steep increase in tariffs due to increase in CAPEX requirements. Also, the 2.5 MHz bandwidth is insufficient for incumbents to continue providing their subscribers with data services.
- In order to insulate both the customer and the industry, we believe that the retention limits by the incumbent license holders (with licences expiring in 2014/15) should be increased to 5 MHz in 900 MHz spectrum with a priority in ranking for bidding another 2.5 MHz in 900 MHz during the auction. The priority should further continue during the auction for 1800 MHz spectrum so as to ensure distribution that is not only equitable but also results in minimal customer service disruptions. This would ensure that subscribers in high density LSAs (including metros) are insulated from service quality disruptions during the cut-over period and subscribers in low density LSAs (towns & rural areas) are insulated from potential coverage gaps.

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#### References

1. Analysis Mason report in impact of spectrum re-farming in India

**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)?**

**Our Views:**

- We express strong reservations regarding the earlier recommendation made by TRAI allowing existing users to retain a maximum 2.5 MHz of spectrum in 900 MHz band and another band of 2.5 MHz to be accumulated through auction through a raking mechanism. In order to insulate both the customer and the industry, we believe that the retention limits by the incumbent license holders (with licences expiring in 2014/15) should be increased to 5 MHz in 900 MHz spectrum with a priority in ranking for bidding another 2.5 MHz in 900 MHz during the auction.
- The "reservation" of spectrum can also be extended for licenses expiring beyond 2014; however the actual quantum of "reserved spectrum" for the licenses expiring beyond 2014 can be discussed at a later date.

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

**Our Views:**

- We believe that the auctions must be open to all new entrants and existing licensees, without any restrictions, to allow for price discovery in a fair and transparent manner through market related process.
- A fair market price cannot be determined if existing licenses are denied the opportunity to participate in the auctions. Also, in case only new entrants are allowed to participate, the result will be no different from an administered price regime and will make the auction process irrelevant. Thus, our view is that the auction should be open to all eligible applicants.

**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?**

**Our Views:**

- We believe that India should adopt the E-GSM band due to diminishing interest in CDMA services. This is evident from section 2.29 of the consultation paper where the Authority has acknowledged the decline in CDMA subscriber base and usage between March 2012 and March 2013. The Authority has also referred to the general operator disinterest to 800 MHz spectrum auctions held in November 2012 and March 2013.
- The inclusion of E-GSM spectrum bands would make available sufficient spectrum during the auctions, thereby preventing over bidding due to artificial scarcity.
- We would also like to bring to your attention that globally the E-GSM band is an acceptable frequency for providing GSM services and hence minimal alterations would be required in the network topology/ configuration to adapt to this frequency.
- The minimum reservation of spectrum in this band should be done in a manner that it suffices the requirements of the existing operators
- Any roadmap drafted by the Authority for vacation of the E-GSM band must be done in a manner which ensures smooth migration of existing CDMA operations to ensure seamless service to customers.

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

**Our Views:**

- Roll out obligations must be imposed upon the licensees to ensure that frivolous bidders are not part of the auction process, with the objective of hoarding spectrum. Participation of serious bidders in the auction process will ensure that prices are not artificially inflated and will result in striking a balance between pricing and desired penetration of services.
- We are however of the view that given the highly competitive nature of the market and to provide a level playing field to all licensees, the roll out time frame should vary depending on the category of the licensee and be linked to the underlying financial viability of the business.
- The existing license holders, we would like to highlight that there is also a need to a 'cut-over' period of 2 years so as to plan and execute network on renewed frequency bands.
- We would also like the regulator to recommend a clear phase-wise schedule for operators to occupy/ vacate spectrum and any delays should be linked to penalties.
- Delay in obtaining SACFA clearances and in-building coverage should be excluded from the calculation of roll-out obligations.

**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**

**Our Views:**



- We believe there is no need to prescribe any additional roll-out obligations for a TSP who have already fulfilled the prescribed roll-out obligations earlier.
- The TSPs have already previously demonstrated their seriousness and commitment to rolling out services as per the obligations on its license by the Authority. Moreover, we believe that since the extension of license and spectrum is awarded through the process of auctions the existing TSPs will in a anyway ensure any additional rolling out of services in a time bound and effective manner to get returns on the huge investments made and during the auction process. Hence there is no need to prescribe any additional roll-out obligations.

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

**Our Views:**

- The mobile licenses have been technology neutral since 1999. The Government's commitment to technology neutrality was continued in the Unified Access Licensing regime introduced in 2003.
- Similarly when the 3G and BWA auctions were conducted, it was clear that what was being auctioned was only the spectrum and that the scope of service will be determined by the underlying license. Therefore, we strongly recommend to the Authority to ensure that ambiguity like intra-circle roaming on 3G spectrum etc are removed in the new policy.
- In view of the above submissions, we submit that spectrum is already liberalized since technology neutrality is enshrined in our policy and licensing framework.

**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?**

**Our Views:**

- We believe that spectrum trading should be permitted to ensure optimum utilization of spectrum, which is a scarce resource.
- It improves upon the efficiency and economy of the spectrum assigned while also allowing licensees to be more responsive to fluctuating and changing spectrum needs and uses.
- While roll out obligations ensure that the licensees are serious in their commitment to roll out services, spectrum trading provides them an opportunity to derive an economically efficient outcome in case of changing market dynamics (like low customer uptake of services).
- We believe that concerns with regards to spectrum trading (for example, that it could lead to significant concentration of spectrum in a few hands/ spectrum hoarding), could be addressed by setting spectrum caps on overall spectrum that are both technology as well as service neutral. This would mean that no operator would be able to gain, through trading, more spectrum than allowed under the caps.

**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?**

**Our Views:**

- We believe that using the auction price of 3G spectrum arrived at in 2010 is not a correct basis for valuation of the 1800 MHz spectrum in 2013 as during these 3 years, the overall macro telecom landscape has undergone drastic

changes and the valuation of the spectrum must be reflective of these market realities.

- Price discovered as part of the 3G Auction was not a true reflection of the VALUE of spectrum but a function of:
  - **Competitive intensity.** There were 6 national operators who were vying for 3 slots in each LSA. Eventually that there was no operator with PAN India 3G License and the eventual price was 5 times the base price is an indication of desperate and unrealistic price competition.
  - **Perceived spectrum scarcity.** Post new licenses issued in 2008, in most LSAs there was no additional spectrum available to be issued to licensees. With rapid base growth there was a dire need for spectrum to augment capacity.
  - Existing operators bid aggressively in anticipation of defending their postpaid base by offering 3G services.
  - Licensees were anxious to win Metro circles where 3G uptake was expected to be very high.
- As per NTP-2012, one of the primary objectives is to maximize public good by making available affordable, reliable and secure telecommunication and broadband services across the entire country - revenue generation is a secondary objective. The NTP also advocates for ensuring adequate availability of spectrum by allocating it to telecom operators in a fair and transparent manner through market related processes.
- It is further noted in the submission made by the Authority in Table 4.1 and 4.2 of the consultation paper on Valuation & Reserve price of Spectrum (No. 06/2013) that reserve prices are generally significantly lower than final prices globally. This can also be evidenced from the 3G spectrum auctions in

2010 where the final prices significantly surpassed the reserve prices recommended by the Authority.

- A zero/ lower reserve price also ensures greater participation thus delivering a more robust auction result, otherwise there is a risk that spectrum will remain un-sold. It also ensures a fair and transparent manner in which true value is discovered based on the correct supply and demand for spectrum. The reserve price must be set at a level that encourages maximum participation and only deters frivolous bidders.
- A higher reserve price may deter operators whose financial performance and margins are already stressed due to high debts (the Authority estimates the debt burden of the telecom sector to be INR 2 trillion) and increased competition (the Indian telecom market is one of the most crowded in the world).

**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?**

**Our Views:**

- We are of the view that the valuation of spectrum for each LSA must be done Individually. This because each LSA represents a unique business case in itself and an LSA-level approach to valuation of spectrum can factor in special characteristics of the market in that LSA (viz. competitiveness, revenue and growth potential, profitability, demographics, cost structures etc.). The differences among various LSAs have also been acknowledged by the Authority in sections 3.32 and 3.33 of the consultation paper on Valuation & Reserve price of Spectrum (No. 06/2013).
- Moreover the sale of spectrum and granting of licenses to TSPs is done LSA wise and hence the valuation of spectrum and the reserve price could be undertaken as an independent exercise for each LSA.

**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?**

**Our Views:**

- We recommend that the reserve price for the 1800 MHz auctions be set to zero to ensure that there is no linkage to earlier prices, thereby doing away with the need of determining an indexation factor and leading to a price discovery completely based on market related demand and supply functions.
- However we are of the view that, if defining the reserve price is mandated as part of the auction process, then the Authority may consider setting a reserve price which is reflective of the market realities (reducing margins due to diminishing incremental gains from less attractive markets in the hinterland, continuously falling tariffs, rising operating costs, difficulties due to health concerns etc.) and not merely based on indexation of the 2001 prices.
- The Authority must also concurrently permit "**reverse auction**" as part of the spectrum auction process to enable true price discovery.

**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?**

**Our Views:**

- We recommend that the process of valuation of spectrum must be completely delinked to the process of setting the reserve price for the November 2012 and March 2013 auctions.

- The reserve prices, if mandated, may be set to ensure maximum participation while at the same time deterring frivolous bidders, thereby leading to a price discovery based on market related processes.

**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.**

**No comments**

**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.**

**Our Views:**

- We recommend that in case setting a reserve price is mandated for spectrum auctions, the same for the 900 MHz band be set no more than 1.3 times the reserve price for the 1800 MHz band.
- This is based on our estimates that the efficiency difference between 900 MHz and 1800 MHz is not constant and varies between the LSAs - based on factors like geography and population density etc. In high population density LSAs (like Metros); the efficiency of the 900 MHz spectrum reduces significantly as more & more capacity cell sites are rolled out.
- A higher reserve price for the 900 MHz band (relative to the 1800 MHz band) will lead to an asymmetric situation whereby the cost of retaining the 900 MHz band will outweigh the cost of dislocation due to re-farming, thereby disturbing the level playing field and leading to unsold spectrum in this band.

**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.**

**Our Views:**

- We recommend that TRAI leverage the international benchmarks from recent auctions to gauge the range in which reserve prices have been set for spectrum before arriving at a suitable approach for the Indian market.
- A comparison of spectrum prices recommended in India with spectrum prices for select countries where auctions were held in last 2-3 years clearly underlines the exorbitant spectrum reserve price in India. For instance, the reserve price for 1800 MHz in India during the auction held in November 2012 stands at \$6.2 per inhabitant per MHz, a massive 39 times the auction price for Singapore, which was \$0.16 per inhabitant per MHz in the 2011 auctions (post adjusting for variance in ARPU levels).
- The price differential noted above will be steeper when the global clearing price is compared with the clearing price in India. The comparison tabulated below considers the clearing price of respective countries to recommended reserve price in India for 1800 MHz (as of November 2012).

Country	Year	Band (MHz)	Clearing amount / MHz (US\$ mn)	Population (Mn)	Price per MHz/ Population (US\$)	Monthly ARPU (US\$)	India ARPU multiplier	India price per MHz/ population (US\$ Adjusted to ARPU)
Germany	2010	1800	2.7	81.15	0.03	18.4	9.2	3.53
Singapore	2011	1800	0.9	5.46	0.16	32.33	16.2	6.20
Greece	2011	900/1800	4.5	10.77	0.42	17.46	8.8	3.35
Italy	2011	1800	21.4	61.48	0.35	21.73	10.9	4.17
Portugal	2011	1800	0.5	10.79	0.05	16.66	8.4	3.19
South Korea	2011	1800	47.4	48.95	0.97	30.57	15.3	5.86

- As is evident, India already has one of the highest costs of spectrum per MHz / population and the one of the lowest ARPUs in the world (approx. USD 1.99). Hence the new price recommendation from TRAI should carefully consider these aspects so that they don't prove to be regressive for the sector's growth.

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

**Our Views:**

- Please refer response to Q14

**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?**

**Our Views:**

- For the sake of maintaining a level playing field among all licensees and to ensure that the auction meets the principles laid down by the Honourable Supreme Court, we recommend that the valuation of spectrum and fixing of reserve price be applied to all LSAs without any exceptions.

**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?**

**Our Views:**

- We believe that the current Spectrum Usage Charge (SUC) regime needs to be reviewed and introduction of a flat rate for SUC is required, irrespective



of quantum of spectrum held or technology mix deployed. Globally, for spectrum sold at an auction, no further usage fee is imposed. A usage fee should cover only the cost of administration and regulation of this sector.

- Therefore, we recommend a low percentage of revenue share (definitely not more than 1% of AGR in line with what has been done for BWA) as spectrum usage charges. The Authority may also use this opportunity to revisit the definition of AGR, to be used for computing spectrum usage charges.

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

**Our Views:**

**No Comments**

**This is for your kind reference and consideration, please.**

Thanking you,

Yours faithfully,  
For **Loop Mobile (India) Limited**



**Harish Kapoor**  
**Chief Regulatory Officer**  
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Encl: As above.

## Annexure1: Global references for spectrum re-farming

- We would like to bring to your notice a few global examples, where the regulators have adopted a re-farming approach, which is symbiotic to both the customers as well as the telecom industry

	Singapore	Hong Kong	Denmark
<b>Background</b>	<ul style="list-style-type: none"> <li>• The Infocomm Development Authority of Singapore (IDA) dealt with the re-farming of spectrum in the 900MHz and 1800MHz bands, when the expiry of the 2G spectrum rights was approaching in September 2008.</li> <li>• In January 2008, the IDA issued its decision on the framework for the reallocation of spectrum in the 900MHz and 1800MHz frequency bands</li> </ul>	<ul style="list-style-type: none"> <li>• In February 2001 the Information Technology and Broadcasting Bureau (ITBB) announced a new licensing framework for 3G services. 2G operators were given permission to re-farm their 900MHz and 1800MHz spectrum for 3G or 4G services under the current terms and conditions of their existing licenses.</li> <li>• In November 2004 the Office of the Telecommunication s Authority (OFTA) published a statement which assigned spectrum in the 900MHz and 1800MHz bands to the GSM and PCS licensees, which exercised their right of first refusal. The licenses were renewed for a period of 15 years, taking the expiration date of some to 2021.</li> </ul>	<ul style="list-style-type: none"> <li>• Prior to the re-farming, almost the spectrum in the 900/1800 bands was licensed to Denmark's three GSM operators: TDC, Telia and Telenor.</li> <li>• The re-farming decision by NITA on 23rd Dec 2009 provided for the redistribution of spectrum to accommodate new entry licensees in both bands and reshuffling of existing licensees meaning all operators had to spectrally move their current operations and adjusting expiry dates of existing licenses.</li> </ul>
<b>Re-farming/ Consultation</b>	<ul style="list-style-type: none"> <li>• As a result of consultations, the</li> </ul>	<ul style="list-style-type: none"> <li>• In June 2009 OFTA announced that</li> </ul>	<ul style="list-style-type: none"> <li>• An auction of the 900MHz and</li> </ul>

	Singapore	Hong Kong	Denmark
<b>Process</b>	<p>IDA decided to auction five lots of 900MHz spectrum and 12 lots of 1800MHz spectrum, as well as one of the two lots of the extended GSM band (EGSM), the 880- 890MHz and 925-935MHz band.</p> <ul style="list-style-type: none"> <li>• The IDA initially intended to reallocate the spectrum coming from expiring licenses on a "greenfield" basis (that is, giving no preference to operators that previously held 2G spectrum).</li> <li>• However, following the outcome of the consultation process, changes such as - granting a "first right of refusal" was introduced for existing holders of 2G spectrum rights, as part of the allocation process were incorporated.</li> <li>• This would give operators the option to retain the spectrum lots in their existing 2G spectrum rights, so as to avoid unnecessary spectrum churn and disruptions to end users.</li> </ul>	<p>China Mobile Hong Kong, PCCWHKT, and SmarTone had won additional spectrum in the 1800MHz band. The licenses would run until 2021 and would also be subject to an annual fee and a condition of technological neutrality. SmarTone also won additional spectrum in the 850MHz and 900MHz bands following an auction in March 2011. The new frequencies were granted for 15 years.</p> <ul style="list-style-type: none"> <li>• When making its decision to extend the 2G licenses, OFTA considered revoking the licenses of HTCL and CSL in order to free up spectrum for the award of a new 3G license.</li> <li>• The regulator eventually decided that it would allow HTCL and CSL to continue to operate their CDMA and TDMA 2G networks until 2008. At that date, however, the two operators were required to migrate their customers onto alternative networks.</li> </ul>	<p>1800MHz spectrum, reserved for a "new entrant", was held in October 2010 and resulted in Hi3G being successfully granted both licences.</p> <ul style="list-style-type: none"> <li>• Existing licenses were expiring in 2011 or 2012 prior to the re-farming decision but NITA did prolong and synchronize the duration so that all existing licenses now expire by end of 2019. NITA also made it clear that it will be no renewals and only new awards when prolonged licenses expire by end 2019.</li> <li>• Re-farming within the band freed 2x5 MHz and 2x10 MHz in 900 and 1800 bands.</li> </ul>

	Singapore	Hong Kong	Denmark
Outcome	<ul style="list-style-type: none"> <li>In March 2008, licenses were issued to MobileOne (M1), SingTel, and StarHub, and these were valid from January 2009 until March 2017</li> </ul>	<ul style="list-style-type: none"> <li>Following the decisions of both the ITBB and OFTA, two MNOs have started to use their 2G spectrum holdings for newer technologies. In September 2009 CSL launched UMTS HSPA+ services in the 900MHz band – this was the first case of re-farming in Hong Kong.</li> <li>In the same month CLS announced the start of an LTE commercial trial network. In November 2010 CSL began using the 1800MHz band in order to offer LTE services to businesses; it made LTE available to consumer subscribers in May 2011.</li> <li>In September 2012 SmarTone launched LTE using refarmed spectrum in the 1800MHz band.</li> </ul>	<ul style="list-style-type: none"> <li>Existing licensees were given approximately one year to carry out their re-planning and accomplishing the process of spectrally moving transmitters.</li> <li>The GSM only technology restrictions were lifted and replaced with conditions on deployment of GSM and technologies than can coexist with GSM, e.g. UMTS/HSPA and LTE can be deployed</li> <li>Use of spectrum liberalised w.e.f. 1st May 2011.</li> </ul>