Cover Letter

19th June 2014

Ms Aileen Chia
Deputy Director General (Telecoms and Post)
Infocomm Development Authority of Singapore
10 Pasir Panjang Road
#10-01 Mapletree Business City
Singapore 117438

Dear Ms Chia,

Subject: **Public Consultation on Spectrum Allocation for IMT and IMT-Advanced Services and Options to Enhance Mobile Competition.**

This is with reference to the consultation paper issued by IDA on "Proposed allocation of spectrum for International Mobile Telecommunications ("IMT") and IMT-advanced services and options to enhance mobile competition" dated 22nd April 2014.

Liberty Wireless ("LW") and Alan Chan (Managing Director, Accenture) would like to attach our responses to the IDA consultation paper.

The co-authors would like to express their gratitude to the IDA for initiating this process and would be happy to clarify any of the views and comments made in the attached document.

Our contact information is as follows:

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Sincerely,

Abhishek Gupta & Alan Chan

SUBMISSION ON CONSULTATION PAPER FOR PROPOSED ALLOCATION OF SPECTRUM FOR INTERNATIONAL MOBILE TELECOMMUNICATIONS ("IMT") AND IMT-ADVANCED SERVICES AND OPTIONS TO ENHANCE MOBILE COMPETITION

Liberty Wireless Pte. Ltd. ("LW")[1] and Alan Chan (Managing Director, Accenture) appreciate the opportunity to provide feedback on Infocomm Development Authority's consultation on the proposed allocation of spectrum for international mobile telecommunications ("IMT") and IMT-advanced services and options to enhance mobile competition.

Our submission is structured as follows:

The co-authors would be happy to clarify any of the views and comments made in this document.

PART I - BACKGROUND AND STATEMENT OF INTEREST

1. LW is a venture funded Singapore based telecommunications focused start-up with deep roots in Singapore. Alan Chan leads Accenture's business and strategy initiatives as a technology expert with in-depth experience in the international and domestic telecom sectors.

2. The co-authors have a long-term interest in the regional telecommunication industry in general and in Singapore in particular.

3. With relevant experience in both the telecommunications and technology sectors, LW is currently exploring a variety of partnership-based business entry models.

4. We wholeheartedly support IDA's broader objectives of establishing Singapore as a Smart Nation of the future. Given the critical role telecommunication sector plays in facilitating this transformation and our interest in being an active participant in this endeavour, we thank IDA for initiating this process and look forward to contributing to it.

5. Our submission focuses on Q10 to Q13 as these questions pertain to "Options to enhance mobile competition" and directly impact LW's ability to bring innovative services to the market. Through these responses, we would like to submit a number of unique perspectives and insights for IDA's consideration.

6. In addition, we provide general responses to Q1 to Q9. We believe MNOs and telecom infrastructure firms are better placed to take a stronger stance on technical issues around the appropriate allocation o[1]f specific bands. However, the proper treatment of these topics can indirectly enhance competition and ultimately impact the business models of smaller players such as LW. Broadly, we believe that MNOs need to retain sufficient incentive to deploy adequate capital expenditures and to be able to generate an appropriate return on it.

7. In summary, we agree that competition in any mobile telecommunications market is a delicate topic. The right amount of competition can induce rapid innovation and result in end-consumer benefit – both in terms of price and product. Too much competition or uncertainty can limit the incentives for market players (including for players such as LW) to innovate.

[1] Supported by Chinta Bhagat (Head of Singapore Office, McKinsey & Company) as an advisor in his personal capacity.

PART II - SUMMARY OF MAJOR POINTS

8. We laud IDA's tremendous efforts in maintaining this delicate competitive balance. This aspiration is ultimately linked to IDA's stated objectives of creating a "*conducive infocomm environment that is both pro-consumer and pro-business."* From a mobile telecommunications perspective, the objectives are particularly illuminating: *"…creating an infocomm environment that allows free and fair competition, so that consumers' interests are protected and they benefit from greater choices and the proliferation of innovative infocomm products and services."*

9. These objectives, in our interpretation, imply a dynamic market structure that provides the greatest possible telecommunication choices to Singaporean consumers in products, services and pricing while retaining the incentives for sustainable infocomm industry development through an approach that is fair, transparent and market-driven.

10. While we recognize that there is no perfect approach to measuring industry outcomes versus stated objectives, we compared the Singapore market with an extensive set of global telecommunication benchmarks. While Singapore has done reasonably well in in certain areas there are some noticeable gaps in others. These gaps are probably more relevant if one considers Singapore's role as the torch-bearer for global infocomm thinking.

11. **Consumer interests - product and service innovation**: Singapore consumers have been relatively well served by telecommunications industry through a variety of innovations over the years. However, the speed of such innovations may have slowed in comparison to that of other markets with similar structure and size.

12. This challenge was probably less pronounced 10 years ago when Singapore was a regional centre versus now when Singapore is commonly regarded as a centre for global technology excellence. We note a few examples of innovations that could have come to Singapore sooner.

- **Number portability:** Introduced in Singapore in late 2008
  - Hong Kong (introduced in 1999), Ireland (2003), Denmark (2001) – all similar to Singapore in terms of small number of subscribers and market structure.
  - Korea (2004), Germany (2002) – technology leaders similar to Singapore.

- **3G:** Introduced in Singapore in 2005
  - Hong Kong (2003), Ireland (2003), Denmark (2003).
  - Korea (2002), Japan (2001), Germany (2004).

- **4G:** Introduced (**refers to launch not full coverage*) in Singapore in 2012-2013
  - HK (2011), Denmark (2010), Ireland (2013)
  - Korea (2011), Germany (2010), Japan (2010)

13. We also note that no new telco players with any markedly innovative offering have emerged recently despite Singapore's top-class infrastructure environment (fibre, smartphone penetration) and start-up friendly environment.

14. **Consumer interests- pricing innovation**: In terms of pricing innovation, the local market had historically innovated well on pricing. However, the end-consumer offers have more or less converged over time to 3-4 packages with broadly similar pricing across Singapore. Such offerings cannot possibly capture the diversity (in ethnicity, lifestyle, age groups, corporate users etc.) of Singapore's local and international population. In fact, serving all these segments well simultaneously may be an impossible job for 2-3 players.

15. In contrast, an average consumer in other global metropolitans realizes a multitude of options and packages.

- **London:** More than 8 distinct packages / offerings across a number of players; most offer unlimited voice and generous data packages, ways to customize.

- **San Francisco:** 5-6 distinct packages; unlimited messages and rolling minimum-call packages are a norm. In particular, T-mobile offers unlimited call minutes, message and data packages too.

- **Hong Kong:** 8 unique packages across different operators with a variety of dimensions: Unlimited local minutes, unlimited local low speed data, bulk mainland minutes, different variations of data only packages. Voice is almost always unlimited. Tiered-pricing by data usage.

- Across most of these packages, there seems to be more flexibility and transparency for the consumer – and no charges for "expected" services like CLI (Caller Line Identification).

16. In order to re-affirm our observations, we commissioned a local consumer survey (of more than 200 respondents) and observed the following:

- **Rates and Billing**: ~55% of all respondents were unhappy with rates they were charged (this included "hidden" charges or expensive excess rates)

- **Contract length**: ~75% of those surveyed found contracts length did not fit their needs and preferences.

- **Contract flexibility**: ~80% of customers would like to customize their plans and tweak them regularly. Recent customizable plans announced by a leading local telco still don't provide the flexibility consumers enjoy elsewhere (e.g. certain Singaporean consumers no longer want to pay for SMS)

- **Quality of service**: Some (albeit small ~10%) even struggled with basic call/data quality and connectivity issues.

17. It would be appropriate for a market observer to assume that the current state of affairs is not for the lack of an incentive structure in the industry. After all, Singapore's multi-billion dollar telco market enjoys top tier consumer ARPUs and its market players have generated superior (compared to global industry average) return on capital.

18. A deeper look might also reveal other factors such as spectrum allocation (including type and length of allocation) that could partially explain the situation.

19. Another challenge faced by market participants is the heavy concentration of their businesses in the hands of a relatively small number of customers. With the exception of Singtel, local telcos rely almost entirely on domestic customers and hence a single mis-step could potentially impact their business materially. These challenges need to be addressed to foster innovation and risk-taking in the local market.

20. We believe that the gap between IDA's objectives and industry outcomes could be narrowed despite the current market structure with some fine-tuning. In line with IDA's objectives, this fine-tuning should foster an environment that allows market forces to shape a more competitive landscape that benefits the customers, enhances the local infrastructure sustainably while allowing large and small local telecom companies to succeed. We touch on this further in Q10- Q13.

21. It would be preferable to have a spectrum allocation process in Singapore that leads to a balanced distribution amongst MNO's at a cost that is commensurate with the right to use the scarce spectrum resources and does not affect the MNOs' ability to invest further in the infrastructure. Pathways for future MNO entry should not be ignored as MVNOs may be in a position to acquire spectrum in the future for specific applications (e.g. low power spectrum for deployment of small cells inside business premises).

22. We also welcome IDA's initiative to provide an enhanced customer experience via the introduction of HetNet. A successfully executed HetNet could mean a superior, uninterrupted and seamless service for the end user. However, we believe implementing the initiative would require overcoming a wide range of complex commercial and technical challenges including access mobility, reliability of service and security of personal data.

23. The 'fine-tuned' approach to create an environment where market forces naturally achieve IDA's objectives is unlikely to involve a 4th MNO – as most market participants would agree. The experiences of similar markets globally and lack of interest from the industry during previous spectrum allocation exercises would also support that conjecture.

24. Introduction of MVNOs could be one of the promising ways forward. MVNOs could help utilize the scarce spectrum resources more effectively in Singapore. Previous attempts at fostering MVNO development have been relatively unsuccessful in building sustainable businesses – but there could be lessons from those experiences. A new or more fine-tuned approach could make this work. In that regard, we appreciate IDA's initiative in reopening this discussion. We provide further details on this in Q10-Q13.

25. We draw inspiration from geographies that provide interesting lessons for MVNOS as well as markets that mirror Singapore in terms of size and market dynamics (for example, Denmark, Ireland and to an extent Hong Kong). The market and technology evolution, role of MVNO's and the associated regulatory framework provided insights that may be relevant for the Singapore market.

26. The delicate competitive balance remains a critical element of successful market evolutions and regulatory frameworks.

27. Key takeaways for MVNO introduction:

- Market-based approaches are more effective and less disruptive in the long-term. Forcing MVNO allocation is a common example of a non-market approach that has shown mixed results.

- Strong signalling of the regulator's interest is important for market evolution and market participants. Signalling sets the direction of the market and provides new and existing players certainty to invest in it. Without this signalling, win-win MNO-MVNO relationships may not take effect.

- All MVNO's are not created equal. Traditional MVNOs may have focused too much on price and less on true innovation.

- MVNO failures are not good for the market so it in the interest of the regulator to consider a model where mechanisms exist for truly innovative MVNOs to establish themselves.

- MVNO development may require some initial support while still letting market forces lead – this will result in an overall benefit in the long-term. In particular, as articulated in our detailed response to Question 13, IDA should prioritise a framework that addresses both price and non-price discrimination to ensure that MVNO business cases are not unjustifiably hindered.

- In general, long-term role innovative MVNOs can play in enhancing competition in the market. And in such cases, the regulators tend to encourage a risk-lowering environment that allows MVNOs to flourish - similar to those enabled for high-growth technology firms and start-ups. This support could take a variety of forms and should benefit both the MVNOs and MNOs.

PART III - SPECIFIC COMMENTS AND CONCLUSION

SPECTRUM BANDS

Question 1: IDA seeks views on whether the 700 MHz band should be allocated as a standalone, or coupled with other bands such as the 900 MHz, 800 MHz or the 1.9/2.1 GHz bands.

28. As stated in the "General views" section, not being an infrastructure player, LW currently has no strong opinion regarding the most efficient way of combining spectrum bands.

29. However, the co-authors understand that the operators will ultimately need a combination of both high and low frequency bands to ensure both sufficient capacity and desired coverage of the networks. Simultaneous release of both high and low frequency bands would allow prospective licensees to better develop medium and long term network planning, based on consumer needs and business objectives, thereby encouraging investment into infrastructure and enabling innovation.

30. A number of countries are releasing a combination of high and low frequency bands simultaneously. For example, in May 2013, the Australian Communications and Media Authority (ACMA) announced successful results of the auction for the 700 MHz and 2.5 GHz spectrum, raising nearly AUD 2bn.

Question 2: IDA seeks views on:
(a) whether the 800 MHz band should be re-farmed for mobile services;
(b) the band plan that should be preferred by Singapore and the underlying reasons;
(c) details of transitional issues to migrate existing services and systems in the 800 MHz band to the revised band plan;
(d) possible impact to end users of digital trunked radio and SRD/RFID, if, as a result of the eventual 800 MHz band plan:
(i) the end users do not have to be migrated but will have to coexist with mobile broadband services;
or (ii) the end users have to be migrated; and
(e) possible co-existence issues between mobile broadband, and digital trunked radio and SRD/RFID.

31. We have no strong opinion on the issue.

32. However, we understand that frequencies below 1 GHz have good propagation and building penetration characteristics. The latter could be specifically useful in Singapore, given the density of the build out and, simultaneously, the aim of the policy-makers to enable world-class seamless connectivity for the Singapore consumer. Re-farming 800 MHz band for mobile services could help operators to improve the deep indoor coverage in populated areas.

Question 3: IDA seeks views on the allocation approach for the 900 MHz spectrum band, particularly:
(a) whether the band should be re-allocated as a standalone band in a market-based allocation framework, and if so, the preferred timeframe for such an allocation exercise;

(b) whether the band should be coupled with other spectrum bands for allocation, and if so, which bands and the preferred timeframe for such an allocation exercise; and
(c) the underlying reasons for your views on the above.

33. We have no strong preference for any specific approach in the allocation of 900 MHz spectrum band.

34. However, we understand that it might be appropriate to give the MNOs an opportunity to acquire different frequency bands simultaneously: this enables operators to have a holistic approach to their planning, encouraging them to invest into innovative and robust networks and services, which could be delivered via different spectrum bands. One of the most recent examples of such approaches to release of spectrum was in India, where, in February 2014, spectrum was simultaneously auctioned in 900 MHz and in 1800 MHZ bands. Mobile operators showed interest in such an approach: for instance, Vodafone India acquired a total of 23MHz in the 900MHz band and 49MHZ in the 1800MHz, to support the company's endeavours to offer their customer base enhanced voice and data services across the country.

Question 4: IDA seeks views and proposals on the technical issues relating to the allocation of the Sub-1 GHz bands for mobile broadband services, in particular, the guard band requirements between the adjacent bands (e.g., 700, 800 and 900 MHz bands) for mobile broadband services.

35. As stated in the Section 2 ("General views"), not being an infrastructure player, LW has no strong preferences or strong views regarding the most efficient way of combining spectrum bands or resolving technical issues relating to spectrum allocation. We do understand that lower frequency bands could be helpful in providing better in-building coverage in Singapore for mobile services.

Question 5: IDA seeks an indication of any industry interest in the use of the 1.4 GHz band

36. We are not in a position to express interest in the use of the 1.4 GHz band, although we are aware of the growing interest in this band internationally. It has been noted, that 1.4 GHz band would offer significant advantages in terms of coverage relative to bands above 2 GHz. In Europe (Region 1), 1.4 GHz band is listed as one of the candidate bands for meeting future spectrum demand from mobile devices. However, in reality, the value and the imperative of releasing the spectrum from 1.4 GHz band in Singapore would depend on whether the other available spectrum is deemed sufficient by the industry players.

Question 6: IDA seeks views on IDA's proposal to allow the deployment of 4G and IMT-Advanced systems and services in the 3G bands.

37. As stated in the Section 2 ("General views"), taking into account the speed of the technological development, we are in favour of allowing the deployment of 4G and IMT-Advanced systems and services in the 3G bands.

38. We understand that there is a significant scope for network integration, as 4G is the natural progression from 3G technology: the transition should be seamless, as the

technologies should complement each other (this, of course, makes an assumption that the spectrum licensees remain the same). Therefore, we support IDA in considering the possibility of technology neutral approach for use spectrum, where possible, to foster innovation and encourage development of the most advanced services. This view is supported by the international precedents: for example, in 2013, the UK regulator Ofcom has allowed mobile operators O2 and Vodafone to reuse their 2G and 3G spectrum for 4G services.

Question 7: IDA seeks:
(a) indications of industry interest in the allocation of long term rights in the TDD bands, as well as planned services (including small cells) and target market segments for the use of these bands;
(b) views on whether the use of the TDD bands solely for the deployment of in-building TDD systems is feasible, and the underlying considerations thereof;
(c) views on whether the use of TDD bands for partial deployment of outdoor and in-building TDD systems is feasible, and the underlying considerations thereof;
(d) views on the use of TDD bands for small cell deployment as part of a HetNet;
(e) views on the mitigation techniques requirement for co-existence (e.g., separation distance, transmit power, and UL-DL configuration21);
(f) views on the implication of the TDD bands on a half-band sharing basis with neighbouring jurisdictions; and
(g) views on the implication of the TDD bands on a full-band sharing basis (primarily for in-building deployment) with neighbouring jurisdictions.

39. We are not in a position to express interest in the rights to use the TDD bands (the 2300 MHz to 2350 MHz and 2570 MHz to 2620 MHz bands).

40. We are aware that the level of industry interest in deploying 4G services over the TDD bands appeared to be low during the IDA consultation in 2012-2013. However, this is not unusual, as many countries worldwide have TDD spectrum available; these spectrums are expected to see less demand than the FDD equivalents. For example, in the 2010 spectrum auction in the Netherlands, the 2.5 GHz TDD spectrum remained unsold, whereas the FDD blocks sold for the total of 2.6 Million Euros. Likewise, in Hong Kong, during the spectrum auction that concluded in 2009, OFTA auctioned 105 MHz of unpaired TDD spectrum in the 2.3 GHz band – and, again, no interest was shown for this block of spectrum.

Question 8: IDA seeks:
(a) indications of industry interest in the allocation of long term rights in the 3.5 GHz band, as well as planned services and target market segments for the use of these bands;
(b) views on whether the use of the 3.5 GHz bands solely for the deployment of in-building mobile systems is feasible, and the underlying considerations thereof;
(c) views on possible impact to end users of FSS and TVRO, if (i) the end users do not have to be migrated; or (ii) the end users have to be migrated; and
(d) views on possible co-existence issues between TDD systems, and FSS and/or TVRO systems.

41. We are not in a position to express interest in the rights for the use of the 3.5 GHz band.

42. While we understand that the interest for this band internationally is currently low, it is likely that the situation could change. For example, by 2015 further spectrum from 3.4 to 3.6 GHz is expected to be allocated for commercial 4G networks in Japan. Although currently there are a number of technical issues around the usage of the band, we expect more interest from the industry for the 3.5 GHz spectrum in the future.

OTHER POLICY CONSIDERATIONS FOR DEVELOPMENT OF HETNET

Question 9: IDA seeks:
(a) views on key policy areas related to technical, service provisioning or end-user impact that should be considered in the deployment of HetNet; and
(b) other policy implications that may arise with HetNet.

43. We support IDA in its vision of creating HetNet to enable seamless connectivity and high quality of service for end users. We believe that a nationwide HetNet could increase the resilience of mobile services and could reduce the ever-increasing pressure on the mobile networks. Furthermore, HetNet is likely to drive up the usage of telecom service, as it is likely to be more readily available and user-friendly in the eyes of the consumer.

44. However, unifying a large number of different technologies raises a number of challengers, which could include:

- Commercial: e.g., revising inter-operator billing and customer billing

- Legal: e.g., defining responsibilities for malfunction, when multiple stakeholders are involved (multiple MNOs, equipment vendors and parties, providing digital services over the network)

- Technical standards: e.g., ensuring the interoperability of devices and networks

- Quality of service: e.g., standardising SLAs across multiple platforms and operators across different tiers of customer service

- Customer experience: e.g., creating a single 'look and feel' of experience for the customer across multiple services, devices, platforms and operators

- Network intelligence and integration across 3G, LTE and Wi-Fi and other networks: e.g., network determining when and to which network each user should be switched at every point

OPTIONS TO ENHANCE MOBILE MARKET COMPETITION

Question 10: IDA seeks:
(a) Views and comments from potential MVNOs on their level of interest to enter the mobile market and the target market segments of potential MVNOs (e.g. pre-paid or post-paid, niche or general consumer segments);

45. A number of local and international players have shown interest in establishing an MVNO business in Singapore recently. They take encouragement from the on-going consultation process on enhancing competition.

46. Singapore's unique characteristics and the rich diversity (as discussed in points 14 and 15) of the local market allow for a number of niche segments that an MVNO could target. In fact, allowing an MVNO to hyper serve a currently underserved segment may be complimentary to a telcos' own market objectives.

47. Drawing from experience in other markets, an MVNO in Singapore could be designed around a number of such segments to fill an important market gap:

- **Data / M2M focused MVNOs**- High smart phone penetration and heavy data usage in Singapore could inspire MVNOs such as Togo and MY Evolution in Malaysia, Rakuten Emobile in Japan and SIM Service in Denmark. With a number of high-value industries located in Singapore, there could be MVNOs designed around industrial use cases.

- **Migrant / Ethnic focused MVNOs:** Singapore has seen an influx of foreigners who retain strong links to their home countries. While local telcos offer 018 etc services, there is room for further customization offered by players such as Lebara in the UK and Lyca Mobile across multiple EU countries. PLDT is one such example of such an ethnic MVNO in Singapore but there is space for more.

- **ISPs/Cable MVNOs:** Retail service providers present in adjacent markets may approach the market through the general bundling approach.

- **Roaming MVNOs:** As Singapore and Singaporeans become more connected to the world, additional Roaming MVNOs such as Matrix Cellular or SIM2Travel could provide the local customers with an expanded option set.

- **Elderly focused MVNOs:** Easy to use handsets and easy to understand plans could be more relevant for the elderly in Singapore. GreatCall in the US is a good example of such a player.

- **Retailer/Brand MVNOs:** Tesco's MVNO with presence across multiple geographies, Ikea's MVNO in the UK. A similar platform could exist for retailers like NTUC and Cold Storage.

- **Youth focused MVNOs**- Youth tends to be a catch-all category so international MVNOs have further segmented the 16-24 age groups and used a variety of different models to serve them. Some examples of this include "48 months" from Ireland and Blyk from Netherlands. Potential MVNOs in Singapore could focus on students, NS men, and recent graduates from polytechnics (who start earlier than

university grads). A great Examples of MVNOs would be “48 Months” from Ireland, Virgin from the UK, Blyk from the Netherlands.

48. Given our own market studies and surveys, we believe there is adequate demand for at least a few such MVNOs.

(b) views from the industry on the interest and viability for a new MNO to enter the market, and whether the market environment, or technology or spectrum developments have changed since the 2013 4G spectrum auction that have made the business case attractive for a new MNO to enter.

49. In line with our response in the ‘General Comments’” section of the paper, we believe it in unlikely that the current environment is attractive for a new MNO to enter.

50. The business case for a 4th MNO is relatively weak given the small size of the market and the minimum investment it would have to undertake to establish itself. This is the most likely rationale for the low level of interest in the 4G spectrum auction despite the encouragement from IDA.

51. The entrance of 4th MNO has seen mixed results in markets of all sizes (e.g. Tele2 in Russia, Croatia and Latvia). In smaller markets, the results are more pronounced.

52. When a 4th MNO does succeed, it does so (almost always) through massive price erosion which can hurt all market participants and may result in slower infrastructure growth over the longer term.

53. In some analogous telco markets such as Ireland and Latvia, the structure eventually reverted to a 3 player market after running a full cycle.

54. We believe IDA’s objectives of enhancing the competition may be better served with the encouragement of the innovative and segment focused MVNOs in the current market structure.

55. The low barriers of entry for MVNOs will also permit for more experimentation and innovation by smaller companies and start-ups. This is also in line with the spirit of the Smart Nation as envisioned by IDA.

Question 11: IDA seeks views on the ‘depth’ of MVNO deployment envisaged by new entrants, in particular, the viability of a ‘Heavy/Full’ MVNO deployment model versus the other models, given that the former would have the most flexibility to differentiate its services to compete with the MNOs.

56. We believe that the regulatory framework should permit all MVNO models. MVNOs are best positioned to determine the network or OSS components that are necessary to support its intended strategy and proposition.

57. While the broad distinction between light vs. full MVNO holds, any specific MVNO-hosting implementation may be very subjective to a given situation – for example, some ‘medium’ implementations may include an HLR while others may not.

58. The important aspect here is for the regulatory framework to encourage open and transparent discussions between the MNO and the MVNO so the MVNO business case is not hindered by inferior QoS, traffic shaping, turn-around-time for fault correction or delays in access to new technologies hosted by the MNO.

59. A set of guidelines and an operational agreement may be helpful. We discuss this further in our response to 13 (a).

Question 12: IDA seeks views on:
(a) Possible mechanisms to implement an MVNO-hosting framework, and the relative merit and usefulness of each of these approaches;
(b) The viability of a regulatory and/or voluntary commitment approach for MVNO-hosting, and the kinds of regulatory or incentives required and which spectrum bands to tie-in the MVNO-hosting incentives.

60. We see four possible mechanisms to implement MVNO-hosting frameworks in Singapore.

- **Voluntary Commitment Approach**: This would be the purely market driven MVNO approach which has been in place for many years in Singapore. Under this mechanism, MNOs have the "general duty to negotiate in good faith with MVNOs". We believe this is the approach FCC has also taken in its approach to MVNO hosting in the USA.

- **Incentivized Voluntary Commitment Approach**: This approach incentivises voluntary commitments on the part of MNOs to host MVNOs (e.g., with discounts or rebates off fees for MNOs, or inclusion to spectrum allocation evaluation criteria) as implemented in countries such as France and Malaysia. This approach would also include a strong signalling element on behalf of the regulator that sets the general direction of the market, removes market uncertainties yet allows for market forces to 'lead'.

- **Negative-incentive Regulatory/license Approach**: This approach enforces MVNO hosting by linking critical inputs for MNOs (such as spectrum) to hosting MVNOs. A version of this was approach was implemented in Hong Kong where MNOs were mandated to put 30% of their spectrum put aside for MVNOs under certain conditions.

- **Mandated regulatory approach**: This approach mandates MNOs to host MVNOs as a requirement for spectrum allocation or market entry. A version of this was implemented in Ireland where 3 Hutch was mandated to negotiate an MVNO agreement within a reasonable time frame. Other countries such as Saudi Arabia have also implemented versions of this.

61. We believe the *Incentivized Voluntary Commitment Approach* is the best path to a sustainable and long-term beneficial MNO-MVNO hosting framework in Singapore. Our primary support for this approach lies in the fact that it is still market led. In addition, it encourages both MNOs and MVNO with a variety of means including but not limited to spectrum benefits, tax advantages during critical phases or access to government contracts.

62. Within the *Incentivized Voluntary Commitment Approach*, strong IDA signalling regarding the long-term market direction is absolutely critical. IDA should also continue to keep the licensing related barriers to entry for MVNOs low. In principle, prices should be set on commercial grounds between MNOs and MVNOs. However, IDA should be open to stepping in if appropriate market terms, fair access and SLAs cannot be agreed between MNOs and MVNOs within a reasonable timeframe.

63. In comparison to the *Incentivized Voluntary Commitment Approach*, the *Voluntary Commitment Market Approach* may be too light to meet the broader objectives of enhancing competition in the Singapore market. With a small number of very strong players, low growth and no strong regulator signalling, the balance of power may favour the incumbents with network access. We believe the Singapore market has traditionally adopted a version of this approach which in retrospect may have been more suitable for either an emerging growth market or a larger market like the USA.

64. Third and fourth approaches laid out above would be too strong in our opinion and perhaps even counter intuitive. In Hong Kong for example, this approach led to too many MVNOs entering the market which then ended up competing on price and eroded the industry profitability. The fourth approach, if implemented strictly, would directly contradict the regulator's objective of market forces determining the direction of the industry.

65. While it is difficult to predict the right level of MNVO concentration in Singapore, we believe that the current market share of MVNO is too low. On the flip-side, certain successful telco markets have demonstrated an MVNO market share as high as 30% (e.g., in Germany). Given our inclination towards a market led approach, we do not believe that the regulator should set a fixed target for MVNO market share. However, we do believe that a 10-15% MVNO market share could be justified within the incentivized voluntary commitment framework.

Question 13: IDA seeks feedback on:
(a) the output/outcome indicators to be imposed on MNOs that would be relevant for MVNOs

66. Under the *Incentivized Voluntary Commitment Approach*, the preference would be for MVNOs and MNOs to negotiate agreements commercially and independently.

67. We believe that only a limited set of indicators should be imposed on MNOs to encourage MVNOs. Other microscopic or long-list approaches may be too heavy-handed.

68. However, the IDA may find it useful to lay out the most critical metrics and indicators for such negotiations – as a guideline rather than strong list. Such a 'guideline' will allow for healthy discussions on topics / metrics that are critical to the success of MVNOs.

69. We list below potential elements of such a potential guideline for IDA's consideration.

- **Access to spectrum**: Focus should be on creating an open architecture for MVNOs to be hosted with ease and transparency. Sub-items for discussion could include:
    - Number and length of negotiations
    - Reasons for unsuccessful negotiation

- **Pricing:** Fair pricing with minimal upfront cost to allow MVNOs a fair chance to be sustainable and profitable.

- **Sustainability of MVNO business**: Focus should be on providing a reasonable 'start-up' period for the MVNO
    - Length of hosting contract offered
    - Minimum volume/minimum revenue imposed on MVNO

- **Operational items**: For example, negotiations should allow for the MVNO's ability to
    - Offer equivalent QoS and availability on the hosted MVNO network
    - Offer flexible end-consumer product innovation flex offerings frequently as long as the MNO infrastructure permits

- **Access to relationships:** Does the MVNO get any access to the MNO network and relationships including roaming partners, long-distance partners, device distributors and OEMs?

(b) the level of wholesale pricing to the MNO's access network (in unit rates) that would justify the business case for market entry;

70. There are three possible approaches for setting the wholesale pricing to the MNOs' access networks:

- **Reference Rate:** Fixed regulated price for all MVNOs involved with the objective of facilitating meaningful competition. This could be achieved through a rate card that clearly lays out pricing based on SLAs, volume, length of contracts and quality of access provided by the MNO.

- **Revenue Minus**: Offering MVNOs bandwidth at a discount to the cheapest per minute retail rate. The difference in retail and wholesale pricing would allow the MVNO to innovate on services, marketing and packages for customers without incurring a loss. This approach- based on our calculations- needs to be at least 40-50% lower than the average retail price for the cheapest per minute rate.

- **Cost plus**: Offering MVNOs bandwidth at the current MNO cost plus a rate of return margin to retain the MNO incentive to support MVNOs and deploy capital expenditure over the longer term.

71. We believe the answer may lie somewhere between a revenue minus and a cost-plus approach. That said, the regulator must also take note that the exact cost structure of a particular MNO may not be transparent to a potential MVNO - even if it is technically feasible for an MNO to estimate.

72. The first approach could lead to a situation with artificially low pricing and result in the entry of more MVNOs than the market can support sustainably. Besides, each MNO will have a different starting point and cost structure which makes this approach too rigid and not market-oriented.

(c) the non-price terms and conditions imposed by MNOs, such as minimum volume or revenue commitments, that would be acceptable for a positive MVNO business case;

73. Given prior history of MVNOs in Singapore and their inability to succeed meaningfully (current market share of all MVNOs combined is still less than 1%), ideal terms and conditions should include a 'start-up period' with minimal revenue or volume commitments. However, these non-price terms and conditions should not result in artificially lowering barriers to entry for the long-term.

74. With the regulator perspective of balance in mind, we list some ideas for IDA's consideration:

- Minimal MVNO volumes and revenues commitments for the first 2-3 years but a reasonable 3 year total volume (sum of all three years) target. In the long term, both MNO and MVNO may be better off in such an arrangement. Plus, in return for allowing such flexibility, the regulator may consider incentives for the MNO.

- Other interesting models have been observed in Europe where MNOs like Telenor ask MVNOs on their network to meet 65% of their previous years' volume or revenue. This is an interesting model as it provides an MVNO flexibility in face of high volatility that it may face in the start-up years.

(e) the ability of MNOs to differentiate classes of service and allow priorities to cater to the needs of government demand or other MNVOs;

75. We believe that the ability of MNOs to differentiate classes of service and allow priorities to cater to the needs of government demand or other MNVOs is important. We would be looking for the ability of MNO not only to offer service differentiation to government or MVNOs as a whole, but also to be able to provide tiering within the traffic, sold to MVNO – enabling MVNOs to offer tiered packages to their end users. This is particularly important, as we anticipate that increasingly more and more of the consumer usage would be in data, where we will see different speed requirements between different applications (and therefore we would anticipate different customer types and their readiness to pay for different tiers of service).

76. For example, US MNOs T-Mobile and Sprint have the capability to offer "All-you-can-eat voice, text, and data without throttling" package, alongside the packages that both limit customer's cumulative consumption and throttle their speeds. We would be looking for a Singaporean MVNO to be able to offer a similar variety of service to their customers – but the host MNO would need to enable this.

(f) any other relevant considerations that IDA should take into account in structuring a framework to encourage the hosting of MVNOs.

77. We propose two other ideas for IDA's consideration with regards to the MVNO hosting framework:

- Given the importance of the telco infrastructure as national asset, it is important to identify and encourage players that are local or at least have a long-term vested interest in the national building process of Singapore. Short-term or half-hearted MVNO approach may not be ideal for the long-term benefit of the market.

- Given the importance of MVNOs in the long-term, IDA may consider additional MNO incentives in the short-term. This may include preferential treatment in government contracts or access to cheaper project financing for infrastructure works.

This paper is prepared in response to IDA's consultation document dated 22 April 2014 and represents LW's and the co-authors' personal views on the subject. LW, the co-author or any party associated with this paper assumes no liability for any loss or damage resulting from the use or misuse of any information contained in this paper.