



SUBMISSION FOR THE SECOND CONSULTATION PAPER
ON
5G MOBILE SERVICES AND NETWORKS

To:

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A handwritten signature in black ink, appearing to read "Adeel Najam", is positioned above the printed name.

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Liberty Wireless Pte. Ltd. (“LW”) / **Circles.Life (“CL”)** thanks the IMDA for inviting us to comment on the Second Consultation on 5G Mobile Services And Networks. Our response to the Consultation Paper is structured as follows:

PART I - SUMMARY OF MAJOR POINTS	2
PART II - STATEMENT OF INTEREST	4
PART III - SPECIFIC COMMENTS	5
Our Vision & Recommended Playbook	5
Spectrum Allocation for 5G	7
Initial 5G Market Structure & 3.5 GHz and mmWave Band Plan Options	8
Key Obligations & Requirements	10
Spectrum Assignment Mode	14
Facilitation for Rollout of 5G Networks	16
Other Facilitations/Reviews Required	17
PART IV - CONCLUSION	17

PART I - SUMMARY OF MAJOR POINTS

Our Vision & Recommended Playbook

1. CL believes that 5G is key to unlocking the potential of digital services in Singapore to serve consumers at unprecedented levels of personalisation and scale, and that Singapore is poised to become a tech hub renowned for the development of such services. We are optimistic that the development and proliferation of 5G tech in Singapore will bring great innovation and benefit to the region.
2. As such digital services rise in prominence, we submit that the future economy will, accordingly, skew heavily towards digital skills. Foundational proficiencies of understanding and working in data- and technology-rich environments will increasingly become baseline requirements, while advanced proficiencies with digital tools - both in technical and non-technical roles - will be in greater demand.
3. To establish Singapore's global 5G tech leadership in the long run, we call on IMDA to take a leading role in scaling a pool of cutting-edge digital talent in our local market, and craft regulatory protections that ensure nondiscriminatory access to current and future networks. As such, we applaud the recent announcement of the Digital Industry Singapore joint office (DISG) as a positive step towards enabling these necessary changes.

Spectrum Allocation for 5G

4. We agree with IMDA on the timelines for the expected availability of the next wave of 5G spectrum, and request that IMDA clarify that both the coming and subsequent bands of 5G spectrum will be awarded on the principles of nondiscriminatory wholesale access.
5. CL also supports any effort by IMDA to reform the current deployments to 3GPP Band 41 for future 5G services in Singapore to the benefit of future users, given the greater opportunity benefits that will result from making these bands available to the next generation of spectrum use in 5G.

Initial 5G Market Structure & 3.5 GHz and mmWave Band Plan Options

6. We agree with IMDA's proposal that the future of 5G competition in Singapore be based upon competition between multiple nationwide networks. In particular, we strongly agree that limiting the number of nationwide networks to two gives strong indication to optimise network quality and facilitate innovation from downstream players, and would hence be the most appropriate for our market at this time.
7. To preserve downstream players' ability to bring innovation and vibrancy to the market, CL submits that wholesale access must be clearly mandated in the framework, and that the

Negotiating Principles underlying the proposed framework be strengthened by immediate clarification, to ensure nondiscriminatory access to all interested parties, and prevent anticompetitive practices in the market.

Key Obligations & Requirements

8. CL reiterates that any proposed network rollout and performance obligations should be clearly and specifically defined, to decisively rule out the possibility of anticompetitive behaviour that exploits the breadth of the proposed obligations and requirements.
9. Therefore, we call for greater specificity on the performance benchmarks required by IMDA, and request that IMDA reconsider its proposal not to impose QoS requirements at an initial stage on 5G networks. CL proposes that, in lieu of not imposing QoS requirements at the onset, IMDA could waive any imposed metrics for a period of time, then make clear that the waiver expires once a time stipulated by IMDA has passed.
10. CL also calls for greater clarity on the process benchmarks that the industry should abide by, and holds that IMDA should mandate that processes meet a certain benchmark of efficiency, to eliminate the possibility that a market player can exploit inefficient processes to bottleneck other service providers seeking access to their network.

Spectrum Assignment Mode

11. CL is optimistic that mandating the provision of 5G wholesale services will ultimately be to the benefit of the Singaporean consumer, and submits that the full, nondiscriminatory provision of 5G wholesale services will best enable the whole industry to encourage market vibrancy, seek capital efficiency, increase service and product innovation, and increase consumer welfare.
12. We submit that any framework for the provision of 5G wholesale services must unequivocally - and enforceably - mandate that the allocation of 5G spectrum is conditional upon the provision of full access for any MVNO or MNO to the 5G spectrum by the awarded spectrum rights holder, on a fair, reasonable, and non-discriminatory basis, and suggest several commitments any bid should make to be considered a responsive one.
13. CL also reiterates its call for IMDA to strengthen the negotiation principles further, in advance of the separate consultation to be issued on the Negotiating Principles guiding wholesale access provision.
14. We submit that beyond assigning weights to each criterion outlined by IMDA, greater clarity should also be provided on how IMDA intends to score each criterion, to provide more guidance to the industry, and elevate any proposals submitted to a higher standard.

15. We also encourage IMDA to lend greater credence in its consideration to operators which provide firmer, demonstrable, and binding commitments to the plans they propose, to encourage greater accountability to delivering on the proposals submitted.
16. To ensure applicants are able to deliver on their proposals, we propose that IMDA consider an oversight responsibility that ensures equivalency of provisioning and conduct on the part of successful applicants, such that they must share their network, and that they must do so on a nondiscriminatory basis to the benefit of the entirety of the market and its consumers.

Facilitation for Rollout of 5G Networks

17. CL asserts that MVNOs should continue to enjoy full and nondiscriminatory sharing access to the same infrastructure elements under 5G as per the hosted (wholesale) model outlined by IMDA in the Consultation, such that MVNOs will be able to leverage and get access to the full range of infrastructure elements, to the benefit of both their operator partners and consumers.

PART II - STATEMENT OF INTEREST

18. CL shares IMDA's optimism on Singapore's potential to be a leading market for innovation, digital services, and consumer welfare in the next generation of 5G technology. As a driver of positive change in our market through customer-centric digital innovation, we believe 5G will enable new products and services, transform consumer behaviour, and induce greater market vibrancy in return.
19. As a consequence, we believe that the coming shift will be technological, social, and exponential, and eagerly anticipate the changes that the shift to 5G will bring: enhanced experiences for local consumers; new opportunities for local talent; and dynamism to our economy as Singapore enriches and solidifies its reputation as the tech capital of Asia, for the world.
20. Simultaneously, we continue to advocate - as we have consistently done before - for the regulatory protections needed to fully realise these benefits for end-users and the economy. These protections are critical for emerging, and often smaller players to compete and innovate in an equivalent and reasonable market with legacy players; and build industry-revolutionising tech that will define the Singaporean brand.
21. Thus, CL recognises this as a critical juncture to define a regulatory framework that creates clarity and certainty in the industry, and categorically upholds fair competition and innovation in the new 5G landscape. We offer our recommendations for a clear and effective regulatory framework below.

PART III - SPECIFIC COMMENTS

Our Vision & Recommended Playbook

Question 1: IMDA would like to seek the industry's views on skills requirements and the potential job demands in the future of networks and next generation of application/use-cases with 5G technology.

Question 2: IMDA would like to seek views on:

i) The types of innovative use-cases that could capitalise and further enhance Singapore's competitive advantages, trigger new growth potential and/or strengthen Singapore's existing strategic pillars; and...

22. CL believes that Singapore's technological advancement towards 5G will be paralleled by a broader shift in the global industry towards serving the needs of the consumer, rather than the constraints of service providers. Our mission of giving power back to consumers has been based on this very assumption: that today's consumers seek personalised, responsive, and reliable solutions; and are increasingly less concerned about how - or who - delivers those to them, be they in the form of a service or an experience.
23. Therefore, on top of the new use-cases that 5G will make possible, CL believes that 5G will unlock the previously untapped potential of digital services in Singapore, which leading tech firms globally and in the region are already building towards. We envision a future in which Singapore becomes a tech hub renowned for developing these services on an international scale: providing a range of services that are deeply, yet invisibly embedded into the daily lives of consumers; granting them unprecedented levels of personalisation and flexibility; and serving their needs seamlessly across business verticals and geographies.
24. To serve a wide range of needs for consumers around the world, the digital services of the future must be a platform flexible enough to reliably accommodate and support new digital products on a massive scale. It will span different sectors; be secure and safe enough to deliver public services and protect the privacy of individual users; and be stable enough to support all these functions as they grow by millions of users and data points.
25. As a locally-grounded innovator seeking to build just such a platform, CL submits that the jobs and skills demanded by the industry will continue to skew heavily towards digital skills. These competencies - ranging from the foundational proficiencies of understanding and working in data- and technology-rich environments, to advanced proficiencies with digital tools - are vital to develop and support next-gen digital products. They include skills such as developing digital products which deliver fluid, 'intuitive' user experiences, and also include subtler soft skills, such

as the ability to lead high-performing digital teams, operate in fast-moving business environments, and having the experience of building and supporting digital products from scratch to massive and uncharted scale.

26. Collectively, these advanced skills and experiences are essential to building the future of digital services, today. They represent a wholly different degree of expertise compared to that which is required to serve current-gen legacy markets, or manage smaller quantities of / less sensitive user transactions.
27. Our example demonstrates how such talent can create positive impact for consumers. Our fully-digital tech stack has enabled us to offer new value to local consumers since our launch in mid-2016, revitalising the telco market - which, as IMDA has observed, led to greater price, service, and product innovation. These skills will continue to drive exponential gains for consumers as we transition towards 5G.
28. Therefore, we believe that developing and attracting the world's best digital talent is imperative to establishing Singapore's global leadership in the 5G paradigm. This is a critical opening and narrow window of time to develop the policies needed to secure that talent - before the unprecedented change brought by 5G fundamentally alters the market landscape - or risk irrelevance.
29. As such, CL welcomes the timely formation of DISG. We view this as a positive step toward forward-looking policies and partnerships that anchor Singapore's leadership in the future, and looks forward to working with DISG to grow opportunities for Singapore and Singaporeans.

ii) Areas of government support that the industry require in order to enable innovation and development in 5G.

30. First, CL submits that in addition to existing schemes to grow and develop the local talent pool (e.g. by retraining / upskilling jobseekers), interventions on a larger scale are required in order to support intensifying industry demand for tech talent - particularly in this early stage of the development of digital platforms when deep tech talent is scarce in the immediate market and cannot be readily sourced.
31. Second, as IMDA has raised in previous Consultations, the shift toward 5G and digital services engenders both great opportunities as well as risks for product and service innovation - and eventually for consumer welfare - as market environments become more fast-moving, and incumbents acquire new ways to strengthen and entrench market power through the use of network effects and big data.
32. We have noted this in our responses to those Consultations, and resurface the position that regulatory protections to ensure nondiscriminatory access to current and future networks will

be critical to enable innovation and development in 5G.

33. Citing network slicing services, as mentioned by IMDA in this Consultation, as an example of the importance of equivalent access. They will enable non-incumbent industry players (including thick MVNOs such as LW) to bring innovation & differentiation to consumers through an enhanced degree of flexibility, automation, and the ability to customise services and experiences over and well beyond earlier MVNO models. Commenters have noted that MVNOs would be able to run targeted mini-networks with characteristics tailored to specific use cases (e.g. mobile gaming), or specialise in different service levels within a slice (e.g. fast control packets).
34. However, without equivalent access, MVNOs - and more importantly the market - may be restrained from benefitting fully from this technology at the same time as their partner MNOs do. As downstream providers, MVNOs enjoy closer relationships with customers that allow us to provide services that are more innovative and user-centric. A lack of equivalent access would compromise these benefits for consumers in the short run; and also in the long run should MNOs leverage their first-mover advantage to entrench their positions.
35. We elaborate below on specific protections that, we believe, will be required to enable innovation and development in 5G.

Spectrum Allocation for 5G

Question 3: IMDA would like to seek views and comments on the suitable technical parameters, including the reasonable amount of guard band needed to reduce potential interference between IMT and FSS use in the 3.5 GHz band.

36. CL has no comment at this time on the technical parameters proposed by IMDA.

Question 4: IMDA would like to seek views and comments on the following:

i) Whether the industry agrees with the timelines on the expected availability of the next wave of 5G spectrum; and

37. CL agrees with the rationale underlying the 5G rollout timeline proposed by IMDA, including the expected availability of the next wave of 5G spectrum. We believe that IMDA's more prudent approach, timed to global and regional harmonised spectrum outcomes, other markets' experiences, and the maturity of 5G infrastructure and the mobile ecosystem will better serve end-users in the long-run, while preserving IMDA's vision - which we share - of Singapore becoming a leading market in 5G applications.
38. We also submit that IMDA should specifically clarify that subsequent bands of 5G spectrum should also be awarded on the condition that any successful spectrum rights holder must grant

wholesale access to any other service provider upon reasonable request on a nondiscriminatory basis, as we will elaborate in our response below.

ii) Whether current deployments in the 2.5 GHz FDD spectrum band (based on 3GPP Band 7) and in the 2.5 GHz TDD spectrum band (based on 3GPP Band 38), should be reformed to 3GPP Band 41 for future 5G services in Singapore, and the views on the associated cost and challenges.

39. We recognize that the two 3GPP bands in 2.5 GHz have been earmarked for 5G in certain regions around the globe, and that even the U.S. regulator is already working on transforming the usage in those bands. Thus, we support any effort by IMDA to reform the current deployments to 3GPP Band 41 for future 5G services in Singapore to the benefit of future users, given the greater opportunity benefits that will result from making these bands available to the next generation of spectrum use in 5G.

Initial 5G Market Structure & 3.5 GHz and mmWave Band Plan Options

Question 5: IMDA would like to seek views, comments and suggestions on:

i) Whether Singapore should have two nationwide networks as a start given the considerations and trade-offs;

40. We agree with IMDA's proposal that the future of 5G competition in Singapore be based upon competition between multiple nationwide networks, on the grounds that facilities-based competition can make the market more vibrant, and can be an incentive to invest in the 5G infrastructure that will be the foundation of any subsequent innovation and competition on 5G. Given IMDA's past success in increasing consumer welfare and market vibrancy through the implementation of the Next Gen National Broadband Network (NGNBN), CL is optimistic that IMDA is well-positioned to lay a foundation for 5G which accomplishes the same goals.

41. On the other hand, we recognize that the deployment of any new network will be capital-intensive, and that considering the overall size of the Singapore market, overdevelopment will breed unintended inefficiencies should a greater-than-optimal number of efficient networks be developed. We understand and accept that IMDA believes the number of networks deployed might fall below the number of infrastructure players presently in the market, and reiterate that as such, network sharing and wholesale access must be clearly mandated, such that open, nondiscriminatory access to the 5G network is made available to all interested parties.

42. This raises a policy challenge for the IMDA to strike the proper balance between network efficiency and economic competitiveness. For further consideration, should two networks be deployed (forming a duopoly), IMDA must accept its added responsibility of insuring the market remains vibrant to sustain growth, and that the duopoly does not become a cooperative - and

therefore anticompetitive - one. This responsibility would require the imposition of expanded regulatory protections over those players, grounded in a regulatory framework, and backed by a firm commitment by the regulator to enforce those regulations. Similarly, in the instance that only one single network (a natural monopoly) qualifies for a spectrum assignment, the regulator's responsibility to check its potential to distort and suppress competition through regulatory protections grows significantly.

43. CL therefore submits that, for this framework to be comprehensive, it must recognize that monopolies or duopolies that serve a market require deeper and direct involvement in areas such as price, anti-competitive conduct, and even investment practices.
44. Conversely, we believe that deploying three new 5G networks (or more) might result in the inefficient use of capital and suboptimal use of spectrum given the overall size of the market. Therefore, we submit that more than two players might not be in the best interest of Singapore's wireless market as it evolves towards 5G.
45. Beyond the question of the number of nationwide networks that Singapore should have, we caution that while IMDA mentions provisions for network sharing and wholesale access in the framework for the provision of 5G wholesale services, we submit that the proposed framework - grounded as it is in the Negotiating Principles - needs to be strengthened by immediate clarification to provide market clarity, to further ensure that it offers nondiscriminatory access and prevents anticompetitive practices in the market.
46. Left unchecked by such regulatory protections, operators elsewhere have dominated their respective wireless markets due to the economies of scale arising from control over wireless infrastructure, making entry nigh-impossible for new entrants, and posing a constant struggle for their regulators to achieve healthy competition.
47. As such, we maintain - as we have elsewhere and most recently in our response to the proposed Converged Code - that the Negotiating Principles must be expressed with greater specificity now so that they can be enforced. We articulate what we believe to be enforceable Negotiating Principles in Paragraphs 67 and 71.
48. Furthermore, we press that these refinements to the Negotiating Principles must be codified together with the rollout of the regulatory framework, rather than left to some future determination by IMDA; CL submits that this would lead to uncertainty and ambiguity, which would in turn create an opportunity for any new 5G spectrum right holder to misuse their new market power.
49. Finally, to complement the efficacy of a refined set of Negotiating Principles, we believe a clear set of regulatory enforcement and / or audit mechanisms to hold successful 5G spectrum right holders to the terms of their initial proposals must be put in place, to ensure that the benefits

for consumers and the market are fully realised as per their original intent. We elaborate further in our response below.

- ii) The proposed 3.5 GHz lot sizes and spectrum packages;*
- iii) Whether 5G equipment would be able to support 3.5 GHz bandwidths in multiples of 50 MHz;*
- iv) The value, if any, in assigning the remaining 50 MHz restricted 3.5 GHz spectrum in the same assignment exercise as the unrestricted lots;*
- v) The proposed mmWave lot sizes and preferred band plan option; and*
- vi) The rank order preference of the 3.5 GHz spectrum package and mmWave lot combinations.*

50. CL has no comment at this time on the questions posed by IMDA above.

Key Obligations & Requirements

- Question 6: IMDA would like to seek views, comments and suggestions on:*
- i) The proposed network rollout and performance obligations to be imposed on the spectrum right holders;*
 - ii) The methodology and measurement criteria for the coverage obligation;*

51. While CL understands that IMDA seeks to strike a balance between protecting the eventual interests of end-users and introducing light-touch regulation which accounts for the challenges of deploying 5G SA networks from the onset, we submit that greater clarity on the proposed obligations is required to fulfil the first objective.

52. CL reiterates that any proposed network rollout and performance obligations should be clearly and specifically defined for the avoidance of doubt, which would lend more clarity to the industry on IMDA's positions proceeding forward, and remove any ambiguity which might create opportunities for anticompetitive behaviour.

53. First, greater specificity is required for the performance benchmarks called for by IMDA. For instance, we note that IMDA has not currently quantified the degree to which new 5G networks are expected to deliver improvements on overall network performance vis-a-vis 3G/4G networks. Left unspecified, any operator of a 5G network may seek merely to satisfy this broad condition, rather than to exceed it by a meaningful margin, to the detriment of the end-user which the regulatory framework originally sought to protect.

54. Similarly, the notion that IMDA will not impose QoS initially on such networks should also be reconsidered. This would allow a rights holder to have control over a public and scarce resource

with no responsibility to use it efficiently for the public good, but only in a way that holder sees fit.

55. As a baseline, we recommend the continued application of the same QoS metrics IMDA currently uses¹ for existing and prior networks - namely, nation-wide outdoor coverage, tunnels coverage, and in-building coverage - to new 5G network providers. CL is also aware of other QoS standards² adopted elsewhere which IMDA may wish to consider, which span both application-based QoS (AQoS), measuring the end-to-end quality of user satisfaction with real-time application performance, and network-based QoS (NQoS), measuring various measures of traffic quality (e.g. throughput, delay, packet loss, and availability).
56. If IMDA believes that in the absence of complete standards, or the uncertainty of demand, it would like to relax conforming to a particular metric on its final list of QoS metrics, we suggest that IMDA could waive the imposed metrics, as suggested in Paragraph 55, for a period of time, but make clear that the waiver expires once the stipulated time has passed. Such an arrangement would account for the initial challenges operators might face in deploying 5G SA networks, while giving the market and its operators greater levels of certainty on the obligations of operators to their end-users.
57. Second, clarity is required on the process benchmarks that the industry should abide by. CL holds that IMDA should mandate that processes meet a certain benchmark of efficiency, as we are aware of an international example where the regulator mandated wholesale network access on a nondiscriminatory basis, but declined to impose standards of efficiency on the processes involved in providing that access. This created an opportunity for a market player - incentivised by its dual position both as a wholesaler and a retail competitor to those seeking access to its network - to exploit this ambiguity by implementing a highly inefficient process that created an effective bottleneck for other service providers seeking access to their network.
58. CL repeats its emphasis that adding clear benchmarks for performance and process obligations best serves the interests of the regulator, the industry, and of course the end-user. CL believes that retroactively and incrementally adding further requirements to the regulatory framework will pose more complications for the regulator and create greater industry uncertainty than if these clarifications had been made at the onset of the publication of the regulatory framework.
59. To add context, CL reiterates that putting forth clear obligations is the first of two prongs that should be strengthened; the second being the ability to check for compliance, and enforce those obligations. We elaborate further in our response below.

¹ As per IMDA's 4G Service QoS framework.

² Al-Shehri, S. M., Loskot, P., Numanoglu, T., & Mert, M. (2017). Common metrics for analyzing, developing and managing telecommunication networks.

iii) The network design and resilience challenges of 5G (in particular, enabling technologies, such as SDN, NFV and Cloud Computing that may fundamentally change how the network would be designed and deployed) and possible measures to address them, and whether there are other aspects that should be considered to enable trusted and resilient 5G network; and

60. CL has no comment at this time.

iv) The framework for the provision of 5G wholesale services.

61. We note that IMDA considers the negotiation principles for wholesale access published in its previous decision (on the Framework for the Allocation of Spectrum for IMT and IMT-Advanced Services and for the Enhancement of Competition in the Mobile Market) to remain relevant, and to apply to spectrum right holders' provision of 5G wholesale services to other MNOs and MVNOs.

62. We assert that wholesale wireless access arrangements across the globe remain in an early stage of implementation, and that where they have failed, the causes have largely been political or administrative³, rather than due to any inherent failing of wholesale access principles. Additionally, we note that multiple commentators concur that wholesale access arrangements are likely to increase access and lower prices for end-users overall⁴.

63. We are therefore optimistic that mandating the provision of 5G wholesale services will ultimately be to the benefit of the Singaporean consumer and the health of the market on the whole. CL also believes that this will facilitate both MNOs and MVNOs in our market to specialise in their respective areas of expertise: the former, tapping on their deep expertise in building and maintaining infrastructure; the latter, leveraging their closer relationships to customers and nimbler digital operations to focus on developing innovative new services. The full, nondiscriminatory provision of 5G wholesale services will enable both sets of players to combine their strengths, encourage market vibrancy, seek capital efficiency, increase service and product innovation, and increase consumer welfare.

64. Therefore, as submitted in our response to the Public Consultation on the Converged Competition Code, CL strongly asserts that this consultation represents a critical opportunity to effectively ensure equal access to wholesale mobile services, product innovation in the market, and enhanced consumer satisfaction in the coming 5G paradigm. We believe this can be achieved in two broad ways.

65. First, CL submits that any framework for the provision of 5G wholesale services must unequivocally - and enforceably - mandate that the allocation of 5G spectrum is conditional

³ Cooper, D. (2018, February 08). A state-run wireless network isn't a crazy idea, just ask Mexico. Retrieved from <https://www.engadget.com/2018/02/08/state-run-wireless-network-mexico-australia/>

⁴ Cramton, P., & Doyle, L. (2017). Open access wireless markets. *Telecommunications Policy*, 41(5-6), 379-390

upon the provision of full access for any MVNO or MNO to the 5G spectrum by the awarded spectrum rights holder, on a fair, reasonable, and non-discriminatory basis. We define “full MVNO access” as the provision of wholesale 5G access to any MVNO or MNO at regulated prices, terms and conditions which allow fair, reasonable, non-discriminatory access to spectrum, at the same level that any 5G spectrum right holder would enjoy.

66. Second, CL reiterates its call for IMDA to strengthen the negotiation principles further, in the interest of preserving the vibrancy of the market and the outcome of increasing consumer welfare; and in advance of the separate consultation to be issued on the Negotiating Principles guiding wholesale access provision. We urge IMDA to incorporate the recommendations we offered - and repeat now, for ease of reference - in our response to the Public Consultation on the Converged Competition Code into the updated negotiation principles, as follows:

(a) spectrum right holders must provide other mobile service providers⁵ access to 5G wholesale services at just and reasonable prices, terms and conditions;

(b) spectrum right holders must not engage in unreasonable discriminatory traffic management practices in any and all respects;

(c) spectrum right holders must provide 5G network access to other mobile service providers on the same timescales and terms and conditions (including price and service levels) that it provides to itself;

(d) spectrum right holders must provide the same quality of service and coverage to mobile service providers that the spectrum right holder provides itself and its own customers, and

(e) spectrum right holders must not impose any condition or restraint in wholesale agreements that adversely impacts the business responsibilities of the mobile service provider purchasing the wholesale service

where “the same” means exactly the same subject only to:

(i) trivial differences; and

(ii) such other difference as may be agreed by the IMDA in writing from time to time.

⁵ Specifically to any MNOs and MVNOs.

Spectrum Assignment Mode

Question 7: IMDA would like to seek views, comments and suggestions on the spectrum assignment framework, including:

i) The proposed assignment approach;

ii) The spectrum right duration of the 3.5 GHz package and mmWave lots;

67. CL has no comment to add at this time.

iii) The evaluation criteria, sub-criteria and weights to assess the proposals;

68. CL submits that the evaluation criteria, sub-criteria and weights suggested by IMDA should be refined further to provide greater clarity to the industry in several ways.

69. First, as expressed in our response to the previous question, CL reiterates that the allocation of 5G spectrum should be conditional upon any would-be 5G spectrum right holder's specific commitment: to the provision of full 5G access for any MVNO or MNO upon request, on a fair, reasonable, efficient and non-discriminatory basis. We firmly believe that making this requirement explicit and unequivocal is necessary to securing fair, healthy competition and enhanced consumer benefits in the future 5G economy. We further believe that as part of this process, IMDA should be prepared to fully enforce this equivalency, and be prepared to take swift action against those who disregard these conditions.

70. As submitted in Paragraph 65, we suggest that a bid that omits such a specific commitment to offer 'Wholesale Arrangements' be deemed in its entirety as non-responsive and be disregarded, regardless of the other conditions of their bid. Further, in line with our position that specificity lends greater credence and credibility to the proposal to the eventual benefit of consumers and the vibrancy of the market on the whole, we suggest that the bid must include the following commitments in order to be considered responsive:

(a) A comprehensive description of the bidder's commitment to any wholesale agreement, including the prices, terms and any relevant conditions of its offers; a technical description of what it intends to offer; the procedures to order these wholesale services, and the timeframes it will abide by for the delivery of those services;

(b) To prepare this offer in advance of its access right award, that is sufficiently detailed that the operator seeking access need not enter into further negotiations with the supplier;

(c) To not discriminate between (or prefer) itself over the requesting licensee i.e. to offer at the same price, the same terms, and the same processes;

(d) To not discriminate amongst all seeking access; i.e. can not offer an unreasonably preferential offer to any particular requesting licensee seeking access;

(e) That the requester of such network access need not acquire any more capacity than it has requested to obtain.

71. Second, we caution that beyond assigning weights to each criterion outlined by IMDA, greater clarity should also be provided on how IMDA intends to score each criterion - by example, if a particular score will be awarded on the basis of how each operator's submission is ranked (by IMDA's judgment) relative to the other submissions, and what are the defined metrics which IMDA will consider in its evaluation. Such an increased level of specificity will provide more guidance to the industry, and elevate any proposals submitted to a higher standard - reducing the ambiguity faced by IMDA in evaluating these proposals, and accruing to the benefit of the market.

72. Finally, as submitted in our response to Question 5(i), CL also seeks clarity from IMDA on whether the award of 5G spectrum rights will be contingent upon having a certain number of qualifying recipients (e.g. that 5G spectrum rights will only be awarded at all if there are at least 2 passing proposals), and if there will be a minimum 'passing' grade for the evaluation criteria, to avoid a situation in which IMDA awards the 5G spectrum rights to weaker proposals on the grounds that no others qualify.

iv) The assessment methodology, including evidence (documentary or otherwise) to evaluate the proposals; and

73. While CL has no comment at this time on the specific evidence that should be produced for the evaluation of the proposals, we broadly urge IMDA to uphold the practice of openness and transparency in this process, as it has done in its public consultations, by sharing the details of these proposals following their submission with the public.

74. We also encourage IMDA to lend greater credence (and inform the industry that it will do so) in its consideration to operators which provide firmer, demonstrable, and binding commitments to the plans they propose, to encourage greater accountability to delivering on the proposals submitted. We expect that there will be proportionate consequences levied on errant providers, should a provider not be able to deliver on its initial commitment as proposed to IMDA.

75. Finally, while the present proposal by IMDA applies this evaluation process to the mid-level and mmWave bands (as laid out in Paragraphs 98, 99, and 125 of the Consultation), we recommend

that IMDA also apply this approach to any sub-1GHz bands as soon as they are assigned and made deployable.

v) The enforcement and/or audit mechanisms to ensure that applicants are able to deliver on their proposals.

76. As we put forth in Paragraph 59, we believe that the ability to audit and enforce compliance to IMDA's proposals is a complementary and necessary prong to the first, of setting out clear obligations for operators and the industry. This would hold the industry accountable to the welfare of end-users, for which the benefits of 5G must accrue.

77. In the absence of clear enforcement and / or audit mechanisms ensuring coverage and performance, there is currently little to prevent any party awarded with spectrum rights from defaulting or deviating on the original proposals submitted to IMDA; particularly as the cost of constructing 5G infrastructure remains difficult to precisely estimate - and contain - given its scale and novelty in the market as well as the built-up density of our urban landscape⁶.

78. We therefore propose that IMDA consider an oversight responsibility that ensures equivalency of provisioning and conduct of those who have earned the right to deploy infrastructure, and thus possess the stated responsibility to share their network, and to share it on a nondiscriminatory basis such that the entirety of the market and its consumers may benefit from the potential of 5G. This would safeguard against any potential abuse of a bidding commitment (i.e. once having secured the spectrum right, a successful bidder then reneges on future responsibilities), and provide the market with adequate confidence that the scarce resource was responsibly administered for the common good.

Facilitation for Rollout of 5G Networks

Question 8: IMDA would like to seek views and comments on the trade-offs (particularly on resilience, 5G capabilities) and technical feasibility of the various levels of infrastructure sharing.

79. CL calls for any mandated infrastructure sharing model to impose and enforce equivalent access to spectrum for any reasonable request from all retail providers in the mobile market. And as submitted in our response above in Paragraph 63, we assert that MVNOs should continue to enjoy full and nondiscriminatory sharing access to the same infrastructure elements under 5G as per the hosted (wholesale) model outlined by IMDA in the Consultation, such that MVNOs will be able to leverage and get access to the full range of infrastructure elements (should there be any degree of structural separation of the elements) to the benefit of both their operator partners, which enjoy increased revenues and fuller infrastructure utilisation rates, and

⁶ Network sharing and 5G: A turning point for lone riders. (2018, February). Retrieved from <https://www.mckinsey.com/industries/telecommunications/our-insights/network-sharing-and-5g-a-turning-point-for-lone-riders>

consumers, which benefit from the broader range of innovation that service-focused MVNOs can then deliver on.

Question 9: IMDA would like to seek views and comments on the following:

i) The synchronisation approach for 5G TDD networks in a multi-operator environment for the 3.5 GHz and mmWave bands, specifically for the following:

a. Synchronised networks: the required frame alignment, compatible frame structures and BEM specifications for AAS and non-AAS base stations; and

b. Unsynchronised networks: the amount of guard band, geographical separation and BEM specifications for AAS and non-AAS base stations;

ii) The adoption of other suitable mitigation measures to mitigate interference between unsynchronised networks; and

iii) The need for IMDA to mandate a regulatory requirement for synchronisation across the 5G TDD networks or leave it to operators to co-ordinate their network deployment and parameters in order to reduce interference between networks.

80. CL has no comment at this time on the questions posed by IMDA above.

Other Facilitations/Reviews Required

Question 10: IMDA would like to seek views and comments on the following:

i) The interest from industry players to leverage 5G spectrum or other mobile spectrum bands for fixed-wireless services that support mobile connectivity; and

ii) The policies (e.g., spectrum allocation, numbering) that should be considered to facilitate such use-cases.

81. CL has no comment to add at this time.

PART IV - CONCLUSION

82. In conclusion, we support the direction that the proposed framework takes towards building a market that is more open, innovative, and better for consumers - and see it as foundational to our shared vision of Singapore's global leadership in the new 5G era. We have made several recommendations that we believe are critical to crafting an effective and lasting regulatory framework above, and are optimistic that our perspectives will help create a framework that best serves the future of the market, consumer, and the regulator alike.