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Ms Aileen Chia
Director-General (Telecoms and Post)
Deputy CE (Policy, Regulation & Competition Development)
Infocomm Media Development Authority
10 Pasir Panjang Road
#03-01 Mapletree Business City
Singapore 117438

**MYREPUBLIC SUBMISSION ON SECOND CONSULTATION ON 5G MOBILE SERVICES
AND NETWORKS**

MyRepublic Contact:
Vaughan Baker
Group Director, Government & Corporate Relations
MyRepublic Group Limited
Email: vaughan@myrepublic.net

TABLE OF CONTENTS

| | |
|------------------------|----|
| TABLE OF CONTENTS | 1 |
| SUMMARY | 2 |
| STATEMENT OF INTEREST | 3 |
| COMMENTS | 4 |
| RESPONSES TO QUESTIONS | 11 |
| CONCLUSION | 16 |
| ANNEX | 17 |

SUMMARY

It is widely accepted that the advent and adoption of 5G technology will be a game changer on a scale not seen in telecommunications, likely to even surpass the significant benefits we have seen in the last decade from fibre capability and its deployment direct to the premise. Singapore has been at the forefront of fixed access network deployments with the hugely successful rollout of the NBN making us undeniably one of the world's true leaders in connectivity.

As it has been with the NBN, the real benefits of the 5G networks will be realised through services-based competition at the retail level. With only two 5G MNOs, Singapore's MVNOs will be critical to unlock these opportunities, but they will need support to do so.

The regulatory framework for the NBN was intentionally designed to create a level playing field and foster retail competition, thereby ensuring consumer benefits through enhanced value and product and service innovation.

MyRepublic urges the IMDA and the Government of Singapore to take another bold step to achieve even greater outcomes for the Singapore mobile consumer upon the arrival of 5G network capability. A regulatory framework that encourages or incentivises structural or operational separation, enshrines open access and equivalence of inputs principles and implements price protection through wholesale price caps or similar will deliver even more value to the Singapore mobile consumer than has thus far been delivered in fixed broadband. Our boldest, most radical recommendation to ensure the introduction of 5G network capability to Singapore outperforms the success of the NBN fixed network is that in exchange for MNO structural separation, the Government should provide access to 5G spectrum at no charge.

Such an approach is not unique, as we have seen a similar adoption by Ofcom UK to incubate innovative private 5G deployments on mid-band spectrum between 3.8GHz and 4.2GHz by making these spectrum accessible for local deployment covering areas as small as 50 square metres.

Also, we note that Brunei announced publicly in February 2019 that it has separated the infrastructure (*both* fixed and mobile) of all existing telecommunication operators to spur the development of Brunei's ICT sector.

Singapore is one of the few nations leading the world in fixed access connectivity and 5G presents an opportunity to seize the same mantle in mobile, but it will require similar vision and foresight once again.

STATEMENT OF INTEREST

Established in Singapore in 2011, MyRepublic is now one of the fastest growing telecom operators in Asia-Pacific, with operations across Singapore, Indonesia, New Zealand, and Australia, and is set to expand further into the region.

Last year MyRepublic supplemented its fixed broadband service in Singapore by entering into an MVNO arrangement with StarHub and we have publicly stated our plans to strike similar deals in Australia and New Zealand .

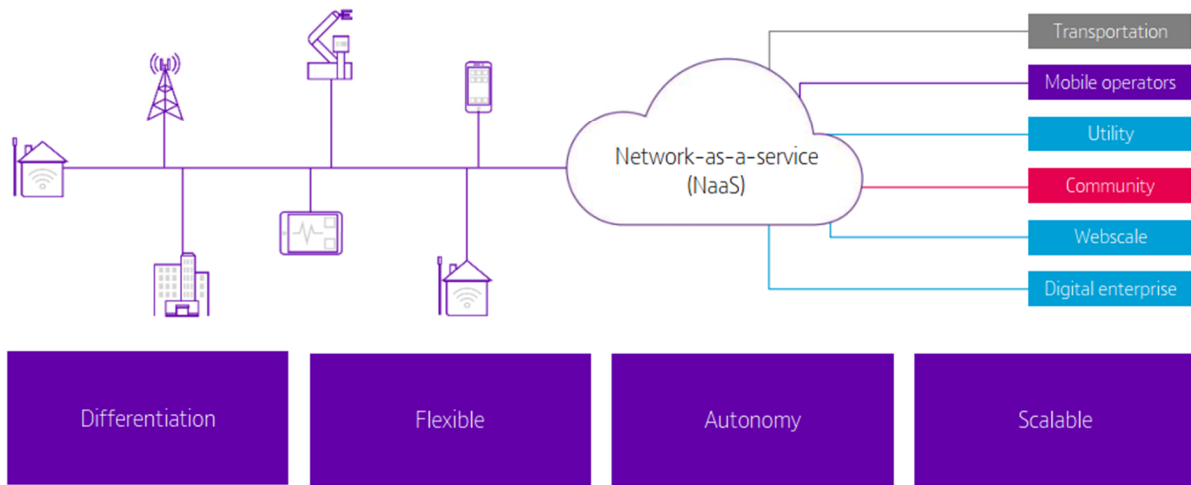
As an infrastructure-light retail service provider, MyRepublic has no plans to enter the MNO market, but as an innovative challenger in the fixed broadband NBN and MVNO markets, we have a critical reliance on timely access to new technology such as 5G on equivalent commercial terms to our competitors.

COMMENTS

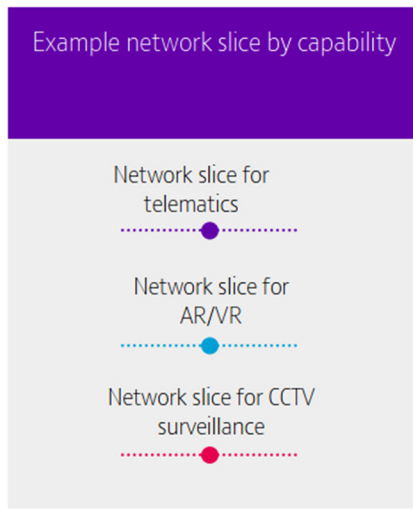
As a recognised technology leader in the region and beyond, innovation brought about by 5G capability is a national imperative for Singapore. The potential for 5G to positively impact the national economy, through job creation, export growth and other digital gains, is far greater than has been previously delivered via 4G and 3G mobile technology. The use cases for 5G, although identified at a high level, have yet to be fully fleshed out, thereby presenting a huge opportunity for Singapore as most of this innovation is yet to be realised. There will be a worldwide race, and Singapore must be a leader.

MyRepublic believes that MVNOs will be a critical ingredient in the 5G innovation discovery process as there are many innovation use cases with 5G around IoT, and industry-specific use cases that MVNOs are likely to uncover. As shared in recent MVNO World Congress 2019 by BT UK, MyRepublic also believe 5G offers the ability to differentiate at the network level and will be able to drive many differentiations.

5G offers the ability to differentiate at the network level



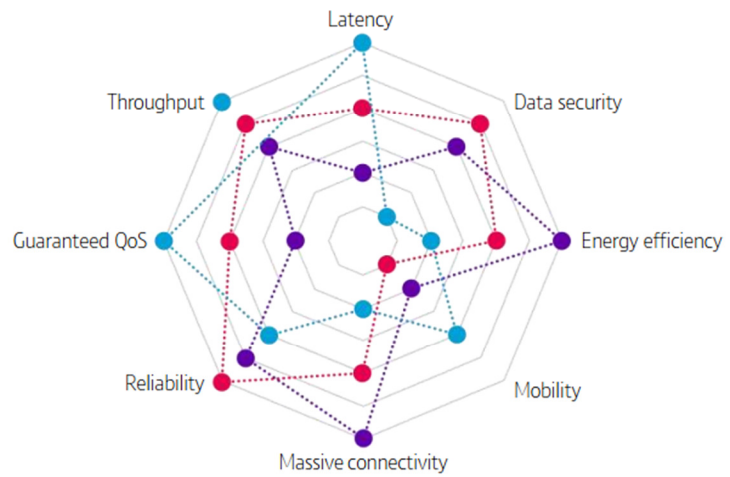
Network capability drivers for differentiation



Source: Ericsson

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Information Classification: General



We envision lots of MVNOs working with industry sectors to explore their own unique use-case specific 5G opportunities. Many industries will become MVNOs including banks, supermarkets and oil companies, which is a trend we are already seeing happening in Europe. The regulatory framework we put in place for 5G will be critical to enabling this.

As shared by BT UK, MVNO with segments specific leveraging on 5G already taking shape in both Industrial and Consumer space.

Industrial MVNO opportunities



M Health



Logistics



Connected Car

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Information Classification: General



5G consumer propositions



Gamer MVNO



Media MVNO



Real-time speed sport betting pack

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Information Classification: General

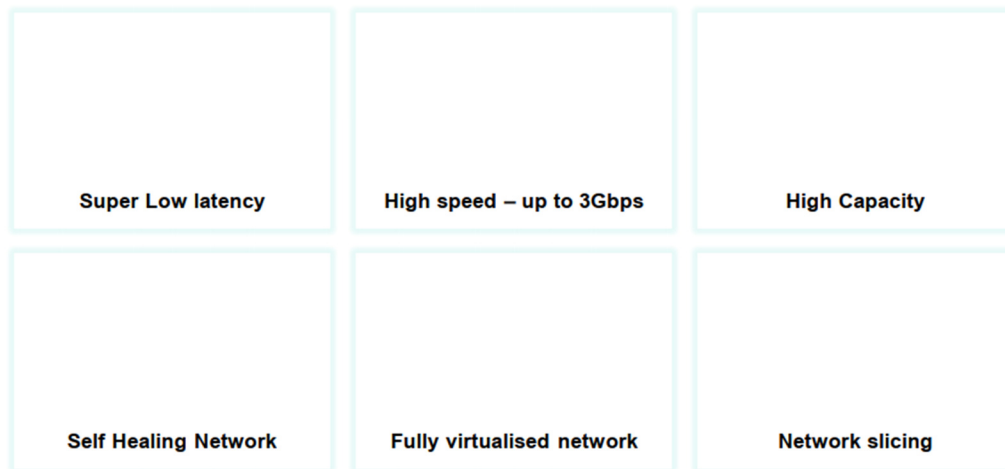


MyRepublic agrees with the IMDA's conclusion that virtual networks will be simpler and easier to provision due to the "network slicing" capability of 5G which allows a single physical infrastructure to be segmented into multiple virtual networks. The same technology can be used to provide various Qualities of Service (QoS) for different types of service as well as different retail providers. The ability to "slice" the 5G network resource for MVNOs, rather than an MVNO

having no choice but to take the watered down version of the MNOs own retail networks under 4G and 3G technology, will ensure the MVNO can access a much better performing network than they could previously.

Also shared in MVNO World Congress, 3 UK has actively promoted a network slicing wholesale model which benefits the development of segment specific application by MVNOs.

5G re-defines what mobiles can achieve



16

5G gives opportunities to network slice

| | |
|-------------------------|---|
| Machine -to-machine | Retail Shipping Manufacturing |
| Broadband | Entertainment Internet |
| Reliable low latency | Automotive Medical Infrastructure |
| Others | Other applications |

Long term this could offer significant opportunity in IOT



Singapore is in a relatively unique and privileged position due to the phenomenal success of the NBN rollout and consumer adoption of high speed services. Rather than providing a substitute for fixed access, in Singapore, 5G capability will be complementary to the fixed services delivered over the NBN infrastructure.

MyRepublic believes that MNOs wishing to deliver 5G services should be incentivised to use the existing NBN fixed infrastructure for the deployment of their 5G network to avoid unnecessary cost and industry inefficiency through duplication of infrastructure.

MyRepublic agrees with the IMDA that two 5G MNOs will be sufficient to balance the desire for some facilities-based competition against the need to ensure resources such as spectrum and other infrastructure are efficiently utilised.

MyRepublic agrees with the Key Focus Areas (KFA) identified by the IMDA as imperative for the creation of a thriving 5G ecosystem. The most important KFA in our opinion is ensuring we establish the regulatory framework and policies that drive a timely, cost-effective and robust 5G network rollout as well as fostering services-based competition.

MyRepublic is of the view that services-based competition will only eventuate in a vibrant retail market and for that to happen when there are only two MNOs, MVNOs need to be able to compete on a level playing field. In the alternative scenario that MyRepublic is advocating where the MNO retail business and operation is either structurally or operationally separated from its wholesale arm, then all retailers are effectively MVNOs. Both scenarios require the same changes in the regulatory framework,

MyRepublic believes MVNOs require regulatory protection via wholesale price caps for mobile services and the introduction of the same open access and equivalence of inputs principles that currently apply to the NBN fixed access market.

In addition to the above suggested measures, MyRepublic strongly recommends the IMDA consider introducing structural separation in exchange for any 5G licence or participation in any 5G spectrum allocation process.

Structural separation would ensure that the MNO was not permitted to participate in the retail market, similar to NetLink Trust who are not permitted to participate in the retail market for fixed broadband.

Alternatively the IMDA could consider operational separation to attempt the same outcome, but MyRepublic believes that the structural separation model is preferable as it cannot be gamed by the MNO and it has already proven to be a huge success in the Singapore fixed broadband market with the achievements of NetLink Trust under such a model being widely known and documented.

MyRepublic would also like to point out that due to the likely phased roll out of 5G networks in Singapore, any wholesale regulation or other changes contemplated as part of the shift to 5G networks should also be extended to 4G and 3G networks to ensure MVNOs are not excluded from participating in 5G until the entire network roll out has been completed.

As the IMDA is aware, MyRepublic has been a very active participant in the fixed access market for the last eight to nine years, where we have competed strongly and delivered significant value to the Singapore fixed broadband consumer. We have noticed fundamental differences in the mobile market, compared to fixed, since we launched our MVNO last year.

Unlike the fixed access market, there are minimal obligations on the wholesale provider and there is no regulated wholesale mobile price.

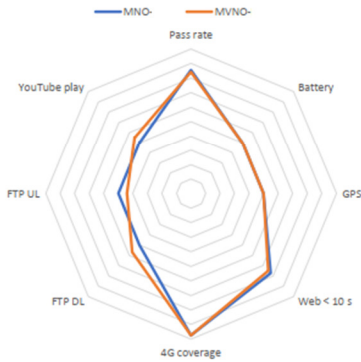


Case 1 Marginal Difference



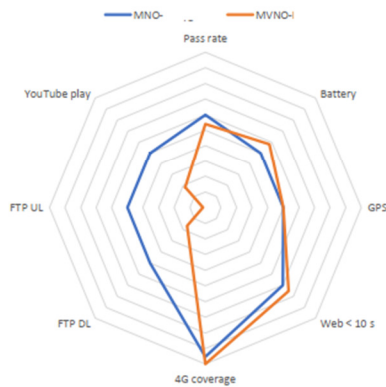
| DATE | AREA | NETWORKS | PACKAGE PRICE |
|-----------------------------|----------------|------------------------|-------------------|
| 4 th of May 2019 | Rennes, France | MNO : MCC MNC: 208-10 | MNO : 15 €/month |
| | | MVNO : MCC MNC: 208-10 | MVNO : 10 €/month |

A general overview MNO versus MVNO is done on the key KPIs.



| KPI | MNO | MVNO |
|-------------|------------------|-------------------|
| Pass rate | 85.53 % | 84.21 % |
| Battery | 11 % (50%) | 11 % (50%) |
| GPS | 7.57 m (50 %) | 7.56 m (50 %) |
| Web < 10 s | 77,5 % | 75 % |
| 4G coverage | 97,4 % | 97,4 % |
| FTP DL | 8.148 Mb/s (50%) | 9.215 Mb/s (57 %) |
| FTP UL | 6.801 Mb/s (50%) | 5.990 Mb/s (44 %) |
| YouTube | 2270 ms (50 %) | 2003 ms (55 %) |

| DATE | AREA | NETWORKS | PACKAGE PRICE |
|-----------------------------|----------------|---|---------------------------------------|
| 4 th of May 2019 | Rennes, France | MNO : MCC MNC: 208-20 MVNO : MCC MNC: 208-20 | MNO : 23 €/month MVNO : 16 €/month |



| KPI | MNO | MVNO |
|-------------|-------------------|---------------------|
| Pass rate | 59.74 % | 53.93 % |
| Battery | 13 % (50%) | 12 % (58%) |
| GPS | 7.6 m (50 %) | 7.59 m (50 %) |
| Web < 10 s | 70 % | 75 % |
| 4G coverage | 95,2 % | 100 % |
| FTP DL | 13.451 Mb/s (50%) | 4.448 Mb/s (16,5 %) |
| FTP UL | 13.068 Mb/s (50%) | 0.410 Mb/s (1,5 %) |
| YouTube | 8398 ms (50 %) | 22965 ms (18,3 %) |

MyRepublic is strongly of the view that for the deployment of 5G to be a success, the key ingredient is a degree of Government funding. We believe that the Government must provide a subsidy for the two 5G licensees and promote the deployment of private local 5G network that is accessible by industries. The traditional approach where the Government charges the successful mobility spectrum bidder acts simply as a regressive tax on innovation. The alternative that MyRepublic would advocate is that the Government provides a subsidy to the successful applicant and imposes certain conditions or requirements, such as structural separation and additional regulatory provisions that ensure a level playing field for competitors, specifically through adoption of open access and equivalence of input principles. A model of this nature is designed to build a stronger industry, ensuring 5G innovation is fostered and the consumer reaps the benefits much sooner.

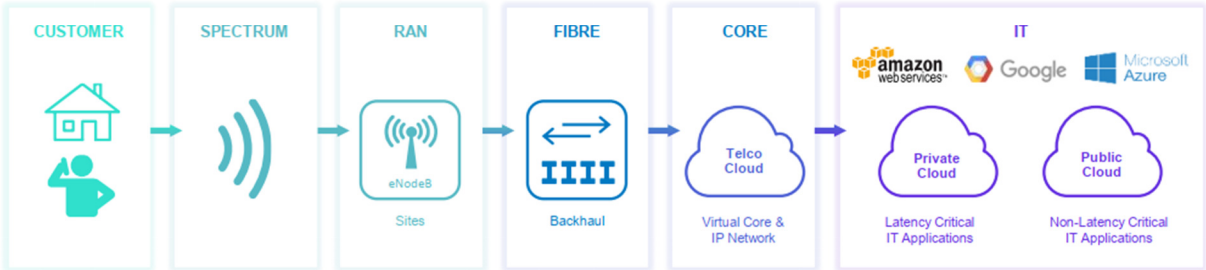
RESPONSES TO QUESTIONS

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.

MyRepublic has no particular insight into what change in skill set will be required as 5G technology is rolled out, but agrees with the IMDA’s view that the emphasis will shift from network centric capability to software and application development as we begin to focus on what these networks can do for us, rather than their maintenance and operation, which will remain important but deliver relatively less value.

MyRepublic see the similar investment trend focusing more on IT/Software in driving 5G applications as shared by operator 3 UK.

We are investing £2Bn+ on 5G



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

MyRepublic believes that not only have the full scope of use cases for 5G have been largely yet to be identified, but the most exciting and radical innovation use-cases have yet to be

discovered. The future is bright. But it is worth noting that innovative use-cases are less likely to originate from the traditional telecommunications providers and more likely to be driven by the users of the technology as well as industry-disruptors. Therefore MyRepublic suggests the IMDA recommends the government focus its support toward industry specific use cases with a focus on opening up 5G to a greater spectre of innovators, of which MVNOs are set to play an increasingly vital role.

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.

MyRepublic does not have a view on this and therefore has no comment.

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**
- 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 refarmed to 3GPP Band 41 for future 5G services in Singapore, and the views on the associated cost and challenges.**

MyRepublic does not have a view on this and therefore has no comment, except that we'd like it as early as possible.

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;**
- 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.**

MyRepublic is of the opinion that there should only be two nationwide 5G networks and they must be compelled to wholesale their services to retailers on an open access and equivalent basis. Although we have no preference for the proposed bands and respective allotments to be made available, MyRepublic believes it is imperative that the lot sizes and spectrum packages

enable the two MNOs to build and deliver equivalent performing 5G networks to ensure there is sufficient facilities-based competition upon which services-based competition can flourish.

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

MyRepublic would like the IMDA to reconsider its recommendation that there is no Quality of Service requirement for the initial deployment of the 5G networks. Quality of Service will be important for 5G networks if we want to take advantage of network slicing and other associated benefits of such a network. Another requirement that we think would make sense for the deployment of 5G is to ensure the network is interoperable with the existing 3G and 4G networks. Both of these requirements will assist the wholesale of 5G services to retailers other than just the two 5G MNOs via MVNO arrangements in the early stages of any 5G network deployment.

MyRepublic has no specific comment on the methodology and measurement criteria for the coverage obligation except ensuring that the 5G network has sufficient coverage and is interoperable with existing 3G and 4G networks so that it provides MNOs and MVNOs with a cohesive network solution whilst the new 5G technology is rolled out.

MyRepublic does not have a view on the 5G network design and resilience challenges and therefore has no comment to add in that regard.

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;**
- iii) The evaluation criteria, sub-criteria and weights to assess the proposals;**
- iv) The assessment methodology, including evidence (documentary or otherwise) to evaluate the proposals; and**
- v) The enforcement and/or audit mechanisms to ensure that applicants are able to deliver on their proposals.**

The assignment approach proposed by the IMDA appears to be appropriate for a traditional approach for assigning licences and auctioning spectrum. It is MyRepublic's view that the

allocation of 5G licences and spectrum represents an opportunity to adopt a framework that, similar to the NBN fixed access network, delivers a truly competitive retail layer that benefits consumers through sustained product, network and service innovation. Rather than auctioning 5G spectrum, the IMDA ought to consider assigning spectrum to MNOs that agree to structurally separate and divest their retail business, or alternatively offer a discount in exchange for a commitment from an MNO to operationally separate. This is a critical aspect of the recommendations set out earlier in our submission.

MyRepublic has no view on the duration of any 5G spectrum rights apart from ensuring that they are sufficient to incentivise the MNOs to participate genuinely and in good faith in this allocation process and commit to delivering the agreed outcomes, including, most importantly, services-based competition.

From a cost efficiency and reduction in duplicate infrastructure perspective, MyRepublic would like to think that MNOs that utilise the NBN infrastructure for small cell and tower access should be favoured over others as this ensures the Government's NBN investment continues to be appropriately leveraged. Ultimately this increased business for Netlink Trust should result in lower wholesale prices for fixed access and mobile backhaul, which can then be passed to consumers through lower fixed and mobile retail prices.

It is MyRepublic's view that the enforcement or audit mechanisms for successful proposals should contain all the normal controls and incentives for on-time rollout and coverage, as well as some sort of performance metrics to ensure the network is performing as intended. In addition to these traditional performance measurements, MyRepublic would like the IMDA to include a commitment to deliver a number of 5G MVNO arrangements, or have a high percentage of MVNOs accessing 5G services, as the 5G network is rolled out.

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.

MyRepublic does not proffer a view on the trade-offs and technical feasibility of the various infrastructure sharing options, as these views are probably best provided by MNOs and the vendor community. MyRepublic does agree with IMDA though that the various network sharing models need to be explored as options to ensure the 5G network rollouts are cost effective and avoid duplication wherever possible. To this end MyRepublic believes both 5G MNOs should be compelled, or otherwise incentivised, to use existing NBN infrastructure for backhaul and small cell site and tower access.

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.**

MyRepublic does not have a view on this and therefore has no comment.

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.**

MyRepublic has no particular view on whether any changes are necessary to numbering or spectrum allocation policies to enable a successful deployment of 5G networks and/or support the delivery of complementary fixed wireless services.

MyRepublic agrees with the IMDA that the existing NBN access infrastructure negates the need or potential business case for utilising fixed wireless services as an alternative access network, but if MNOs are to be granted a right to use existing and upcoming 5G spectrum for fixed wireless services, it is MyRepublic's opinion that this right must carry through to MVNOs, as well as MNOs, so they are not disadvantaged.

CONCLUSION

The entire telecommunications, media and technology industry understand and appreciate the significance of the impending arrival of 5G network capability. Rather than just providing faster speeds, like its predecessors, 5G offers the opportunity for its capability to be delivered much wider and have its application determined in many cases by the user or industry participant, rather than the telecommunications provider.

The traditional telecommunications provider is limited by its own distribution networks, product roadmaps and fundamentally “old world” mode of operation and is therefore less likely to discover or recognise the user or industry participant has a use-case for 5G capability. It is much more likely that these use-cases will come from non-traditional technology sources. For this reason alone, MVNOs are likely to multiply significantly as 5G capability is gradually rolled out across the world. This presents an unparalleled opportunity for services-based competition and resultant innovation at a level we have never seen before, all ultimately for the benefit of the consumer.

The NBN has delivered, now it's mobile's turn and 5G provides the catalyst for change.

ANNEX

The 5G opportunities for MVNOs (BT)

5G - The race to be first (Three Wholesale)

what are the factors to consider for benchmarking and future regulations (Testime)