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**PUBLIC CONSULTATION ON THE REVIEW OF THE CODE OF  
PRACTICE FOR INFO-COMMUNICATION FACILITIES IN  
BUILDINGS (“COPIF”)**

**Submission by StarHub Ltd to the  
Infocomm Media Development Authority**

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**Contact Details:**

StarHub Ltd  
67 Ubi Avenue 1  
#05-01 StarHub Green  
Singapore 408942  
Phone: +65 6825 5000  
Fax: +65 6721 5002

Tim Goodchild  
Email: [timothy@starhub.com](mailto:timothy@starhub.com)

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## Introduction:

1. StarHub Ltd (“**StarHub**”) thanks the Infocomm Media Development Authority of Singapore (the “**Authority**”) for the opportunity to comment on the proposed changes to the COPIF.

2. We believe that the proposed revisions to the COPIF are in the public interest and will greatly benefit users of telecoms services in Singapore. We sincerely appreciate the Authority’s efforts to facilitate mobile coverage via the requirement for building owners / developers<sup>1</sup> to provide rent-free Mobile Deployment Space (“**MDS**”) on rooftops. Such a requirement is critical in meeting the Government’s Smart Nation objectives, and ensuring that all customers in Singapore continue to enjoy high quality 3G, 4G and (going forward) 5G services.

3. The key issue, for StarHub, is ensuring that the COPIF sets-out robust and future-proof standards and requirements. It would be contrary to the Authority’s efforts if building owners could exploit loopholes in the COPIF. We also believe that strong enforcement must be taken for any failure by building owners to comply with the COPIF. Given the strict regulatory obligations imposed on licensees in Singapore (e.g., quality of service (“**QoS**”), and service resiliency requirements), we need full assistance from building owners to ensure we can comply with the Authority’s requirements.

4. We strongly believe that it is necessary for the COPIF to take a forward-looking position, and to address issues before they start to impede the provision of telecommunication services. StarHub’s detailed comments as well as responses to the Authority’s specific queries are attached below. We sincerely appreciate the Authority’s consideration of our comments.

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<sup>1</sup> For ease of reference, we will refer to such parties (including building managers) commonly as “building owners” going forward. This would include parties such as MCST as well as other types of managing agents for the buildings.

## StarHub's Comments:

### Section 1 – Use and Scope of MDS provided within a development to provide mobile coverage:

5. As stated above, we welcome the addition of this requirement. As the Authority has acknowledged, most mobile coverage in Singapore is provided via outdoor sites. This includes using outdoor sites in one building, to provide in-building coverage to neighbouring buildings. Such deployments are the most cost-effective and efficient way to provide pervasive mobile coverage throughout Singapore.

6. Given the density of buildings in Singapore, and to comply with the Authority's stringent QoS standards, each mobile network operator ("**MNO**") has installed thousands of outdoor base stations. In many cases, MNOs pay significant rental fees for use of these outdoor sites, which creates a significant drain on the MNOs resources. Such rental fees also discourage the provision of mobile services.

7. We note that the Government is actively driving its "Smart Nation" objectives, and there is a pressing need for even more pervasive mobile coverage. This is needed to handle not just customer traffic, but also traffic from millions of connected devices. In his recent speech, the Minister of Communications and Information stated that<sup>2</sup>:

*"Exponential growth in processing power, internet connectivity, and usage of mobile devices have led to rapid growth of devices, services, and software for the Internet of Things, or IoT, worldwide. To further multiply the potential of IoT, and to further fuel the digital economy, IMDA will be partnering the industry to develop and put in place key components of **future ready and resilient communications infrastructure** that will benefit consumers and businesses across various sectors ... **To ensure that these infrastructural plans will address and meet the industry's needs, IMDA will be conducting industry consultations to seek feedback and ideas.**" (emphasis added).*

8. Therefore, the pressing need for rooftop MDS cannot be over-emphasised. In-line with Minister's speech, apart from addressing existing needs, the current consultation needs to ensure that the COPIF is a "*future ready*" document, that readily addresses the communications needs of a Smart Nation. Respectfully, we do not believe the current COPIF review proposals go far enough in this regard.

9. We would not recommend a piecemeal approach, where the COPIF is reviewed periodically, only when new developments occur, or after significant problems have arisen. If the Authority only starts planning for 5G when 5G is ready, this would create problems with existing buildings and infrastructure where expansion is not possible. We are already running into this problem today with the existing MRT and road tunnels, where there is insufficient space for expansion of telecoms services.

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<sup>2</sup> Extracted from the Minister's speech at the Infocomm Media Business Exchange 2017 opening ceremony.

10. We would also caution that, in allowing MNOs to request for outdoor rent-free MDS, the Authority should ensure that building owners will not seek to exploit potential loopholes, and to pass-on charges via other means. Otherwise, this would simply defeat the purpose of the Authority's review.

**Question 1: IMDA invites views and comments on:**

***i. Any procedural issues (e.g., physical access or implementation matters) arising from IMDA's proposed amendments to the COPIF on the scope and use of the MDS on building rooftops to provide coverage to External Areas.***

*Definition of Building Owners:*

11. As a general comment, we would note that in the recent amendments to the Telecommunications Act, "owner" has been defined to include parties such as subsidiary proprietors, management corporations as well as any party receiving rent or charge for the maintenance and management. We believe that it is important to make this definition of "owner" upfront in the COPIF, to avoid any disputes or opportunity for parties to seek to pass-on responsibilities to each other.

*Costs for MNOs:*

12. In the Authority's consultation paper, it has stated that "MNOs may pay building owners for costs in providing access to rooftops and other associated costs". We are very concerned with how this statement is drafted, and believe that it should be removed in its entirety from the finalised COPIF.

13. Today, StarHub is required to pay varying amounts of "security" fees to building owners, to access our existing rooftop installations. The amounts for such fees can go up to hundreds of dollars for each individual access request. This is not sustainable and clearly cannot be in-line with the Authority's regulatory requirements. By leaving it open for building owners to charge for "costs in providing access ... and other associated costs", building owners may simply seek to offset their loss of rental by imposing other ancillary charges. This would clearly defeat the purpose of the proposed changes. We respectfully submit that building owners should not be able to impose charges for "costs in providing access ... and other associated costs".

14. Additionally, for electricity fees, we would respectfully submit that all usage by mobile equipment should be billed strictly to a meter installed on-site. We have encountered cases where building owners seek to apply an additional mark-up fee on top of the actual power usage (e.g., as an "administrative fee"). This should be disallowed.

*Application to different types of buildings:*

15. We seek the Authority's confirmation that all building types (including buildings owned by the Military and the Civil Defence) will be subject to the requirement to provide

MDS. As a further example, to provide coverage to landed estates, the rooftops of power stations are the optimal areas to site outdoor base stations.

*Timeliness of response by building owners:*

16. In many cases, the ability of StarHub to install new equipment will be highly dependent on approvals by the building owners. To dis-incentivise MNOs from taking up outdoor MDS, building owners may seek to significantly delay approvals. The COPIF should explicitly state that any approvals needed for installations at MDS shall not be unreasonably withheld, and, in general, should be processed within five business days. If timeframes are not specified under the COPIF, this would allow some building owners to discourage access by imposing unreasonable delays on the MNOs.

*Agreements for Rooftop MDS:*

17. As highlighted above, the MNOs are currently paying for usage of certain rooftops. It is vitally important that the MNOs can exercise termination clauses in the existing rental agreements, without the need for physically relocating their requirement. Given the Authority's acknowledgement that MNOs should be allocated rooftop MDS, and the recognition that more mobile deployments are needed to meet Singapore's Smart Nation goals, it would be inconsistent if some building owners can continue charging for rooftop rentals. It would also create an unbalanced regulatory environment, where different rooftops (even within the same areas) may be treated differently simply because of the timing of the implementation of the various versions of the COPIF.

18. Going forward, MNOs should also be allowed to enter into perpetual agreements for rooftop MDS. This ensures that there is certainty on the deployment of infrastructure, and reduces the administrative burden imposed on MNOs to constantly review and renegotiate the agreements.

## Section 2 – Requirements of Space and Facilities to be provided to MNOs:

### **Question 2: IMDA invites views and comments on:**

#### **i. The proposal to allow MNOs to determine the location of the MDS, in consultation with building developers or owners; and**

19. We fully agree that the MNOs should be allowed to determine the location of the MDS. However, the key issue is the grounds on which the building owners can reject the MNOs choice. Based on StarHub’s review, the only reason a building owner should be able to reject the provision of rooftop MDS, is due to safety (e.g., structural loading) concerns.

20. Allowing the MNOs to determine the location of the MDS also removes the problem of the building owners seeking to choose undesirable locations (e.g., with poor ventilation or lacking in safety features) for the MDS, indirectly compelling MNOs to pay rental for their preferred locations.

21. Building owners should not be allowed to reject rooftop MDS for reasons such as:

- Aesthetics (e.g., if MNOs need to install safety railings which could alter the facade of the building);
- The possibility that such space may be reserved for future use;
- Subjective reasons (such as “Feng Shui” or potential impact to property prices); and
- Concerns over emission levels.

22. In its consultation paper, the Authority has also stated that “*where the MNOs may need to use the MDS to serve the development and beyond, it may be better for the MDS to be located on the rooftop of that development, at a specific corner of that rooftop*”. We would respectfully request that this point be removed from the final COPIF document. To ensure pervasive mobile coverage, it is often necessary to ensure that mobile antennas are placed at multiple areas of the rooftop. They cannot simply be placed at a “specific corner” which: (a) could be blocked; and (b) would limit the outdoor coverage potential of the base station.

#### *Size of MDS:*

23. To provide clarity to building owners and to the industry, it is important for the Authority to elaborate on how the MDS should be calculated. From a StarHub perspective, we would note that the calculation of the MDS should only cover the space necessary for the location of base station equipment. The calculation of the MDS should exclude:

- Cabling needed to connect the equipment;
- Poles, antennas and remote radio units;
- Walkways and service areas for access to the equipment; and

- Any installations of floor boards or plinths to spread the load of the equipment for safety loading reasons.

We respectfully submit that this clarification should be included in the COPIF.

24. We are also concerned about the adequacy of the existing MDS required under the COPIF. To elaborate, it is not correct that the cessation of 2G would mean that the existing MNOs now need less MDS. In StarHub's case, equipment used for 2G are already co-located with equipment for 4G. This means that we are already efficiently making use of existing space.

25. We therefore strongly believe that an expansion of the MDS is required for the following reasons:

- The upcoming market entry of the fourth MNO. It is simply not feasible to expect existing MNOs to shift their equipment to make space for a fourth MNO. This would either mean: (a) a disruption to existing services; or (b) result in existing MNOs having to enter into protracted negotiations with building owners for additional space;
- MDS is now needed to cater, not just for in-building coverage, but also outdoor coverage. This means more equipment needs to be added, not less. In particular, this point needs to be considered when the size of the MDS is calculated. Rather than just factoring the number of units / floor area of the building itself, the building owner should be required to also take into consideration the outdoor coverage area of the mobile equipment. For example, a typical outdoor site will provide a coverage radius of 300 metres, which equates to a coverage area of over 200,000 m<sup>2</sup>. The MDS should therefore be commensurately sized. It is not tenable if the Authority allowed the expansion of the mobile coverage area to be served by an MDS, but have the MDS size remain the same; and
- As more spectrum bands are released for mobile services (including 5G services), the amount of space needed to provide increasingly high capacity and pervasive mobile services will increase (not decrease). As mentioned, the COPIF document needs to be forward-looking, and cater fully for the Government's Smart Nation goals.

26. Based on StarHub's estimates, each MNO will need a minimum of 12m<sup>2</sup> for their mobile equipment. This needs to be factored into the Authority's review.

*MDS for Other Locations:*

27. Apart from rooftop MDS, it is also important for the Authority to review whether MDS should be allocated at other areas. Given that the Authority's QoS framework applies island-wide, it is only reasonable that MDS should be applied to all types of infrastructure, including non-building structures such as lampposts and towers. Today, the MNOs pay a significant amount of rental for such facilities. To ensure pervasive coverage in a Smart Nation, the COPIF needs to be reviewed holistically, and for the MNOs to obtain space in all necessary locations.

**ii. *The proposed definition of “Mobile Coverage Area” using GFA + site/land area.***

28. We are generally agreeable to this proposal. However, we would appreciate confirmation that the calculation of the site / land area will include wide open areas such as gardens, golf courses and parks. This is an important clarification as, in many circumstances, there may only be a single building site within a large expanse of land, and that building may be the only suitable slot for the location of base stations for outdoor coverage. In addition, if towers need to be set-up to provide outdoor coverage, there should not be rental imposed, and adequate power facilities must be provided for the mobile equipment.



### Section 3 – Use of and Access to Space and Facilities by Licensees:

**Question 3: IMDA invites views and comments on:**

**i. Whether a set of guidelines should be included where MNOs use the rooftops, to ensure that MNOs deploy their equipment efficiently, taking into consideration the building developer's or owner's future needs and requirements;**

29. Given the increasing importance of telecoms services, we do not believe that it is reasonable for building owners to adopt a position that MNOs may be required to relocate their equipment to cater for the owner's "future needs and requirements". Respectfully, mobile equipment needs to be treated as a priority service, rather than an unimportant service jostling for space amongst solar panels and rooftop gardens.

30. As highlighted above, sufficient space needs to be provided to all MNOs, to ensure:

- Sufficient equipment space for both indoor and outdoor coverage;
- That services of existing MNOs are not disrupted should the fourth MNO seek additional MDS; and
- There is enough space for future telecoms needs, extending not just to existing 3G and 4G services, but also to 5G.

31. Again, the COPIF needs to be a future-ready document, and not cater only to existing requirements.

**ii. The proposal to continue relying on the Rules of Usage, laid down in COPIF paragraph 16.4, as a guide to resolving disputes over how house rules are to be applied when Licensees use COPIF Space and Facilities; whether these Rules should be expanded and/or new rules added and what these additional rules should encompass;**

32. Please see our comments below on the grant of emergency access. We believe that rules governing emergency access should also be included in the "Rules of Usage".

33. We also submit that the Authority clarify its enforcement regime against building owners who fail to comply with the COPIF. Unfortunately, StarHub continues to encounter situations where building owners refuse to comply with their COPIF obligations. For example, we have seen an increasing number of building owners seeking to charge "administrative fees" for access to telecoms facilities within buildings. We have also observed cases where the building owners seeks to impose charges on tenants who request for licensees to install telecoms infrastructure within the buildings.<sup>3</sup>

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<sup>3</sup> It may be useful for the Authority to also clarify whether building owners are allowed to charge their tenants for requesting the installation of telecoms infrastructure within the building. While such charges are not directly imposed on licensees, this effectively discourages the take-up of telecoms services.

34. Where these issues are escalated to the Authority, they may take prolonged periods to resolve. While we sincerely appreciate the Authority's assistance, the current escalation process creates:

- Long delays in resolving COPIF-related issues. Before any escalation to the Authority, StarHub will have to go through a long negotiation period with the building owner to attempt to explain the COPIF requirements. After escalation, the Authority will then provide the building owner with a period of consideration and response. If the matter still cannot be resolved, the Authority may then issue a directive to the building owner for compliance; and
- Additional workload and unnecessary resources incurred for all parties involved. In many cases, to ensure that customers are provided services on-time, StarHub simply has had to accede to the building owners' requests, even where it directly contradicts the COPIF.

35. We would respectfully submit that the Authority adopt a "fast-track" approach, by issuing directives to building owners who have clearly failed to comply with the COPIF requirements. As the COPIF has been in place for over 15-years (with the current version in-place for 4-years), building owners cannot claim to be unaware of their obligations. Therefore, where the breaches are blatant, enforcement action must be taken against the building owners in question to send a clear signal to the industry that the COPIF must be complied with.

36. As mentioned above, given the stringent regulatory requirements imposed on licensees, it is only reasonable that building owners must similarly be held to the requirements set-out under the COPIF. Ultimately, the COPIF is meant to benefit customers in Singapore. Speeding-up the resolution of COPIF-related issues is in the best interests of customers, and will serve to further the Authority's Smart Nation goals.

***iii. The propose removal of the obligation on building developers or owners to provide the necessary means for Licensees to access cable distribution systems or other Space and Facilities which are located above the Height Limit, i.e. it is recommended that Licensees will be obliged to secure their own means of access to Space and Facilities beyond the Height Limit; and***

37. We are generally agreeable with this proposal. However, we would also submit that there must also be a parallel requirement imposed on the building owners to:

- Facilitate access to the Space and Facilities located above the Height Limit, without any charges imposed on licensees; and
- Allow licensees to use their own contractors and equipment, without having to rely on the building owners' contractors or equipment.

38. Otherwise, licensees may continue to be subject to unreasonable terms, which would unnecessarily delay their work.

*iv. -*

***(a) The proposed requirement for Licensees and building owners/managers to secure pre-agreed emergency access for service restoration during emergencies, particularly where the Licensee is using the space and facilities for Springboarding;***

39. We are concerned with the feasibility of the Authority's proposal. There are thousands of buildings in Singapore, and it would be an administrative nightmare to expect each licensee to reach out to each individual building owner to negotiate individual agreements for access. It would also create a problem for the building owners if multiple licensees separately approached them to sign agreements (or sign modifications to their existing agreements).

40. Respectfully, we do not believe that emergency access to telecoms facilities should be a contractual matter which needs to be legally enforced by the individual licensees. Rather, emergency access should be treated as a regulatory requirement set on building owners as a condition of the COPIF.

***(b) The recommendation for managed buildings to have pre-agreed emergency access to be provided within two (2) hours' notice and for unmanned buildings to have pre-agreed emergency access provided soonest possible upon notification; and***

***(c) Any special details that should be included in such pre-agreed emergency access requirements.***

41. As highlighted above, we do not believe that it is reasonable to expect individual licensees to separately negotiate with individual building owners for separate access agreements. Such access should be mandated within the COPIF.

42. We are also concerned that a two-hour notice period is excessively long. This would mean that any incident affecting a building would take (at a minimum) two hours to resolve, and would not be acceptable from a customer perspective. Given the whole-of-Government push towards Smart Nation, and the increasing focus of the Authority on resiliency, it is critical that telecoms be considered an essential service by building owners. Any disruptions to telecoms services should therefore be accorded the same priority as disruptions to utilities such as power or water. If other utility providers can obtain access to in-building facilities within a shorter timeframe, the same treatment should be extended to telecoms licensees as well.

43. We would therefore respectfully request that the COPIF contain a clear statement that the building owner should allow emergency access:

- Immediately for manned-buildings; and

- Within a 1-hour notice period for unmanned-buildings.

44. We would also request confirmation that HDB estates (including HDB roof-tops) are also subject to this requirement, and must provide access within a minimum 1-hour notice period (for unmanned sites).

45. As a separate point, we also periodically encounter cases where building owners carry out maintenance on their building's mechanical and electrical ("**M&E**") systems, without notifying licensees beforehand. When such M&E maintenance impacts the telecoms services provided to the building, it appears as though an outage has occurred, and we have had to incur unnecessary resources to dispatch staff to investigate. To avoid such a scenario, we respectfully submit that there should also be a COPIF obligation that building owners notify licensees prior to the commencement of any M&E maintenance.

#### Section 4 – Requirements to Enhance Network and Service Resilience:

**Question 4: IMDA invites views and comments on:**

**i. Whether the current requirement of 2 sets of lead-in pipes (i.e. one set in vital services buildings and essential facilities, with an additional set at a different location) is sufficient for resilience purposes;**

46. From a Public Telecommunications Licensee (“PTL”) perspective, StarHub believes that all buildings (unless physically constrained) should be required to have two sets of lead-in pipes for resiliency purposes.

**ii. Whether an additional MDF room, telecom riser and set of cable distribution system should be provided as mandatory requirements or included as recommendations under the COPIF guidelines; and**

47. Apart from telecoms facilities, the Authority should also work with its electricity regulator counterpart to ensure that key buildings in Singapore are provided with duplicate power feeds. Having multiple telecoms feeds without corresponding power feeds is not sufficient to ensure resiliency of services.

**iii. Any other types of developments (besides those stated in this Section) that should be included in the list of vital services buildings and essential facilities, and the reasons for doing so.**

48. We would respectfully request that the Authority classify the following types of buildings as “vital services buildings and essential facilities”:

- Healthcare facilities, such as hospitals and polyclinics. We note that the increasing trend is towards telemedicine, and polyclinics will be key players in this field;
- Government buildings, including not just office buildings, but also buildings belonging to the Military, Civil Defence and Police. Such buildings serve critical public functions, and need to have diverse infrastructure;
- Higher education buildings, which may require significant amounts of telecoms infrastructure for teaching and research purposes;
- Buildings reserved for use in emergency situations (e.g., as bomb shelters or evacuation points); and
- Key public transportation nodes, such as MRT stations.

49. In addition, we note an increasing trend whereby Data Centre owners have carved out specific facilities for resiliency and redundancy purposes, and charge licensees who wish to use such facilities. For example, we are aware of data centres that have designated a separate set of lead-in pipes connecting to a “Meet-me-room”, and access to those facilities are

chargeable. We are concerned over such developments, which we believe to be contrary to the intent of the COPIF. We would respectfully request the Authority to clarify that such practices are disallowed.

**Section 5 – Provision of Cables for Telecommunication (Non-Broadband Coaxial Cable) Systems in all Developments:**

***Question 5: IMDA invites views and comments on:***

**Residential Developments**

- i. Whether the current requirement of one 2-core optical fibre is sufficient to meet future home communication needs and if one more 2-core optical fibre termination point should be provided;***
- ii. Whether the current requirements of:  
- 2 RJ45 outlets for each living/dining room in a residential property; and  
- 1 RJ45 outlet for each bedroom in a residential property  
are sufficient. If not, where else should such RJ45 outlets be located; and***
- iii. Whether any other requirements ought to also be included for in- building cabling for residential developments.***

50. We believe that the requirement of one 2-core optical fibre is not sufficient given the increasing number of retail service providers in the market, and the potential trend of consumers subscribing to multiple services over different operator platforms.

51. We also believe that the nationwide provider of fibre services (NetLink Trust) should also ensure that it has sufficient fibre resources to meet the revised COPIF standards. There is no point increasing the amount of facilities within the home, if the bottleneck is at the wholesale service provider level.

52. We would also request confirmation that such in-building fibre infrastructure would be openly accessible to all licensees in the market providing fibre services (and not restricted to just NetLink Trust).

**Non-residential Developments**

- iv. Whether building developers or owners of new non-residential developments should be required to pre-install additional infrastructure to facilitate the provision of telecommunication services to the units, and reasons for or against doing so.***

53. StarHub's strong preference is that non-residential buildings should have pre-installed additional infrastructure to facilitate the provision of telecoms services within the building. As the Authority is aware, the time taken to install telecoms services to non-residential buildings is significantly longer than for residential buildings. This is an anomaly, given that non-residential customers are more likely to require telecom services to be provided in a timely manner.

54. A key reason for the delays in non-residential service installations is precisely the lack of pre-installed infrastructure, and the need for licensees to install the necessary infrastructure to support telecoms services. In many cases, licensees have to work within the constraints laid-out by building owners, in terms of timings, design and aesthetic

considerations. Having pre-installed infrastructure significantly reduces such delays, and facilitate the provision of services to customers.

55. Speeding up the delivery of fixed services to businesses is also in-line with the Authority's Smart Nation objectives. Again, telecoms should be a priority along with other utilities, and there is no logical reason why businesses in Singapore should have to wait extended periods for the delivery of services.

**v. Where:**

**a) internal telecommunication wiring should be pre-installed,**

**- whether fibre should be the prescribed option and if so, what requisite number of cores of optical fibre would be appropriate;**

56. StarHub would support the pre-installation of fibre. In particular, it is important for key commercial buildings to have fibre pre-installed, to minimise the waiting time for the provision of telecoms services. For such buildings, we would recommend a minimum of 8-cores to be provided, to support: (1) the NBN and other leased-line services; (2) for maintenance purposes; and (3) to allow for operator diversity.

57. To avoid over-burdening non-residential buildings which may not require such extensive telecoms services, the Authority could consider mandating a 2-core installation (which is in-line with the requirement for residential buildings).

**- where these should be terminated given that for non-residential developments, the use and the size of the units within the developments may change from time to time; and**

58. We recommend that these fibres should be terminated within the utility panels, which would allow for easy pick-up by licensees.

**- what operational issues need to be addressed, including how to manage and monitor the use of the additional facilities/infrastructure (e.g., how to ensure that Licensees remove their cables/connections to the units promptly and what processes should be put in place).**

59. As with the in-building infrastructure installed within residential buildings, we would submit that the maintenance and operations of the pre-installed infrastructure should be managed by the building owners. This is in-line with the Authority's recent comments where it noted that "*it remains the [building owner's] responsibility to perform regular maintenance of common fibre infrastructure built by the [building owner]*".<sup>4</sup>

60. We would also submit that building owners should install simple dividers within their cable trays, to allow neat separation of individual fibres. This would ease the identification of fibres, and minimise the chance of any damage when new fibres are installed, or existing

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<sup>4</sup> Reference the explanatory memorandum explaining the Authority's direction on the review of NetLink Trust's Interconnection Offer.



fibres are removed. While we have suggested that new non-residential buildings should have pre-laid fibres, there could still be a possibility that operators will also need to install additional fibres. Having neatly segregated cable trays will greatly facilitate such installations. We would recommend that the cable trays be sub-divided into at least four sections, to cater for pre-laid fibres, as well as additional fibres if necessary.

**Section 6 – Developments consisting of 1 or more Road or Mass Transit System (“MRT”) Tunnels:**

***Question 6: IMDA invites views and comments on:***

***i. Whether an increase of the MDS beyond the current provision of 40m<sup>2</sup> for Road and MRT Tunnels is required, to be future-ready, and if so, how much more space in excess of the current 40m<sup>2</sup> MDS for road and MRT Tunnels is required;***

61. It is important to note that, for existing tunnels, the space allocated for mobile equipment is already insufficient for the three current MNOs, and there is no space available for the deployment of additional equipment for newer mobile technologies.

62. Given the difficulties involved in creating new space for telecoms equipment in existing road / MRT tunnels, it is critically important that the space set-aside for mobile equipment must be future-proof. This takes into consideration, not just current requirements, but also future needs. This is in-line with Minister’s comments (as set out above).

63. Based on StarHub’s assessment, we are proposing that an additional 40m<sup>2</sup> be set-aside for the MNOs (i.e., for a total of 80m<sup>2</sup>). Such a space will be required to cater for both current and future technologies (including 5G technologies). This 80m<sup>2</sup> space should be rectangular in size, and will comprise of 18m<sup>2</sup> per MNO, with an additional 8m<sup>2</sup> for common equipment. Each MNO will also require power of 32A TPN with 20A TPN for common equipment to be deployed (as discussed in our response to question 6(iv) below).

***ii. The requirement for suitable specifications for the niches and the distances between the niches and the MDS in Road and MRT Tunnels to be provided;***

64. We propose that there should be two niches, located side-by-side, with dimensions of 3m x 2m x 1m, at intervals of 100m. There should also be power of 20A TPN provided to cater for future 5G requirements.

***iii. The proposal to include requirements for specifications on the leaky cable to be aligned with the height of the MRT train window along MRT Tunnels, and any other considerations which would enhance coverage in the Tunnels; and***

65. Based on our extensive experience in this area, our proposals are as follows:

- For road tunnels: two pairs of Leaky Coaxial Cable (4 x LCX) to be evenly spaced on the centre of the soffit of the road tunnel; and
- For MRT tunnels: two pairs of Leaky Coaxial Cable (4 x LCX) to be evenly spaced on the height of the MRT train window along the MRT tunnels

66. We would also submit that both road and MRT tunnels should have fibre installed from the MDS throughout the entire tunnel. This fibre is required to deliver broadband

speeds that customers expect. Without this, tunnel speeds will inevitably drop, which will create a negative customer experience.

67. All existing provisions should also continue for road and MRT tunnels. These include:

- Cable supports along the sides of the tunnels for both LCX and fibre;
- Niches / space to house equipment within the tunnels;
- Locomotives for cable laying; and
- Availability of test trains for testing purposes.

***iv. Any other considerations (e.g. additional power requirements) or suitable specifications to be included for Space and Facilities in Road and MRT Tunnels.***

68. Due to the long duration and complexity involved in the construction of road and MRT tunnels and their associated buildings, it is not practical for MNOs to apply for their own power / utilities for their equipment in the station / buildings or within the tunnels.

69. We respectfully submit that, for road and MRT tunnels, the building owner must provide the MNOs with 100A three phase power for the MDS space in buildings and stations and 20A three phase power in each of the tunnel niches. Given the criticality of mobile coverage in such facilities, the power supply should also be backed up by the building owner's generators.

70. In addition, MDS for tunnels are generally located in outdoor locations. Such outdoor locations are not ideal, as there are typically constructed at a later stage. By the time the outdoor MDS are constructed, there may not be sufficient time for the MNOs to deploy and install their equipment and carry out the necessary integration and testing to be ready for the opening of the tunnel.

71. We would also highlight that, for any outdoor MDS, the distance between the location of the MDS to the first tunnel amplifier must be less than 250m. Otherwise, this creates problems with the transmission of the mobile signals.

*Coverage at Ventilation Buildings for Tunnels:*

72. Today, ventilation buildings are not obliged to provide MDS on rooftops. This creates significant inefficiencies as these buildings are typically the only buildings located near to the road tunnel's slip roads. Accordingly, it is necessary that MNOs be provided sufficiently sized MDS at the ventilation buildings to: (a) serve the tunnel; and (b) for outdoor coverage via the rooftops.

73. However, we note that, typically, ventilation buildings have very low (if any) human traffic. It is not economical for the MNOs to provide dedicated in-building coverage for such

buildings. Furthermore, in certain cases, such buildings are located underground, and it is not possible to provide in-building coverage via nearby outdoor sites.

74. If the Authority believes that coverage in such buildings is necessary the Authority should require the building owner to permit the usage of the building's rooftop for MDS, and availability of lampposts within the facility itself for mounting of antennae. If this is not feasible (or if the ventilation building is located underground), then the cost of providing coverage needs to be shared, with: (a) the building owner deploying its own distributed antennae system within the ventilation building; and (b) the MNOs bearing the costs of their base station equipment.

## Conclusion:

75. A summary of the key points of StarHub's submission is as follows:

- The Authority's COPIF needs to be a forward-looking document, that caters not just to existing requirements, but also to future needs. This is particularly important given the Government's Smart Nation objectives, as well as the push towards 5G services;
- It is critical to ensure MDS on rooftops are indeed rent-free, and that building owners cannot: (a) seek to reject such MDS; and/or (b) seek to impose fees for use of the MDS via other means;
- The Authority should conduct a holistic review of the MDS requirements, looking at factors such as: (a) the size of the MDS, which we believe to be inadequate; and (b) the need for MDS in non-building structures to ensure pervasive coverage island-wide;
- Telecoms services need to be accorded priority, like other utilities such as power and water. Access for emergency maintenance must be a regulatory requirement, and not subject to individual contracts between licensees and building owners. We believe that immediate access is required for manned buildings, and up to a 1-hour notice for unmanned buildings;
- Non-residential buildings should have pre-installed telecoms infrastructure, to speed-up the delivery of fixed services to businesses. This is in-line with the Authority's Smart Nation objectives; and
- We have listed above the proposed amendments to the telecoms facilities for MRT and road tunnels. These proposals seek to ensure that the requirements are future-proof, and sufficient to cater for 5G services.

76. StarHub is grateful for the opportunity to comment on this matter and we appreciate the Authority's consideration of our comments. We would be happy to meet with the Authority to discuss this matter further.