



**COVER NOTE ISSUED BY
THE INFO-COMMUNICATIONS MEDIA DEVELOPMENT AUTHORITY**

**CODE OF PRACTICE FOR
INFO-COMMUNICATION FACILITIES IN BUILDINGS 2018**

28 NOVEMBER 2018

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CODE OF PRACTICE FOR INFO-COMMUNICATION FACILITIES IN BUILDINGS 2018

28 NOVEMBER 2018

In exercise of the powers conferred by Section 19 (1)(a) and Section 28 of the Telecommunications Act (Chapter 323) (the “**Act**”), the Info-communications Media Development Authority (“**IMDA**”) hereby issues the Code of Practice for Info-communication Facilities in Buildings 2018 (“**COPIF 2018**”). This document provides IMDA’s response to the comments received on the proposed revised Code of Practice for Info-communication Facilities in Buildings (“**Proposed Revised COPIF**”) issued in April 2018.

PART I: INTRODUCTION

1. On 26 April 2017, IMDA invited views and comments on proposed key changes to the Code of Practice for Info-communication Facilities in Buildings (“**COPIF**”). Those proposed key changes were intended to reflect the Telecommunications Act (Cap. 323) (“**Telecoms Act**”) amendments introduced earlier that year, as well as to keep pace with market and technology developments.¹ The purpose is to enhance in-building infrastructure to enable Smart Nation initiatives in leveraging technology to better serve the needs of citizens, strengthen and empower communities and use tech-enabled solutions to boost and further support the evolving info-communication needs of users.²
2. At the close of the public consultation on 21 June 2017 (“**First Public Consultation**”), IMDA received comments from 11 respondents including M1 Limited, Mediacorp Ltd, NetLink Trust, Mr Harish Pillay, Sheraton Towers Singapore, Singapore Telecommunications Ltd, SP Telecoms, StarHub Ltd, SuperInternet Access, Superloop Pte Ltd, TPG Telecom Pte Ltd. We also received 3 other responses requesting confidential treatment, which IMDA accepted.
3. Having carefully considered the views and comments contained in each of the submissions, IMDA issued the Proposed Revised COPIF, for a second round of public consultation (the “**Second Public Consultation**”) on 20 April 2018.
4. At the close of the Second Public Consultation on 8 June 2018, IMDA received 6 submissions from respondents, namely M1 Limited, Mediacorp Ltd, NetLink Trust, Singapore Telecommunications Limited and SingTel Mobile Singapore Pte Ltd jointly, StarHub Ltd and TPG Telecom Pte Ltd. IMDA also received 3 other submissions requesting confidential treatment, which we accepted.

¹ On 5 August 2016, the Ministry of Communications and Information (“**MCI**”) conducted a public consultation and review of the Telecoms Act. The Telecommunications (Amendment) Bill was subsequently passed in Parliament on 10 November 2016 and the Telecommunications (Amendment) Act (“**Telecoms (Amendment) Act**”) 2016 came into effect on 1 February 2017.

² www.smartnation.sg/initiatives/Services

5. IMDA thanks all the respondents for their comments.
6. Taking into account IMDA's overall policy objectives and purpose of the COPIF, as well as the views received in the Second Public Consultation, IMDA has completed its review of the Proposed Revised COPIF.
7. This cover note sets out the following:
 - (a) A summary of the views and comments received during the Second Public Consultation;
 - (b) IMDA's assessment of the views and comments raised by the respondents on the Proposed Revised COPIF; and
 - (c) IMDA's final decision and issuance of COPIF 2018.

PART II: SUMMARY OF COMMENTS RECEIVED IN SECOND PUBLIC CONSULTATION AND IMDA'S ASSESSMENT

8. This section provides a summary of the comments and views received on the Proposed Revised COPIF, as well as IMDA's assessment.
9. IMDA notes that a number of the comments raised in the Second Public Consultation were similar to those raised in the First Public Consultation. In these cases, IMDA would like to refer the respondents to the comments by IMDA provided in the Second Public Consultation. Where new information has been provided and where assessed to be reasonable and justified, IMDA has reflected its re-assessment in this document.

SECTION 1 Use and Scope of Mobile Deployment Space ("MDS") provided within a development to provide mobile coverage

10. The COPIF sets out the requirements on the responsibilities and obligations of respective building developers or owners ("**developers/owners**") of developments and telecommunication licensees ("**Licensees**"), in connection with the info-communication space and facilities provided pursuant to the COPIF ("**COPIF Space and Facilities**").

Renaming of MDS to Mobile Installation Space ("**MIS**")

11. In the course of implementing the regulatory framework through the requirements for COPIF Space and Facilities, it has come to IMDA's attention that various parties have commonly confused the abbreviated references of Mobile Deployment Space, i.e. "MDS", with the Main Distribution Frame or "MDF". IMDA has therefore amended the reference of MDS to MIS instead, to minimise actual

or potential confusion while retaining the definition of what constitutes an allocated amount of deployment space for mobile equipment that should be provided by developers/owners without charge. This change in terminology in no way affects the existing definition of rent-free space to be set aside for mobile deployment. The re-naming to MIS is reflected throughout the COPIF 2018 accordingly.

Designation of rooftops as the *preferred* location for mobile deployment

12. In the two rounds of public consultation conducted, IMDA had proposed for changes to be made to the COPIF to allow Mobile Network Operators (“**MNOs**”) to deploy installation, plant and systems in relevant spaces and facilities of developments, i.e. preferred rooftop space, for the provision of better cellular mobile coverage within these developments and to external areas. Respondents were largely supportive of the recommendations to designate rooftop space as the *preferred* location for deployment of mobile equipment, although some commented that rooftops may not be ideal in all situations due to different factors and considerations (e.g. locating MIS in the basement may be needed instead for mobile coverage in an underground carpark). Furthermore, respondents highlighted that developers/owners ought to be open to the MNOs’ recommended MIS location, as MNOs now select the MIS location in consultation with developers/owners. IMDA agrees with the respondents’ feedback and has provided examples of factors influencing the location of MIS accordingly in the COPIF 2018, to assist developers/owners and Licensees alike in reaching a common understanding and avoiding disputes.

Treatment of existing agreements for use of rooftop MIS

13. On the treatment of existing or current agreements for the use of rooftop space, several respondents commented that such agreements ought to be aligned with the framework for the use of MIS at no charge. One respondent had submitted that such agreements should transition to rent-free rooftop MIS by way of “auto-conversion” to rent-free agreements. IMDA is of the view that there should be no such auto-conversion. MNOs should continue to honour the agreements with the developer/owner and make the necessary arrangements to amend the terms of the agreements to align with the revised COPIF when the agreements are due to expire or when renewing the agreements. Notwithstanding the above, MNOs and the respective developer/owner may make any other arrangements, as long as both parties mutually agree to the terms of such arrangements.
14. Another respondent commented that where there were cases of existing rental agreements without a specific end-date, a reasonable time ought to be given to transition away from these, towards rent-free space. Similarly, one other respondent suggested that such agreements should be reviewed and brought in line with the revised COPIF framework for free space.

15. Again as with both rounds of the Public Consultation, IMDA maintains that respecting parties' contractual rights and providing regulatory certainty are of utmost importance. Hence, any existing commercial agreements for rooftop space should continue to run their course until termination or expiry as the case may be.

Charges incurred in connection with access to rooftop MIS

16. In the Second Public Consultation, some respondents were of the view that basic facilities such as power supply, lighting and ventilation should be provided by developers/owners. IMDA continues to be mindful of the cost burden that may be imposed on developers/owners as a result of the MIS requirements. In any case, for rooftop deployment, IMDA holds the view that there is no need for ventilation nor lighting. since it would be unlikely that these are needed on an open rooftop. Moreover, these MIS requirements are intended to facilitate the MNOs' deployment of equipment for mobile coverage, which may extend beyond the development. Notwithstanding the above, where the developers/owners suggest and MNOs agree that deployment would be in an enclosed room, the developers/owners shall provide at their own cost the necessary ventilation and lighting.
17. Separately, one respondent had wondered whether different forms of payment to the developer/owner was acceptable in return for the provision of rooftop MIS. For example, whether an MNO could offer sponsorship for event(s) organised by the developer/owner in return for equipment space. As MIS is supposed to be provided rent-free, MNOs are allowed to request for such space without the need to provide any forms of payment. Nevertheless, as highlighted in paragraph 13 above, both parties may mutually agree to other arrangements so long as other MNOs are not prevented from using the MIS.

Expansion of MIS scope and prioritisation of use

18. In both rounds of the Consultation, a number of respondents had been concerned with aesthetic reasons being used to deny access requests for deployment of equipment. On the other hand, other respondents had also highlighted that there were competing needs for limited rooftop space. While IMDA remains of the view that since provision of rooftop MIS is subject to space availability, due consideration ought to be given to developers'/owners' concerns, where reasonable.
19. However, some respondents had raised doubts regarding the definition or degree of reasonableness, which might give rise to disputes. IMDA considers that while it is not possible to provide an exhaustive list of categories of what might constitute reasonable aesthetics as one respondent had suggested, IMDA will intervene where necessary to facilitate the resolution of any such disputes between various parties. In effect, MNOs ought to address developers'/owners'

concerns or their reasonable requests where practicable, and this obligation is reflected in the COPIF 2018.

20. For the avoidance of doubt, where developers/owners have required MNOs to have camouflage in place for their mobile equipment, the space occupied by such camouflage will not be counted as MIS allocated. IMDA maintains that this position strikes a balance between addressing developers'/owners' reasonable concerns and meeting MNOs' deployment needs, while bringing enhanced mobile coverage to the public.

SECTION 2 Requirements of Space and Facilities to be provided to MNOs

21. IMDA sets Quality of Service (“**QoS**”) requirements to regulate the performance of mobile services provided by MNOs such that they achieve reasonable standards, and to ensure that nationwide mobile coverage, including in-building, is provided to the public. Under their COPIF obligations, developers/owners are required to set aside a specified amount of rent-free space known as MIS, within their developments at the request of MNOs to facilitate their deployment of mobile equipment to ensure that MNOs are able to comply with the QoS standards.³ While the COPIF requires developers/owners to provide MIS, MNOs do not necessarily deploy their equipment to every development as deployment would be based on each MNO’s network needs.

Location of MIS

22. While respondents supported the recommendation for MNOs to select the location of MIS in consultation with the developers/owners, there were concerns related to situations where mobile equipment may have already been deployed but radiation-related complaints from residents would cause some developers/owners to insist on the mobile equipment being relocated elsewhere in the development, with MNOs incurring costs due to the relocation. Generally, IMDA takes the view that MNOs are responsible for their installations and costs of deployment, especially since the allocated MIS is already to be provided by developers/owners rent-free. Where there are public complaints due to radiation-related situations which pose genuine radiation-related risks that go beyond the permitted limits of health and safety standards, MNOs should indeed take on the responsibility of ensuring that such risks are mitigated, including the bearing of any costs related to relocation of their installation(s), if needed.

Size of MIS

23. One key issue raised in both consultations was the size of MIS. The comments in the Second Public Consultation were mainly that it was necessary for larger MIS for future needs. One respondent sought the expansion of MIS with the advent of 5G technology, citing that more base stations and new “hub” sites may be required. While the submissions seek to justify expanded MIS due to 5G deployment, IMDA reiterates here that the full requirements of 5G remain uncertain at this current stage. It would be unreasonable to require developer/owners to provide space for 5G deployment now, especially if this is not utilised. Should additional MIS be necessary due to 5G developments in the future, IMDA maintains that MIS requirements will be reviewed accordingly when there is more clarity in 5G specifications and needs. Therefore, the existing MIS size as stipulated will be retained in COPIF 2018.
24. Another respondent suggested that as MNOs had no choice but to co-exist in one building for coverage to the area, they would not always be able to find

³ The exact amount of rent-free space depends on the size of the building/development.

nearby sites to serve that area. It was further suggested that since the outdoor coverage area of mobile equipment typically covers a wide outdoor radius which equates to a coverage area beyond IMDA's tiered formula, the MIS should be expanded. IMDA would like to clarify that, while both rounds of consultation had sought to supplement further explanation on "Mobile Coverage Area", the definition itself remains unchanged. IMDA is mindful of the amount of MIS that developers/owners need to provide in order for the public to benefit from enhanced, wider mobile service coverage. Hence, IMDA does not believe that it would be reasonable to further burden the developers/owners by expanding the MIS. Moreover, as the COPIF already requires all buildings that meet stipulated criteria to provide MIS, MNOs ought to proactively self-help and work together in situations where all MNOs need the MIS in the same location.

25. On the issue of MNOs choosing to deploy equipment at the same location, IMDA would like to also clarify that while the MIS allocation is to be shared for all MNOs occupying that same space, the developer/owner should not prevent an MNO from first utilising all available space in the MIS (i.e. Earlier Requesting MNO) until such time as another MNO (i.e. Later Requesting MNO) is ready to install equipment in that shared MIS. Since the COPIF requirement is for developers/owners to provide a stipulated amount of MIS, the developer/owner is still providing the same stipulated amount of MIS overall for deployment by MNOs in any case. Therefore, the developer/owner should not be apportioning the MIS into equal spaces based on a presumed number of MNOs, allocating each one a fraction of the overall MIS regardless of the number of MNOs currently occupying that space.
26. With regard to the principle of sharing MIS among the MNOs, IMDA expects MNOs to utilise the space efficiently. Where a Later Requesting MNO subsequently seeks its share of MIS which is being occupied by the Earlier Requesting MNO, the Later Requesting MNO should only request for space that it actually needs. Should any dispute arise, MNOs may request IMDA's facilitation to resolve the matter. IMDA reserves the right to allocate the shared MIS as it deems reasonable, particularly where it is found that there has been hoarding of space not actually needed or efficiently utilised. IMDA may further require the Earlier Requesting MNO to bear any modification costs such that the MIS can be shared with the Later Requesting MNO, if found that the Earlier Requesting MNO had failed to use the MIS efficiently. In the case of MIS in tunnels, however, please refer specifically to Section 6 of this document.
27. Respondents also raised several other issues relating to COPIF requirements and refinements to be made, in connection with various aspects and details of the sizing of MIS. We set out the respondents' main points and IMDA's position on these as follow:
 - a) Each disaggregated Mobile Space should be at least 8m²
 - i. IMDA had prescribed a minimum size of 8m² under the COPIF 2013 requirements to ensure that the developer/owner would provide a reasonably-

- sized MIS, where it is disaggregated space, which would have been selected by the developer/owner.
- ii. Moving forward, since the MNOs select the location of the MIS and would consider their own operational needs including whether to deploy equipment in different locations, IMDA has proposed not to specify nor distinguish the minimum size between single contiguous and disaggregated space. As MNOs would generally each require 6m² for their equipment, and with the entry of the 4th MNO, the minimum stipulated MIS should accordingly take into account any development(s) where all 4 MNOs would need to use the same development to provide mobile service coverage to the development and the surroundings. Hence, IMDA is doing away with the minimum 18m² for single contiguous space in the COPIF 2018 and adjusting the minimum MIS to be set at the next stipulated tier, i.e. 24 m². The developers/owners are generally not made worse-off since the amount of space they would have to provide as MIS, where disaggregated, remains unchanged overall. IMDA reiterates that as long as the total space occupied by MNOs does not exceed the total allocation stipulated under the COPIF, the MIS would have to be provided at no charge to MNOs.
- b) Ancillaries and associated installation, plant or system
- i. In the Second Public Consultation, one respondent had commented that wall-mounted and ceiling-mounted equipment should not be computed into MIS. To avoid confusion, IMDA had already addressed this within the Second Public Consultation document, i.e. that the general guiding principle is that ancillaries should be wall-mounted or ceiling-mounted wherever possible, for optimal use of allocated space. This is in consideration that where mobile equipment is installed in the MIS, associated ancillaries such as antennae, remote radio units etc. would also typically be deployed. Should such floor-standing ancillaries take up footprint, these would be counted towards MIS, while ceiling space taken up by ceiling-mounted installations such as indoor cones would be excluded. For the avoidance of doubt, MIS will be computed where any space is rendered unusable by ancillaries deployed unless it is an associated installation as listed in Table 1 below).
 - ii. Again, IMDA would highlight that this is to be distinguished from associated installations such as cabling and cable trays, trunking etc. which are a necessary part of the cable distribution system being deployed by MNOs, for which it is impracticable to compute towards MIS. While developers/owners should not impose charges for these associated installations, MNOs should minimise the space used for cables/cable trays (i.e. reasonable routing of cables, placed on or close to walls etc.) as much as practicable.

- iii. For the avoidance of doubt, we have set out some examples in Table 1 below.

Table 1: Ancillary and associated apparatus for mobile deployment

Type of ancillary/ associated apparatus	Computed as MIS?
Cabling/trunking and cable trays	No
Ceiling-mounted indoor cones/antennae	No
Camouflage (i.e. reasonable aesthetics)	No
Antennae (with footprint)	Yes
Base transmission system (BTS) (with footprint)	Yes
Combiner (with footprint)	Yes
DB box (with footprint)	Yes
Remote Radio Unit (RRU) (with footprint)	Yes

- iv. In addition, one respondent commented that it has encountered instances where floor-standing ancillaries had to be deployed due to radiation and aesthetic concerns over having a clear/unobstructed roof parapet. This resulted in more space being taken up due to the ancillaries' footprint(s), with the subsequent increase in space amounting beyond the stipulated rent-free MIS. IMDA's view is that where floor-standing ancillaries have been unreasonably required, such space used to support these ancillaries should not be included as part the MIS.
- v. The same respondent also claimed that due to floor-mounted panel antennae, the total space required for an outdoor base station could be up to 38m². Similar to the above, if the floor-mounted panel antennae have been unreasonably required by the developers/owners, then such space occupied should not be counted as part of the MIS.

c) Method of determining and ascertaining the size of MIS

- i. As no new issues were raised with respect to the proposed method for determining and ascertaining the size of MIS to be provided by developers/owners in the respective residential and non-residential developments, this remains unchanged in the COPIF 2018. IMDA has thus retained the MIS size requirement respectively in the COPIF 2018.

Definition of non-residential buildings

28. On the definition of non-residential buildings, respondents had asked for clarification citing that this should be extended to non-traditional buildings such as substations and ventilation buildings where MNOs would need to deploy their equipment. IMDA would like to clarify that these buildings that are not for residential use would be categorised as non-residential buildings and would be treated similarly to other non-residential buildings.

Definition of Mobile Coverage Area: Gross Floor Area (“GFA”) + Land/Site area

29. IMDA had highlighted that the original policy objective is for mobile coverage to be made available anywhere within a property development, but not all developers/owners may have included this in their computation. On this basis, IMDA had consulted on the need to clarify the definition of “Mobile Coverage Area” used to determine MIS for non-residential developments. Since there may be some developments that do not consist purely of built-up buildings, but may comprise open-air areas that would still need to be served by mobile coverage, IMDA had clarified that the definition of Mobile Coverage Area should not just be based on the built-up areas purely with GFA, but also the adjoining open land/site area within the property boundary, i.e. GFA plus land/site area. As respondents generally agreed with IMDA’s existing definition of Mobile Coverage Area as clarified in the Second Public Consultation, there will be no change to it.
30. On some respondents’ suggestion that the developers/owners ought to provide the GFA as part of their obligation to provide building plans to be shared with MNOs in order to determine or confirm the GFA, IMDA’s view differs. Instead of placing additional administrative burden on developers/owners, MNOs’ checking of GFA may be better carried out through the Urban Redevelopment Authority.⁴

Requirements of Reasonableness and Timeliness

31. Some respondents had taken issue with the references under COPIF requirements to “reasonableness” and “timeliness”, stating that clear guidance was needed as these were open to interpretation and might give rise to disputes. One respondent also suggested that “timely manner” could be defined as 5 working days.
32. IMDA considers that every situation and context differs, which makes it impracticable to define these terms. As for clarity in timelines, the escalation process is already provided for in the COPIF 2018. For these reasons, the said references have been retained to allow some scope in varied situations. For the avoidance of doubt, IMDA will not hesitate to facilitate the resolution of relevant disputes arising in such varied situations where necessary.

⁴ Apply online for URA’s GFA verification at www.ura.gov.sg.

SECTION 3 – Use of and Access to Space and Facilities by Licensees

Use of COPIF Space and Facilities: Rules of Usage

33. On the Rules of Usage, some respondents submitted that Licensees should continue to be provided with the building blueprints at no cost to the Licensee(s) as has been the current practice by developers/owners in facilitating the MNOs' access. IMDA agrees with the comments and has reflected this as part of developer's/owner's obligations accordingly in the COPIF 2018.
34. In addition, there were concerns pertaining to the insurance co-naming of telecommunication contractors as the developer's/owner's condition for Licensees' access to COPIF Space and Facilities. Respondents also felt that the Rules of Usage should indicate the requirement that existing installations would follow the same arrangements when the developer/owner (or managing agent) changed hands. IMDA's view differs in that licensees are expected to manage their own contractors, along with making their own arrangements with the subsequent developer/owner (or managing agent) as necessary. For example, Licensees could novate or re-negotiate their terms of lease or consider providing for such situations in their terms of lease to deal with a subsequent stakeholder, as it would be prudent to do so.
35. For the avoidance of doubt, Licensees should not be required to provide full indemnity and insurance against third party claims for the developer/owner as a condition of access to COPIF Space and Facilities. As highlighted in the Second Public Consultation, Licensees typically take up general public liability insurance as a matter of business prudence. IMDA does not agree with the inclusion of insurance co-naming (of developers/owners) or additional take-up of insurance as a condition for access to COPIF Space and Facilities. IMDA would like to reiterate that under COPIF 2013, Licensees are already required to make good any damage caused and that developers/owners should not be requiring Licensees to buy additional insurance. This is also the case under the new COPIF 2018. In addition, any third party claims are legal matters to be pursued privately and are therefore not appropriate to be addressed under the scope of the COPIF.

Access to COPIF Space and Facilities located at a height of more than four (4) metres above floor level

36. On the matter of Licensees' access to space and facilities over 4 metres high, one respondent had commented that this practice was discouraged due to work safety and maintenance concerns. While IMDA understands the nature of such safety concerns, the managing agent(s) of each development would still have to abide by the COPIF 2018 requirements to facilitate Licensees' access at a height over 4 metres above floor level, while still complying with the necessary work safety requirements and regulations. This involves allowing Licensees their own means of access, e.g. mechanised equipment such as Licensees' boom lifts,

cherry-pickers etc., including Licensees' own choice of contractors and not be restricted to the developer's/owner's contractors, except where warranted for security reasons (e.g. in highly secured locations, where only specific contractors are authorised to enter the premises). The relevant work safety framework would still have to be adhered to, alongside the COPIF requirements.

Emergency Access to COPIF Space and Facilities

37. The COPIF 2018 has defined Emergency Access as needed for situations that require restoration of telecommunication service(s), due to outage or downtime, which cannot be resolved by the Licensee remotely. At the root of this, Licensees should not be prevented from Emergency Access to the development for the purpose of service restoration, unless there are immediate safety and danger concerns. IMDA has carefully considered the emergency access procedure while taking into account that prompt service restoration due to unplanned outage has to be balanced with reasonable response time of developers/owners within context.
38. IMDA notes that for Emergency Access, respondents had sought shorter parameters for access procedures as follow:
- immediate access (manned buildings); and
 - within 4 hours (on average, for unmanned buildings).
- Some respondents also commented that the clock should start at the point when the first notice is made to the developer/owner for Emergency Access.
39. IMDA holds the view that the Emergency Access procedures should remain as proposed in both consultations, i.e.

Building type	Timeframe for Emergency Access to be provided
Manned	Within 2 hours from the receipt of licensee's notice
Unmanned	As soon as possible and in any case not more than 8 hours from the receipt of licensee's notice

40. The exception would be road and train tunnels, for which such Emergency Access timeframe would not apply, since there are overriding operational and safety considerations. For example, *ad hoc* emergency access would pose widespread inconvenience to the public caused by the disruption to commuter train services. In such cases, the developer/owner (or the train operator) of the road or train tunnel should make prompt, alternative arrangements for the Licensee's service restoration. This has been provided for under chapters 2 and 16 of the COPIF 2018, which stipulates the developer's/owner's and Licensee's obligations respectively, including their obligations in relation to Emergency Access to road and train tunnels.
41. In addition, the clock should start only when notice is received by the developer/owner. The COPIF obligations of the parties already require that emergency point(s) of contact and relevant details be exchanged as part of

access arrangements at the outset, hence allaying any concerns on communication during emergencies. Where the Licensee wishes to cater to other situations (e.g. where serving external areas beyond the development or impose the requirement that the developer/owner informs the Licensee if there is any planned electrical maintenance for the development as such situations present themselves as if an outage had occurred), the onus would also be on the Licensee to make the necessary prior arrangements with the developer/owner to have the safeguards in place to address such other situations, at the time when the Licensee takes the decision to deploy installations onsite.

42. For costs incurred due to emergency access, several comments called for the types of emergency access resources and charges developers/owners may incur to be specified upfront so as to prevent any abuse or disputes. Some respondents even suggested that any security charges should be subject to a maximum time limit of 2 hours for example, or imposed on a “per activation” basis depending on whether it was during or after business hours, or on public holidays.
43. IMDA considers it reasonable to allow recovery of costs for Emergency Access should it be necessary (i.e. due to regulatory requirements) that a security escort is hired, and where additional resources are incurred, to provide secured Emergency Access. Also, “out of pocket” expenses (e.g., transport cost incurred by the building manager specifically to facilitate Emergency Access for an unmanned building) should be recoverable. Generally, any recovery of security escort fees or transport charges incurred by developers/owners should be on an “as incurred” basis. For clarity, where emergency access to:
 - i. unmanned buildings is required, it would be reasonable for developers/owners to claim “out of pocket” expenses and security charges. It would not be reasonable to set a maximum time limit or capped fees for security escorted emergency access, since the needs or duration of different emergency situations would vary as well;
 - ii. manned buildings is required, IMDA agrees with the comments that there would already be an on-duty guard stationed onsite to provide emergency access and that there would be no reason for building owners to claim security costs. However, should the on-duty guard be required to leave his guard post to assist in providing access for example, requiring other staff to take his place, or perform additional work in order to enable the access, some provision should be made for cost-based reimbursement.

Enforcement regime of the COPIF

44. One respondent raised the issue of taking enforcement or issuing directives against developers/owners in instances where their obligations have not been fulfilled or where they have not complied with the COPIF. IMDA would like to highlight that IMDA has already put in place a process for such situations. The requirements and escalation process have been set out for Licensees to raise

cases for attention, including what information will be necessary for IMDA to intervene and take action against parties who do not comply with the COPIF. IMDA would urge Licensees who encounter such cases to adhere to the escalation process and furnish full information for IMDA's appropriate action.

45. On the comment that disputes between stakeholders undergo a lengthy duration before resolution, IMDA would like to point out that due process must be afforded to the parties to address the issues at stake. By and large, there are escalation cases which simply warrant IMDA's contacting the developer/owner forthwith and these are resolved promptly. While much of the COPIF main requirements may have been in place for some years, managing agents change from time to time. It is only reasonable to avail them the opportunity to better understand the access requirements for in-building space and facilities and so, a collaborative approach is preferred.

SECTION 4 – Requirements to Enhance Network and Service Resilience

Buildings housing vital services

46. On requirements to enhance the resilience of networks and services, it was submitted that the COPIF should provide for cable systems from two risers and that developers/owners should bear the cost for the horizontal facilities. IMDA has incorporated this into the COPIF 2018; although, should the developer/owner of the vital services building wish to deviate from the COPIF obligations, a waiver must be sought from IMDA.
47. Another respondent felt that the developers/owners should provide the second set of infrastructure in the same size as the first set. On this point, IMDA's view is that the second set of facilities need not be of the same size, to avoid wastage. For example, in considering to provide cable trays, the additional cable tray need not be exactly the same size as long as it is sufficient to serve the purpose of buildings housing vital services.
48. On the list of buildings housing vital services, a respondent suggested several more types of buildings (e.g. polyclinics, government buildings, bomb shelters and evacuation points, higher education buildings etc.) to be included on the list. For a start, IMDA will not expand the list of buildings housing vital services but retain the proposed definite list of buildings, while leaving to the discretion of the relevant stakeholders or developers/owners of the abovementioned additional building types whether they require such resilience requirements and to implement them for their premises. However, in the case of Data Centres which have been listed as one type of building housing vital services, IMDA is mindful that there may be Data Centres developed for a business' own dedicated use, for which such resilience requirements may not need to be prescribed for compulsory compliance. Thus, IMDA has provided for this accordingly in the COPIF 2018, i.e. Data Centres (excluding those developed for a business' own dedicated use) would have to fulfil the stipulated resilience requirements. In addition, IMDA would like to clarify that in the case of bomb shelters, the requirements for these buildings or facilities are stipulated by the Singapore Civil Defence Force. In this regard, such type of buildings or facilities would fall outside the scope of the COPIF.
49. The respondent also submitted that multiple electricity feeds would be needed in order to also ensure service resilience. While IMDA sees the advantages of having multiple electricity feeds, this falls outside the scope of the COPIF. If developers do so require, however, IMDA will leave to the building developers/owners to engage their own electrical suppliers for such multiple feeds accordingly.

Resilience of networks and services

50. A respondent raised an issue centred on the treatment of Meet-Me-Rooms (“MMR”) in data centres and sought clarification on these vis-à-vis resilience

requirements. It appears that increasingly there are cases where developers/owners have carved out redundancy facilities and charged licensees for access and usage of these MMR.

51. IMDA notes that data centres generally have a single use or are single-tenanted buildings. Hence, where a data centre has been required to provide resilience for telecom infrastructure such as separate lead-in pipes, MDF room(s), telecommunication risers etc., it cannot charge for access to such facilities. However, where any data centre has enhanced features which a Licensee prefers to use (i.e. MMR and data riser), or where the data centre operator requires the Licensee to use enhanced features not provided under the COPIF space and facilities, that Licensee may then be subject to the terms of those features offered by the data centre and such arrangements may be commercially negotiated.

SECTION 5 – Provision of Cables for Telecommunication (excluding Broadband Coaxial Cable) Systems in all Developments

Residential developments: requirements for optical fibre cable installation

52. On requirements for optical fibre installation, some respondents proposed that Fibre Distribution Units might be more space-saving compared to Fibre Termination Points (“**FTPs**”), particularly where a riser serves three or more units in residential developments. The comments were that having multiple FTPs would pose space issues within risers themselves. However, IMDA holds that having individual FTPs allows neater determination of Licensees’ responsibility with easier maintenance overall. As the COPIF requirements already limit the distance between the riser to the residential units, effectively limiting the number of units served by a riser, space issues would be unlikely.

RJ45 outlets and supporting power outlet requirements

53. There were comments calling for guidance on the location of additional RJ45 outlets and supporting power for the home owners’ convenience such as specifying whether the RJ45 outlets should be adjacent to the RG6 co-axial cable outlets such that home owners can transition between the receipt of TV channels via an antenna to receiving it via a set-top box without having to physically shift their TV set. IMDA recommends that developers/owners adopt this wherever practicable, but recognises that design consultants may be allowed the flexibility to plan where and how to place those, since the layout of every residential unit differs.
54. In addition, IMDA understands that for safety reasons the mounting height of the switch socket outlet from the finished floor level should not exceed 1.8 metres. We note also that there are concerns among developers/owners on the aesthetics and safety of the placement of these RJ45 and power outlets at such a height. In view of the overriding safety concerns, IMDA will do away with the proposed data points above the main entrance, as well as at the ceiling or high along the wall of the living room, and adjust the number of data points required. See Table 2 below.

Table 2 - Number of data points to be provided within a home

Location within residential unit	Number of data point(s) (Category 6 or better) per location
Living room	2
Master bedroom	2
Kitchen	1
Bedroom(s)	1

Non-residential developments: requirements for the provision of internal telecommunication wiring

55. For internal wiring in non-residential developments, one respondent suggested that developers/owners should be required to install dividers within the cable tray in the riser, to partition the fibres for each Public Telecommunication Licensee (“**PTL**”) and allow a neat installation. IMDA does not consider this to be necessary as it not only poses additional costs for the developers/owners, but is also likely to constrain the possible number of Licensees sharing the facility. IMDA would however expect Licensees, including PTLs, to use the shared facilities efficiently.
56. While respondents were mainly supportive of the requirement for Air-blown Fibre (“**ABF**”) microducts to be pre-installed for non-residential developments, one respondent proposed that this be increased from 2-way to 4-way ABF microducts, which could reduce the need for Licensees to recover the fibre in the microducts since fibre recovery might inconvenience customers. In addition, records of microducts usage should be retained by developers/owners to be submitted to the Telecom Facility Co-ordination Committee (“**TFCC**”) so that such information is available when needed.
57. IMDA does not consider the above proposal to be practical. Typically for each unit in a non-residential development, there would be only one Licensee serving the unit so not all the ABF microducts would be used up. In asking a developer/owner to provide more ABF microducts than necessary, additional costs would be incurred by the developer/owner and there would be a waste of resources. To ensure ABF facilities are efficiently used, IMDA has required Licensees to adopt the good practice of removing and recovering the fibre if they no longer provide services to an end user in the building. This is consistent with the use of COPIF space and facilities where IMDA, as a general principle, would expect Licensees to remove their equipment if the Licensee is no longer using the equipment deployed to the development to serve the development. As for making records of ABF microduct usage and submitting the records to the TFCC, IMDA does not agree that there is need to do so. IMDA will require the Licensee who uses the ABF microduct to label the microduct, so that it can be easily identified by other Licensees. As such, there is no need for the building developer/owner to still make records as this would impose additional administrative burden on the building developer/owner (or their managing agent). It follows that neither is there a need for records of ABF microduct usage to be submitted to TFCC. In any case, the TFCC is made up of the PTLs only, whereas the ABF microducts are meant to be shared by all Licensees and not just PTLs.
58. For the avoidance of doubt, where the developer/owner has provided the ABF under COPIF 2018, Licensees should first use the ABF microducts to deploy fibre to end users, unless Licensees are able to demonstrate that those ABF microducts provided by the developer/owner are unable to serve the Licensees’ purpose. In that case, the developer/owner shall continue to facilitate the Licensees’ access to other COPIF space and facilities in order to serve end users. As the ABF microducts are limited, Licensees should not pre-blow fibre in

the ABF microducts and prevent another Licensee from using the ABF microducts when an end user orders services from that Licensee. Licensees are however encouraged to pre-install their fibre up to the risers, prior to the development obtaining its Temporary Occupation Permit (“**TOP**”). Such pre-installation would allow the Licensees to subsequently deploy the fibre into the end users’ premises using the ABF microducts when the end users order services and provision services to the end users more expeditiously. IMDA expects Licensees to follow the COPIF guiding principle of efficient utilisation as highlighted above. This would prevent any attempt to pre-blow fibre to hoard or “reserve” infrastructure, to the detriment of other Licensees who would be precluded from using the infrastructure when there is an actual demand for their service(s).

SECTION 6 – Developments consisting of 1 or more Road or Mass Rapid Transit System (“MRT”) Tunnels

59. IMDA explained in the Second Public Consultation that the mobile network deployed to provide mobile coverage at both residential and non-residential developments differed from that which was deployed to provide mobile coverage to road or train tunnels. IMDA acknowledges that network deployment for road and train tunnels undergoes a much lengthier process. IMDA continues to hold the view that setting out general requirements for such facilities would benefit all stakeholders involved, both in terms of identifying and addressing any access challenges while promoting implementation efficiency. IMDA would also like to highlight that stakeholders are expected to maintain the existing good practice of co-ordination during implementation to discuss specific dimensions and agree upon them, consulting IMDA on special requirements where needed or if there is any deviation from the general requirements. These factors have been taken into account under the relevant requirements of the COPIF 2018.
60. Respondents have been generally supportive of expanding the MIS for developments consisting of road or train tunnels. Hence, the MIS requirement for underground tunnel developments, i.e. road tunnels, train tunnels and ventilation/facility buildings (where they serve a tunnel), have been increased to 60m². For clarity, IMDA’s requirement of 60m² MIS is to be provided on a forward-looking basis for new projects only and not to be applied retrospectively to existing road or train tunnel developments and on-going projects under construction. Notwithstanding the above, with the entry of a new MNO and the changes in technology e.g. 5G, which may require more equipment to be deployed, IMDA may need to expand the current MIS provided in these locations. IMDA would work with the relevant developer/owner or (train) operator with regard to the additional space required for existing underground tunnel developments to be treated as MIS, where such a need arises.
61. The MIS requirement for aboveground MRT stations however, will adopt those set out for the space and facilities specified in COPIF 2018 chapters 7 to 9, corresponding to the use or type of building. See Table 3 below. In the event of uncertainty, IMDA is to be consulted for cases where it may not be as clear-cut (e.g. aboveground MRT station with connecting mall) due to the mixed use. IMDA will consider the use type of the development, in ascertaining the MIS to be provided for such mixed use aboveground MRT stations.

Table 3 – Mobile space to be provided in aboveground train station

Total mobile coverage area ('000 m ²)	Mobile space (m ²)	Minimum height of mobile space (m)
> 2 - ≤ 6	24	3
> 6 - ≤ 20	36	
> 20 - ≤ 100	54	
> 100 - ≤ 200	72	
> 200	To consult IMDA	

62. On MIS for developments consisting of road or train tunnels, where developer/owner requires MNOs to use an enclosed room as MIS, the developer/owner would need to bear the set-up costs for lighting and ventilation, especially since MNOs would not have a choice on MIS locations within developments with tunnels. IMDA would require, in such cases, that MNOs need only bear utility charges.
63. IMDA notes one respondent's comment that the floor loading requirement of 7.5kN/m² for installation in underground MRT stations and ventilation/facility buildings (to serve road and train tunnels) proposed in the Second Public Consultation is significantly higher than that required for non-residential developments. IMDA agrees that it may not be reasonable for the floor loading requirement to be different from that for non-residential developments. IMDA has reconsidered this, taking into account all relevant feedback, and has removed the proposed floor loading requirement of 7.5kN/m² while factoring in the need for load spreaders where circumstances so require under the COPIF 2018. However, IMDA is also mindful of the unique construction process of, and the difficulty in making modifications to, underground MRT stations and ventilation/facility buildings. IMDA understands that the developer/owner of such developments would consult MNOs for their requirements at the planning stage, and where the MNOs can justify that the floor loading requirement needs to be adjusted, the parties should discuss these variations in good faith. In the event that the parties are unable to reach agreement, they may refer the matter to IMDA for a decision.
64. Likewise, general requirements for niches, wall spaces and leaky cables ("**LCX**") have been included under the COPIF 2018 for reference by stakeholders with the expectation that dimensions for each project are to be discussed and agreed upon on a case-by-case basis. IMDA understands that there are different considerations for various tunnel projects and has made allowance for the co-ordination of specifications during implementation where feasible (e.g. for a road tunnel to accommodate up to 4 LCX "where site conditions permit").

SECTION 7 – Further changes introduced to the Proposed Revised Code

65. The COPIF 2013 required developers/owners to provide the Broadband Co-axial System (“**BCS**”) within their residential developments. With StarHub’s announcements earlier this year of the cessation of its Hybrid-Fibre Co-axial (“**HFC**”) network deployment to new buildings that attain TOP status from 1 May 2018 onwards and of full cessation of HFC services after June 2019, home owners in such residential buildings will not be able to subscribe to cable TV services to watch cable TV programmes, even though the units may have been installed with the BCS with cable TV points in accordance with previous requirements.⁵
66. In addition, non-pay TV subscribers in such new buildings will also not be able to watch Free-To-Air (“**FTA**”) TV channels from Mediacorp via their co-axial cable outlets. Home owners will need to switch over to Digital Television (“**DTV**”) in order to continue receiving FTA TV channels, either by obtaining a Digital TV ready TV or a DVB-T2 digital set-top box and connecting an indoor antenna; or by subscribing to pay TV services.
67. For home owners with multiple TV sets, each TV set would need to be connected to a separate indoor antenna in order to receive FTA DTV, unless the in-home co-axial cabling is reconfigured as described below.
68. Given the above, including having explored the possible uses and modification of the BCS to allow home owners to continue the use of co-axial cabling for the distribution of DTV signals for FTA TV, IMDA had proposed in the Second Public Consultation the re-configuration of the co-axial cabling such that it can be used to distribute DTV signals within the home. This would allow home owners to attach an antenna to the inlet of the splitter and distribute the DTV signals to the room(s) with the co-axial cable outlets, thus eliminating the need for each TV set to be attached with separate antenna(e). Refer to Figure A.

⁵ For the public announcement titled “StarHub to Cease Further HFC Rollout”, please refer to StarHub’s website: www.starhub.com/about-us/newsroom/2018/april/starhub-to-cease-further-hfc-rollout.html. For the public announcement titled “StarHub Ushering Cable Customers to All-Fibre Networks”, please refer to StarHub’s website: www.starhub.com/about-us/newsroom/2018/november/starhub-ushering-cable-customers-to-all-fibre-networks.html

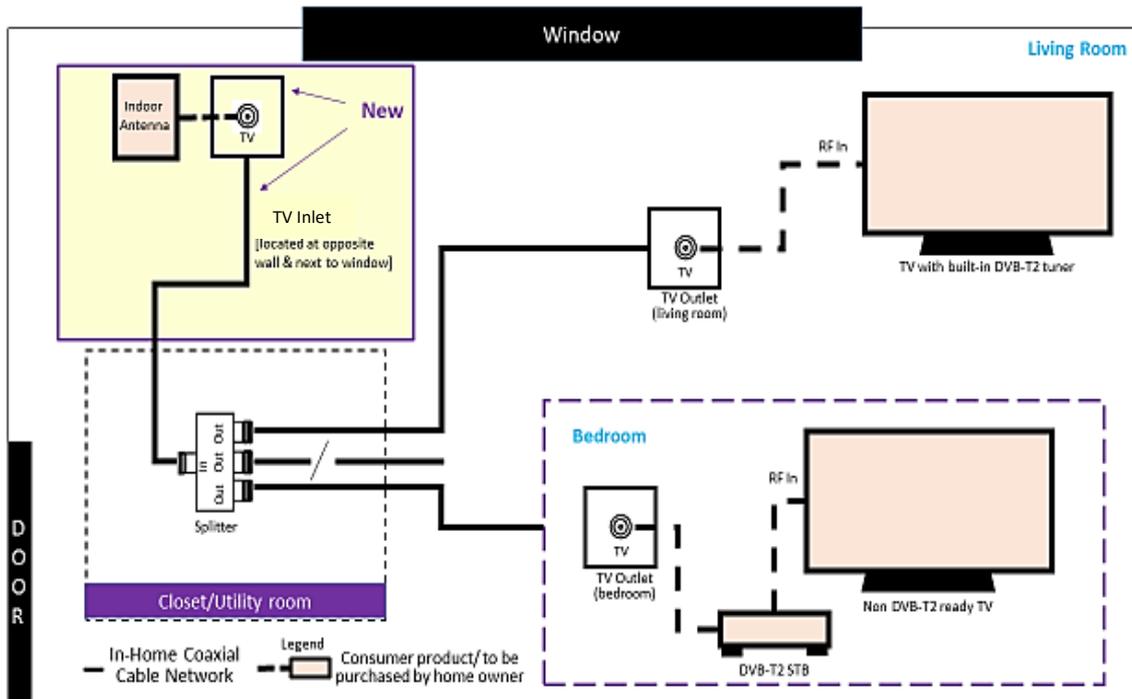


Figure A: Recommended – Re-configuration of In-home Co-axial Cabling under COPIF 2018

69. One respondent, while generally supportive, had commented that the in-home co-axial reconfiguration may not be a full solution due to inherent issues, i.e. the nature of the indoor antenna. IMDA noted some of the technical issues and hence, has advised home owners to place the indoor antenna at higher places to allow better signal reception. IMDA has also proposed that the co-axial cablings for new homes be configured in the manner as illustrated in Figure A. However, IMDA strongly discourages all indoor antennae from being placed at the window ledges or sills and advises developers/owners (or their managing agents) to guide their residents accordingly.
70. In addition, it is highly recommended that affected developers/owners adopt the configuration if the BCS has not yet been installed or is in the midst of deployment, as developers/owners who adopt it will no longer need to provide co-axial cables from the gate pillar/telecom riser to new residential units, thus resulting in savings to the cost of construction. More details can be found in the COPIF Guidelines (the “**Guidelines**”) that have been revised and now published together with the COPIF 2018.
71. Notwithstanding the above recommendations, IMDA recognises that there may be developers/owners who wish to install a common outdoor antenna to allow DTV signals to be distributed within the development, e.g. private residential high-rise development(s), and have included relevant details as guidance where this option is taken. The Guidelines provide further information on the installation of the common outdoor antenna.

72. Separately, on the issue of in-unit TV points, there were concerns that as high-rise residential units were becoming increasingly smaller, there may be insufficient space to house that many TV outlets and power points for some of these (smaller) residential units. IMDA notes the concerns and is prepared to work with the developer/owner where such issues arise due to genuine space constraints and address these accordingly.

Acceptance of Other Key Changes

73. In the Second Public Consultation, IMDA also proposed the following key changes/positions to be reflected in COPIF:

- a) For landed dwelling houses only – Removal of requirement for building developers/owners to obtain Fibre Readiness Certification on their installation of optical fibre cables from gate pillars/telecommunication riser to residential units;
- b) New requirements for the design of manhole covers – A less stringent requirement will be imposed after further consultation with the Energy Market Authority, i.e. both the proposed requirements for gas checking holes and hinge from the manhole cover will be removed. The new requirements for manhole covers will thus comprise:
 - i. At least four (4) gas discharge valves to ensure that there are sufficient vents to allow gas to be discharged from the manhole;
 - ii. Gas discharge valves should be able to release gas automatically once the manhole is accumulated with gas; and
 - iii. Gas discharge valves should have caps so as to minimise the risk of mosquitoes getting into and breeding inside the manholes. The caps should be secured to prevent them from being dislodged;

and

- c) Removing the requirement for building developers/owners to obtain Cable Readiness Certification for co-axial cable systems installed by them.

74. Also, IMDA has further clarified the sharing arrangement for Licensees' connection to the lead-in pipes provided by the developer or owner under paragraph 16.8 of the COPIF 2018, as these are designated as infrastructure that must be shared under other existing regulatory requirements.⁶

75. IMDA will proceed to implement the aforementioned changes in COPIF 2018.

⁶ Under Section 7.5.1 of the Code of Practice for Competition in the Provision of Telecommunication Services ("**Telecom Competition Code**"), lead-in pipes and associated manholes are designated as infrastructure that must be shared. This sharing arrangement must be at cost-based prices and on non-discriminatory terms and conditions in accordance with Section 7 of the Telecom Competition Code.

PART III: CONCLUSION AND ISSUANCE OF COPIF 2018

76. IMDA hereby issues COPIF 2018, which shall take effect on 15 December 2018 (“**Effective Date**”). COPIF 2018 will apply in its entirety to new developments which have obtained URA’s provisional or written permission on or after the Effective Date.
77. For existing developments, the requirements as specified in Chapters 1, 2, 16 and 17 of COPIF 2018 will be applicable upon the Effective Date of COPIF 2018.
78. For the avoidance of doubt, where there are existing leasing arrangements between building developers/owners and MNOs for the provision of cellular mobile coverage using rooftop spaces within the developments, such arrangements will not be affected by the rooftop MIS provision in COPIF 2018 until the relevant leasing agreements have expired.
79. IMDA will continue to monitor market and industry trends, to ensure that info-communication facilities provided within buildings continue to keep pace with the developments in telecommunication infrastructure technology and to support the evolving info-communication needs of users.