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ECONOMIC ANALYSIS OF THE COMPETITION IMPACT ARISING FROM THE PROPOSED ACQUISITION OF HKBN LTD BY CHINA MOBILE HONG KONG COMPANY LIMITED

25 JULY 2025

THIS IS THE PUBLIC VERSION OF THE CONSULTANCY REPORT IN WHICH SOME FIGURES AND INFORMATION HAVE BEEN REDACTED TAKING INTO ACCOUNT REQUESTS OF RELEVANT INDUSTRY PLAYERS. THE REDACTION IS DONE IN A MANNER TO PRESERVE THE LEGIBILITY OF THE REPORT.

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1 Summary

1.1.1 The Office of the Communications Authority (OFCA) instructed Frontier Economics to prepare this Consultancy Report analysing the proposed acquisition of HKBN Ltd., which indirectly and wholly owns Hong Kong Broadband Network Limited, HKBN Enterprise Solutions Limited and HKBN Enterprise Solutions HK Limited (collectively referred to as "HKBN"), by China Mobile Hong Kong Company Limited (CMHK)[1] (Proposed Transaction). CMHK and HKBN are referred to as the Merging Parties hereinafter.

(a) HKBN is a fixed network operator (FNO) operating primarily in Hong Kong. It is Hong Kong's [redacted] largest provider of residential and commercial fixed internet access (by subscriber numbers). It also offers mobile services as a Mobile Virtual Network Operator (MVNO).

(b) CMHK is [redacted] largest mobile network operator (MNO) in Hong Kong. It is also an FNO with a presence in the retail fixed internet access and residential local voice services markets.

1.1.2 Our report considers whether the Proposed Transaction might lead to substantial lessening of competition in relation to any of the services the Merging Parties provide in the relevant economic markets where they operate.

1.1.3 Our analysis is based on evidence submitted to us by the Merging Parties and other stakeholders (e.g. in response to OFCA's request for information (RFI) and consultation document), data/evidence provided by OFCA and relevant precedents. For the avoidance of doubt, all the information, inputs, views and representations received during the consultation process have been considered, albeit not each of such submissions is explicitly mentioned or addressed in this report. We have identified 4 potential main theories of harm[2]:

(a) Horizontal concerns (reduced competition) in retail internet access services for the residential market and fixed local access networks;

(b) Input foreclosure in mobile backhaul services;

(c) Customer foreclosure in mobile backhaul and network deployment services; and

(d) Conglomerate concerns in relation to fixed/mobile bundles.

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1 Like CMHK, China Mobile International Limited (CMI) is another subsidiary of China Mobile Limited that is active in Hong Kong. As such, for the purposes of this competition assessment CMI and China Mobile Hong Kong Company Limited needs to be generally treated as one entity. Any reference to CMHK in this report should be interpreted as referring to the two companies collectively.

2 In the other markets we examine the parties either do not have any overlapping activities, or if they do, the merger does not lead to a material change in market conditions.

1.1.4 Below, we summarise our analysis and findings for each of these theories of harm.

Horizontal concerns in the market for fixed local access network services

1.1.5 There are five main FNOs of wholesale and retail services in Hong Kong: PCCW-HKT Telephone Limited and Hong Kong Telecommunications (HKT) Limited (collectively "PCCW-HKT"), HGC Global Communications Limited (HGC), Hong Kong Cable Television Limited (Cable TV), HKBN and CMHK – with CMHK having a retail residential market share of less than [redacted]%. Therefore, this is a 5-to-4 merger in the fixed internet access market on the residential segment, with a post-merger combined retail market share of [redacted]% for the Merging Parties. 5-to-4 mergers with 4 players remaining after a merger are typically not considered to raise significant competition concerns as the Merged Entity would be constrained by three other retail providers / networks after the merger.

1.1.6 The evidence provided is also consistent with (i) the Merging Parties are not particularly close competitors (based on analysis on pricing) and (ii) CMHK does not appear to act as an Important Competitive Force ('ICF', i.e. a firm that has more of an influence on the competitive process than their market shares would suggest).[3]

1.1.7 There are however many buildings in Hong Kong where the Proposed Transaction would lead to fewer than four independent networks. Furthermore, in the counterfactual absent the merger, CMHK would continue rolling out its own network, so that the number of buildings with an increased number of networks would increase in the counterfactual. If the Proposed Transaction is allowed to proceed, there would be a reduction in competition in some of these buildings vis-à-vis the counterfactual. Given that retail internet access prices may vary at a building level in Hong Kong, there is a concern that consumers in some of these buildings could face higher prices or reduced quality of service post-merger.

1.1.8 Given the above, the Proposed Transaction has the potential to substantially lessen competition via unilateral effects in buildings where there will be one and possibly two other competing FNOs post-merger.

Input foreclosure in mobile backhaul services

1.1.9 HKBN currently provides mobile backhaul services to MNOs. The theory of harm related to mobile backhaul, is that the Merged Entity may have the ability and incentive to cease offering mobile backhaul services (or deteriorate the terms of

3 ICF is defined in the European Commission ('EC') guidance on horizontal mergers (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52004XC0205(02)), paragraphs 37-38.

such offers) to CMHK's mobile rivals, to strengthen the position of CMHK in the mobile retail market.

1.1.10 Our assessment suggests that this theory of harm is unlikely to be feasible because:

(a) Mobile backhaul services are relatively homogenous and there are typically limited barriers preventing MNOs from switching between wholesale backhaul providers.

(b) There will remain other alternative providers of mobile backhaul after the merger (PCCW-HKT, HGC and TraxComm Limited (TraxComm)). Having at least three providers overall is typically considered to be sufficient for the market to remain competitive.

(c) HKBN's customers are likely to be able to find viable alternatives (given the presence of competing suppliers, the possibility of new suppliers entering the market as well as self-supply).

1.1.11 In response to the representations received from the industry, CMHK has made a voluntary offer to preserve the terms of existing mobile backhaul supply contracts for 3 years. This should mitigate any concern regarding potential mobile backhaul foreclosure at least for three years post-merger.

1.1.12 In light of the above, based on the evidence analysed (including experience from other countries covered in the main report), the risk of this theory of harm appears small.

Customer foreclosure in mobile backhaul and network deployment services

1.1.13 CMHK procures mobile backhaul services from a number of FNOs. There is a risk that after the merger the Merged Entity could switch to self-provision of these services, depriving FNOs of some revenues.

1.1.14 This would be unlikely to have a significant impact on [redacted]'s and [redacted]'s financial viability, as they are large FNOs. Furthermore, according to the United Kingdom's (UK's) Competition and Markets Authority (CMA), mobile backhaul typically represents a small share of mobile expenditure. [redacted].

1.1.15 CMHK is an important customer of [redacted], as CMHK buys wholesale access, and fixed network deployment services from [redacted]. According to [redacted], [redacted] revenues come from its network agreement with CMHK.

1.1.16 The agreement with CMHK may constitute [redacted] source of revenues for [redacted]. However, if [redacted] were to lose these network deployment revenues, it should also be able to reduce its costs. Indeed, overseas case studies show that up to 80% of network deployment costs are labour costs,[4] which can be scaled up or down in proportion to the network deployment required. Hence, [redacted]'s profitability should not be materially affected.

1.1.17 We also understand that CMHK will not normally be able to terminate its agreement with [redacted] before [redacted], even if the Proposed Transaction proceeds. This would provide [redacted] with some protection to be able to adjust its strategies and business model before any agreement termination.

1.1.18 The evidence we have reviewed and our analysis therefore suggests that there is unlikely to be a substantial lessening of competition from customer foreclosure.

Conglomerate effects

1.1.19 Conglomerate effects arise when a merger allows the parties to leverage a strong market position in one market into a related market, e.g. via tying / bundling several products, and in doing so to marginalise its competitors. There is scope for conglomerate effects arising from this merger given that one of the Merging Parties (HKBN) is primarily an FNO, while the other (CMHK) is primarily an MNO. Therefore, the theory of harm is that, after the merger, the Merged Entity would become particularly strong in the provision of Fixed-Mobile Converged (FMC) bundles and could then be able to foreclose its non-converged competitors.

1.1.20 While in principle, being able to offer fully-integrated FMC bundles to more customers could increase the Merged Entity's competitiveness, there are a number of reasons why the Proposed Transaction is unlikely to increase the risk of foreclosure:

(a) FMC bundles do not appear to be in high demand in Hong Kong, which makes it unlikely that any operator would have the ability to 'steal' a large number of non-FMC customers from competitors by attracting them with FMC bundles.

(b) There is another fully converged operator in the market: PCCW-HKT. PCCW-HKT should be able to compete with the Merged Entity in the provision of FMC bundles.

(c) There are also several other operators in Hong Kong that are offering or would be able to offer FMC bundles, which limits the competitive advantages the Merged Entity could gain from the strengthening of its FMC offering.

1.1.21 Given the reasons set out above, the Proposed Transaction is not likely to have the effect of substantially lessening competition (SLC Effect) in Hong Kong due to conglomerate effects.

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[4] See e.g. EC working document: "Proposal for a Regulation of the European Parliament and of the Council on measures to reduce the cost of deploying high-speed electronic communications networks".

Commitments offered by CMHK

1.1.22 CMHK has offered commitments that seek to address the competition concern identified. Frontier has been asked to consider these commitments and the extent to which they address the identified concern.

1.1.23 CMHK offered a set of commitments to CA to address the competition concern related to in-building access. In summary, these commitments ensure that, if an FNO encounters difficulties accessing buildings to install its own in-building telecommunications systems in buildings where HKBN owns these systems, the Merged Entity would provide access to this system on commercially negotiated fair and reasonable terms.

1.1.24 As these commitments imply that competitors providing fixed internet access services would be able to access buildings where the transaction could potentially lead to foreclosure, they address the competition concern identified.

1.1.25 As set out above, CMHK has also made a voluntary offer to maintain the terms of access to HKBN's mobile backhaul services for 3 years. This should alleviate third parties' concern about input foreclosure in mobile backhaul services at least for three years post-merger, whilst a significant lessening of competition in the longer term appears unlikely.

2 Introduction

2.1 Purpose of this report

2.1.1 OFCA instructed Frontier Economics to prepare this Consultancy Report analysing Proposed Transaction between CMHK and HKBN.[5]

2.1.2 Our report therefore considers whether the Proposed Transaction might potentially lead to competition concerns in Hong Kong in relation to any of the services the Merging Parties provide. Where competition concerns do arise, we assess whether the commitments offered by CMHK are capable of effectively addressing these concerns.

2.2 The Merging Parties' activities

2.2.1 HKBN is an FNO operating primarily in Hong Kong. It is [redacted] largest provider of residential and commercial fixed internet access (by subscriber numbers) in Hong Kong. It also offers other fixed services (e.g. mobile backhaul and access to external telecommunications facilities (ETF)). Furthermore, it offers mobile services as an MVNO, using leased mobile network capacity from CMHK, SmarTone Mobile Communications Limited (SmarTone) and Hutchison Telephone Company Limited (HTCL).

2.2.2 CMHK is a subsidiary of China Mobile Limited, the largest MNO in Mainland China. CMHK is [redacted] largest MNO (by subscriber numbers) operating in Hong Kong. CMHK is also an FNO providing fixed internet access and residential local voice services, and it also provides other telecommunications services such as access to ETF.

2.2.3 The Merging Parties hold Unified Carrier Licences (UCLs), which authorise them to provide a full range of telecommunications services, including internal fixed, external fixed, and mobile services, among others.

2.2.4 Table 1 lists the main services provided by the Merging Parties and indicates where there are overlaps.[6]

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5 We assess a scenario where CMHK would acquire 100% ownership of HKBN. We consider this to be a conservative approach to assessing competition concerns under the Merger Rule. Indeed, if CMHK were to acquire less than 100% of HKBN's shares (but still acquire direct or indirect control of HKBN), its level of control over HKBN's activities would be expected to be more limited, which would tend to partially mitigate competition concerns arising from the Proposed Transaction.

6 The Merging Parties may overlap in some other services – we have focused on services which require a telecommunications license and those in relation to which market participants have raised concerns.

Table 1 Services provided by the Merging Parties in major markets

Services	Description	HKBN	CMHK
Retail fixed internet access services	Provision of connectivity that provides customers with access to the internet via a fixed telecommunications network	Active	Active
Fixed local access network services	Provision of access to last-mile fixed infrastructure necessary to deliver fixed voice and internet access services to end-users	Active	Active
Leased lines and mobile backhaul services	Access to infrastructure that connects the local access network to the core network, enabling the transmission of data within a telecommunications system	Active	Minimal presence
Retail multiple-play services	Provision of fixed-mobile bundles to customers	Active	Active
Retail local fixed voice services	Telephony services provided at fixed location	Active	Minimal presence
Retail mobile services	Provision of wireless communications services through mobile networks, enabling users to access voice, text, and data services on the move	Minimal presence	Active
Mobile access network services	Provision of mobile wholesale services that MVNOs need to procure to supply mobile services to end-customers if they do not own radiocommunications infrastructure	Inactive	Active
Access to external telecoms facilities	Access to infrastructure used to connect Hong Kong with the rest of the world	Minimal presence	Active
External telecoms services	International or cross-border voice services such as the use of calling prefixes, call back services, etc.	Active	Active[7]

7 In spite of CMHK's minimal presence in the fixed voice market, CMHK provides external telecommunications services to its fixed and mobile service subscribers and other subscribers through indirect access.

Services	Description	HKBN	CMHK
IT services	Day to day management and operations of computing infrastructure and business applications to business customers, systems integration services, data centre services and cloud services	Minimal presence	Minimal presence

Source: Frontier analysis based on data from OFCA and RFI responses by market participants. See detailed information in the relevant sections of this report.

Note*: Active refers to an operator with a market share that is likely to be greater than [redacted]%; minimal presence refers to an operator with a market share of [redacted]% or less and/or the capability to provide services in this category; inactive refers to an operator that lacks the capability to provide services in this category.*

2.3 Structure of this report

2.3.1 Our report is structured as follows:

(a) Section 3 sets out the analytical framework we apply;

(b) Section 4 sets out the market definitions for the affected services;

(c) Sections 5 to 9 set out our assessment of the impact of the Proposed Transaction. Based on the activities of the Merging Parties and overlaps in their activities, and the consideration of safe harbour provisions, amongst other factors, we have split this assessment into:

(i) an analysis of the markets in which there are potential competition concerns (Sections 5 to 8); and

(ii) an analysis for the markets where we would not expect any material competition concerns (Section 9).

(d) Section 10 assesses whether the commitments proposed by CMHK addresses competition concern arising from the Proposed Transaction.

2.3.2 In annexes, we discuss some additional activities where the parties overlap (Annex A), and provide a glossary of technical terms (Annex B).

3 Analytical framework

3.1 Overview

3.1.1 Our analysis generally follows the competition assessment framework set out in the Hong Kong *Guideline on the Merger Rule* (the Guideline), which is issued jointly by the Competition Commission (the Commission) and the Communications Authority (CA).[8] This describes the general approach which the Commission intends to apply to the topics covered in the Guideline. The approach described will be adapted, as appropriate, to the facts and circumstances of the matter. We note that the framework set out by the Guideline is largely aligned with the relevant guidance in the EU and the UK.[9] We also rely on guidance from these jurisdictions where they provide additional detail.

3.1.2 The Merger Rule under the Competition Ordinance disallows mergers that are likely to "*substantially lessen competition*"[10], with an aim of increasing "*economic efficiencies and, ultimately, consumer welfare*". The Guideline recognises potential adverse effects of mergers, such as higher prices or a lessening of quality, choice, or innovation[11] and underlines "*protection of the process, not the competitor*".[12] That is, a merger that disadvantages a particular competitor does not necessarily contravene the Merger Rule provided that overall competition in the market is preserved.[13]

3.1.3 In line with the Guideline, our aim is to assess whether the merger will lead to a substantial lessening of competition in any of the relevant markets in which the Merging Parties operate. Where there are any such competition concerns, we also consider whether the remedies offered by CMHK appropriately address these concerns.

3.1.4 Our analysis involves the following steps:

(a) Defining the relevant markets;

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8 Available at: https://www.compcomm.hk/en/legislation_guidance/guidance/merger_rule/files/Guideline_The_Merger_Rule_Eng.pdf

9 EU Merger Regulation: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32004R0139

The CMA Merger Assessment Guidelines: https://assets.publishing.service.gov.uk/media/61f952dd8fa8f5388690df76/MAGs_for_publication_2021_--_.pdf

10 See Part 2 of Schedule 7; available at: https://www.elegislation.gov.hk/hk/cap619?xpid=ID_1438403537872_001

11 The Guideline, paragraph 3.3.

12 The Guideline, paragraphs 3.26-3.27.

13 The Guideline, paragraphs 3.26-3.27.

(b) Initial assessment via 'safe harbour thresholds' and other high-level considerations (aimed at identifying areas of potential concern);

(c) More detailed assessment of the effects of the merger (where necessary); and

(d) Assessment of remedies (where necessary).

We discuss each of these steps in more detail below.

3.2 Market definition

3.2.1 Our analysis of the anti-competitive effects of the Proposed Transaction starts with defining the relevant markets. It is necessary to identify the markets that the affected services belong to in order to assess the potential impact of the Proposed Transaction on the competitive constraints faced by the Merging Parties (which ultimately determines whether consumers might be harmed).

3.2.2 Products (and services) are considered to be part of the same market if enough buyers consider them to be substitutes, i.e. the threat of customers switching between the products/services in response to a small but significant increase in the price of one product is sufficient to discourage the said price increase.[14] This is referred to as 'demand-side substitution'. 'Supply-side substitution' is also relevant. Supply-side substitution takes place if suppliers that are currently not offering the given product may be able to start offering it, with relative ease, should the price of that product were to increase. This discourages price increases.

3.2.3 Substitutability needs to be assessed both in terms of substitution between different products (to arrive at the relevant product market definition), and in terms of the same product being offered in different geographical locations (to arrive at the relevant geographic market definition).[15]

3.2.4 There is relevant precedent available in relation to the definition of the markets considered in this case, the HKBN/WTT Holding Corp. (WTT) merger, which was assessed by CA in 2019, involved many of the same products and services as the present case. We consider whether the evidence in this case supports the same market definition as in the HKBN/WTT merger or whether any changes are required due to recent market developments. In some case, we do not need to come to a definitive view on whether certain products should be included in (or excluded from) a particular market because this inclusion (or exclusion) does not impact our competitive assessment.

14 Guideline on the Second Conduct Rule, paragraphs 2.10 and 2.11. Available at: https://www.compcomm.hk/en/legislation_guidance/guidance/second_conduct_rule/second_conduct_rule.html

15 Guideline on the Second Conduct Rule, paragraph 2.6.

3.3 High-level assessment

3.3.1 Under the Guideline, there are two 'safe harbour measures' that can be used to indicate whether a transaction is likely to raise any competition concerns. Where a merger meets either of these thresholds, the CA is unlikely to assess it. On the other hand, if neither of the thresholds are met, further investigation may be needed to explore the likely anti-competitive effects of the merger. The two measures and their respective thresholds are:[16]

(a) **Market share measures** – A proposed transaction falls under the safe harbour threshold where the CR4[17] is less than 75%, and where the ex-post market share of the merging parties is less than 40% and where the CR4 is 75% or more, and where the ex-post market share of the merging parties is less than 15% of the relevant market.[18]

(b) **The Herfindahl-Hirschman Index (HHI)** [19] – Under the Guideline, transactions are likely to demand further investigation if they cause an increase in the HHI in any relevant markets of:

(i) more than 100, where the post-merger HHI lies between 1,000 and 1,800; or

(ii) more than 50, where the post-merger HHI is more than 1,800.

3.3.2 We note that the safe harbour thresholds are not always determinative, i.e. the CA may decide to investigate or not investigate a particular market regardless of the results of the safe harbour tests. If the safe harbour thresholds are exceeded, it does not automatically imply that there are significant competition concerns. In our initial analysis, we assess both the safe harbour thresholds and other market characteristics to come to a view as to whether a particular market requires a more in-depth investigation.[20]

3.3.3 Given the results of this high-level assessment, we found that an in-depth assessment was not necessary in case of the following markets: retail local fixed voice services, retail mobile services, mobile access network services, access to ETF, external telecommunications services and IT services.

16 The Guideline, paragraphs 3.14-3.19.

17 This measure reflects the combined market shares of the four largest operators in any relevant markets after the merger.

18 The Guideline, paragraph 3.15.

19 The HHI is a standard measure of market concentration used in economic analysis that is based on the market shares of all companies in the market. The HHI is calculated by taking the square of each firm's market share and summing all values together. It can range between 0 and 10,000, with lower values indicating less concentrated markets (i.e. greater competition).

20 The Guideline, paragraph 3.20.

3.4 Detailed assessment

3.4.1 Where the high-level assessment is not sufficient to alleviate possible competition concerns arising from the merger,[21] we undertake more detailed analysis to determine whether the Proposed Transaction has, or is likely to have, the SLC Effect in Hong Kong.

3.4.2 Beyond the assessment of market shares and market concentration, Schedule 7 of the Competition Ordinance outlines a non-exhaustive list of factors that may be considered:

(a) the extent of competition from competitors outside Hong Kong;

(b) whether the acquired undertaking, or part of the acquired undertaking, has failed or is likely to fail in the near future;

(c) the extent to which substitutes are available or are likely to be available in the market;

(d) the existence and height of any barriers to entry into the market;

(e) whether the merger would result in the removal of an effective and vigorous competitor;

(f) the degree of countervailing power in the market; and

(g) *the nature and extent of change and innovation in the market.*[22]

3.4.3 Our assessment considers the following potential (anti-)competitive effects that can arise from mergers: horizontal, vertical, coordinated and conglomerate effects (depending on the relationship between the Merging Parties in the given market). We discuss each in more detail below. We first focus on unilateral (non-coordinated) effects in relation to each of these types of theories of harm, then consider coordinated effects, followed by efficiency effects.[23] For markets where there are potential competition concerns, relevant potential (anti-) competitive effects will be discussed and assessed. For details, please refer to Sections 5 to 8.

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21 These services are: Fixed local access network services, retail fixed internet access services, leased lines and mobile backhaul services and retail multiple-play services.

22 Schedule 7 of the Competition Ordinance, Section 6. Available at: https://www.elegislation.gov.hk/hk/cap619

23 The Guideline, paragraphs 3.32, 3.80, 4.2;

EC guidance on horizontal mergers (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52004XC0205(02)) , paragraphs 5, 22;

EC guidance on non-horizontal mergers (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52008XC1018(03)), paragraphs 4, 5, 17.

3.4.1 Unilateral horizontal effects

3.4.4 Horizontal effects occur when merging parties operate in the same market(s). By removing a competitor from the market, the merger could lead to a reduction in the competitive constraints faced by the merging parties, and in a second round, their rivals (see the Guideline, paragraphs 3.32-3.33).

3.4.5 This is because after a merger, the merging parties face lower incentives to keep prices low (and/or to maintain non-price conditions). Specifically, if one of the parties raises prices after a merger, some of the customers who would have switched to competitors are instead recaptured by the other arm of the merged entity. In other words, the merger lifts the competitive constraint each merging party imposes on the other.

3.4.6 The assessment of horizontal effects is therefore focused on the strength of the competitive constraint the merging parties impose on each other before the merger. Such an assessment normally involves an analysis of market shares and closeness of competition (via looking at pricing strategy, similarity of product offering, etc.).

3.4.2 Unilateral vertical effects

3.4.7 Vertical effects arise when the merging parties have a vertical relationship, i.e. an existing relationship for the supply of a service from an upstream to a downstream market. Following the merger, the incentives of the parties may change in relation to the supply or acquisition of these services.

3.4.8 Generally, vertical mergers are less likely to be considered anti-competitive compared to horizontal mergers, as firms with a vertical relationship do not compete with each other directly (rather, their products/services can be considered complementary) (see the Guideline, paragraphs 3.77-3.80; EC guideline on non-horizontal mergers, paragraphs 11-14).

3.4.9 However, a vertical merger can lead to a lessening of competition by making it more likely that the merging parties engage in foreclosure of rivals. As set out in the Guideline[24] this may take two forms.

(a) **Input foreclosure**: the upstream arm of the merged entity restricts access to an important input for its downstream competitors. This reduces the ability of its downstream competitors to compete in the downstream market – thereby giving advantage to the downstream arm of the merged entity.

24 The Guideline, paragraph 3.80.

(b) **Customer foreclosure**: the downstream arm of the merged entity stops (or reduces) its purchases from upstream competitors, foreclosing upstream competitors from accessing important groups of end-customers. This reduces the ability of the upstream competitors to compete in the upstream market – thereby giving advantage to the upstream arm of the merged entity.

3.4.10 As set out in the Guideline,[25] foreclosure may be full or partial: the merged entity may stop sales of an important input to downstream competitors completely (full foreclosure), or it may offer the input at less favourable terms, e.g. higher prices (partial foreclosure).

3.4.11 As set out in the Guideline[26] and the EC guideline on non-horizontal mergers,[27] the framework for assessing the risk of foreclosure involves assessment of the Merged Entity's **ability** to foreclose, its **incentive** to foreclose, and the likely **effects** on end-consumers.

(a) **Ability** is assessed based on whether the Merged Entity will have market power in the relevant market from which it might engage in foreclosure. For example, in case of input foreclosure, if the Merged Entity does not have market power in the upstream market, in the event of an attempt to foreclose downstream competitors, they could simply bypass the Merged Entity and seek better terms from other upstream entities.

(b) **Incentive** is assessed based on whether engaging in foreclosure would be profitable for the Merged Entity. For example, in case of input foreclosure, by engaging in foreclosure, the Merged Entity is likely to lose profits upstream (as it is restricting sales to the downstream market), but gain profits in the downstream market (as downstream competitors are weakened). The combined effect on the Merged Entity's profits needs to be positive for the Merged Entity to have incentives to foreclose.

(c) In terms of **effects**, one needs to consider the likely effects on prices (and quality) offered to end-consumers. For example, in case of input foreclosure, detrimental effects are more likely if the costs of the upstream service constitute a significant part of the price paid by consumers. One would also need to consider any potential countervailing effects (e.g. efficiencies) from the merger.

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25 The Guideline, paragraph 3.82.

26 The Guideline, paragraphs 3.83-3.84.

27 EC guideline on non-horizontal mergers, paragraphs 35, 40, 47-50.

3.4.3 Unilateral conglomerate effects

3.4.12 Conglomerate effects arise when the merger allows the parties to leverage a strong market position in one market into a related market, e.g. via tying / bundling several products, and in doing so marginalising competitors.[28]

3.4.13 Conglomerate effects are not covered explicitly in the Guidelines. The European Competition Guidelines state that conglomerate mergers are similar to vertical mergers in that they involve a merger between complementary services, which entails significant scope for efficiencies. However, there is scope for foreclosure via bundling or tying – the Merged Entity may leverage market power from one market into another via bundling or tying the relevant services together (see EC guideline on non-horizontal mergers, paragraphs 11-14).

3.4.14 There is scope for conglomerate effects arising from this merger given that HKBN is primarily a fixed internet service provider, while CMHK is primarily a mobile services provider. Fixed internet access and mobile services are sometimes purchased together by customers, meaning that bundling and tying can take place. However, bundling and tying strategies need not have anti-competitive effects.

3.4.15 The key considerations for whether, after the merger, such tying or bundling of fixed and mobile services may be detrimental to competition is whether such strategies would be capable of foreclosing competitors. As such, the relevant analytical framework mirrors the one applied in relation to vertical mergers (discussed above): the factors to consider are whether the Merging Parties would have the ability and incentive to foreclose, and the likely effect on consumers (see EC guideline on non-horizontal mergers, paragraphs 35, 40, 47-50).

3.4.4 Coordinated effects

3.4.16 As set out in the Guideline[29], coordinated effects consider whether, after the merger, remaining firms in the market may be more able – and more likely – to coordinate, leading to a reduction in competition. Coordination may take place in relation to prices, quality, customer segmentation and other aspects of competition (e.g. dividing a market up by geography). Coordination may transpire in the form of formal agreements or of implicit understanding.

[28] Bundling refers to selling two or more products together. It can be pure bundling, where products are only sold as a package in fixed proportions, or mixed bundling, where products are available separately but at a higher combined price than the bundled offer. Tying occurs when purchasing one product requires buying another product This can be technical tying, where the tying product only works with the tied product and not competitors' alternatives, or contractual tying, where customers must agree to buy only the tied product, restricting competition.

[29] The Guideline, paragraph 3.34.

3.4.17 An assessment of coordinated effects should consider whether the changes in the market associated with the merger might make coordination more likely. At paragraph 3.34, the Guideline sets out, at a high-level, some relevant factors:

> *"Conditions conducive to coordination typically include concentrated markets, product homogeneity and transparent pricing."*

3.4.18 EC guidance considers that coordination is more likely to take place in markets where it is relatively simple to reach a common understanding on the terms of coordination (for example, it is easier to coordinate in relation to the price of a few products that are reasonably homogenous compared to a large number of differentiated products that compete with each other).

3.4.19 The EC also sets out three criteria that are necessary for coordination to be sustainable (also known as the 'Airtours criteria', set out in the EC guideline on horizontal mergers, paragraphs 40-41, 45).

(a) **Transparency**: the coordinating firms must be able to monitor to a sufficient degree whether the terms of coordination are being adhered to.

(b) **Deterrence**: maintaining the agreement requires that there is some form of credible deterrent mechanism that can be activated if deviation is detected.

(c) **External stability**: the reactions of outsiders, such as current and future competitors not participating in the coordination, as well as customers, should not be able to jeopardise the outcome of the coordination.

3.4.20 The reduction in the number of firms in a market may, in itself, be a factor that facilitates coordination, particularly if only a few firms remain in the market after the merger, or if the merger involves a 'maverick' firm that has a history of disrupting coordination e.g. as a result of its aggressive pricing strategy (see the Guideline, paragraphs 3.34-3.35). Another factor to consider is whether the business strategy of the merged entity is likely to be similar to those of other competitors. Evidence of past coordination may also be indicative that coordinated effects need to be considered in detail (see the EC guideline on horizontal mergers, paragraph 41-43).

3.4.5 Efficiencies

3.4.21 As set out in the Guideline, paragraph 4.2, a merger assessment should consider efficiencies that are likely to arise as a result of the merger, as in some cases these can outweigh the detrimental effects the merger might have on competition. That is, if a merger results in merger specific and verifiable improvements in quality of service, reductions in (variable) cost or other benefits for consumers, any such effects should be taken into account in assessing the net competitive impact of a proposed transaction.

3.4.22 According to paragraph 4.8 of the Guideline, to demonstrate relevant efficiencies from the merger, the merging parties need to demonstrate that:

(a) The efficiency gains occur as a direct result of the merger;

(b) the efficiencies must be clearly identified and verified; and

(c) the efficiencies will be achieved as a direct result of the merger (i.e. they are unlikely to be achieved through any means absent the merger).

3.4.23 [redacted]. [30]

3.4.24 However, CMHK has not submitted detailed evidence to demonstrate that the required conditions set out above hold. As such, we do not consider efficiencies further in this report.

3.5 Commitments

3.5.1 As set out in the Guideline, paragraphs 5.9-5.10, Section 60 of the Competition Ordinance provides that CA may accept from a person a commitment to take an action or refrain from taking action that CA considers appropriate to address its concerns about a possible contravention of, inter alia, the Merger Rule, in return for CA's agreement not to commence an investigation, or bring proceedings in the Competition Tribunal, or to terminate any investigation or proceedings that have been commenced. Where we identify competition concerns, we consider whether remedies offered by CMHK are capable of effectively addressing these concerns, i.e. maintaining competition in the affected markets.

30 [redacted].

4 Market definition

4.1 Overview

4.1.1 As the first step in our analysis, we have considered the relevant markets for each of the services identified in Section 2.2:

(a) Retail fixed internet access services;

(b) Fixed local access network services;

(c) Leased lines and mobile backhaul services;

(d) Retail multiple-play services;

(e) Retail local fixed voice services;

(f) Retail mobile services;

(g) Mobile access network services;

(h) Access to external telecommunications facilities;

(i) External telecommunications services; and

(j) IT services.

4.1.2 We discuss each of these markets in more detail below.

4.2 Retail fixed internet access services

4.2.1 Fixed internet access services refer to provision of connectivity that provides customers with access to the internet via a fixed telecommunications network. This can involve provision via different technologies (fibre, cable etc.), at different speeds, with various service specifications (business customers may require dedicated upload/download bandwidth and secure connections between different sites, while residential customers normally do not have such requirements).

4.2.2 The Merging Parties are both active in the supply of retail fixed internet access services. Within this market definition, OFCA and competition authorities in other jurisdictions have typically considered up to three customer segments – residential customers, small and medium-sized business customers, and large business customers.[31] This is because there may be differences in services required by each customer group. Residential customers typically require more standard and simple internet access, whereas large business customers require more tailored services such as virtual private networks (VPNs) and dedicated lines.

31 HKBN/WTT merger assessment, page 47-48; M.6990 - Vodafone/Kabel Deutschland page 34, available at: https://ec.europa.eu/competition/mergers/cases/decisions/m6990_571_2.pdf

4.2.3 The EC generally considers residential and small business customers as one market and large business customers as another market, noting that the requirements of small businesses and residential customers are typically similar, while large business customers may require more sophisticated services.[32]

4.2.4 As CMHK is not active in the business segment, for practical purposes we focus our analysis on the residential segment. Note, however, that our conclusions would not be affected if the business segment was included in the same market. Therefore, for this assessment it is not necessary to arrive at a definitive view on whether residential and corporate customers are in the same market.[33]

4.2.5 Regarding segmentation by technology and speed: in line with OFCA's previous HKBN/WTT decision[34] and Ofcom's view,[35] we analyse different technologies and speeds within the same market. In any event, we find that the market shares of major competitors are broadly similar when looking at services above and below 1 Gbps, meaning that segmenting the market by speed would not materially affect our conclusions.[36] Nevertheless, we do consider differences in operators' speed offering as part of our analysis of the closeness of competition.

4.2.6 Mobile internet access services provided at a fixed location (fixed wireless access, FWA) are sometimes argued to compete directly with fixed internet access. In the HKBN/WTT decision, FWA was considered to be materially more expensive and slower than fixed internet, and was therefore excluded from the market definition. With the improvement of technology (e.g. 5G), FWA services are becoming more competitive, though they still have their limitations (e.g. they can have data caps).[37] In any case, the inclusion or exclusion of FWA in the market would not materially affect our assessment, as this segment is very small relative to the wider internet access services market. As such, for this assessment, it is not necessary to determine whether FWA forms part of the same market as fixed internet services.[38]

32 This is set out e.g. in the Vodafone/Liberty Global case – see Case M.8864 - VODAFONE / CERTAIN LIBERTY GLOBAL ASSETS Page 24, available at: https://ec.europa.eu/competition/mergers/cases/decisions/m8864_7363_3.pdf

33 We find that that the Proposed Transaction does not appear likely to materially lessen competition when considering the residential segment. Based on data from OFCA, if the business segment was included in the same market, the Merged Entity's share of the relevant market would be (marginally) lower, implying that a lessening of competition is even less likely under this alternative market definition. See Table 4 and Table 6 in Section 6.2.

34 HKBN/WTT merger assessment, page 48-49.

35 Ofcom is the UK's regulator communications services. See Ofcom Wholesale Fixed Telecoms Market Review 2021--26, paragraph 6.3-6.58, available at: https://www.ofcom.org.uk/phones-and-broadband/telecoms-infrastructure/2021-26-wholesale-fixed-telecoms-market-review

36 See paragraph 6.2.3 onwards for an analysis of market shares by speed segment.

37 See for example https://web.three.com.hk/terms/supfup/index-en.html on 5G broadband fair usage policy

38 See Paragraph 6.2.8 in Section 6.2.

4.2.7 A third party has expressed a view that fixed internet access services and mobile services should be considered part of a single relevant 'fixed-mobile convergence' (FMC) market, as the Merged Entity will be able to compete across both of these markets and offer bundled services. However, fixed internet and mobile services are not generally substitutable either from the demand-side perspective (e.g. fixed internet cannot substitute for mobile internet) or the supply-side perspective (e.g. a mobile operator cannot easily develop its own fixed internet offering). As such, economic theory indicates that fixed internet access services and mobile services belong to separate product markets. However, we do consider concerns related FMC bundles specifically.[39]

4.2.8 In relation to the geographic market definition: We observe that, unlike in the EU/UK, there is evidence that indicates that prices offered by a given operator may vary materially from one customer to another in fixed internet access services in Hong Kong. In particular:

(a) Operators do not appear to publish clear Hong Kong-wide 'headline' prices for specific packages. Instead they only provide prices after an address is specified, indicating prices might differ by address; and

(b) In their submissions to OFCA, operators have indicated that they vary prices based on a number of factors, including competitive conditions (i.e. the number of operators present); and have in some cases indicated that the prices charged for specific packages can vary significantly.

4.2.9 Furthermore, we observe that the number of fixed internet access networks varies by building. This is discussed in more detail in the following Section (on the market for fixed local access network services). Taken together with the fact that operators can vary pricing by address, this implies that the relative reduction in competitive intensity resulting from the Proposed Transaction may vary by building. For example, at buildings where there would still be 4 independent networks after the Proposed Transaction, operators would likely find it more difficult to increase prices than in buildings where there will only be 2 independent networks available after the merger, all else the same.

4.2.10 Given that the relative reduction in competitive intensity resulting from the Proposed Transaction (and hence the likelihood of price increases) varies depending on the number of competing networks present, economic theory indicates it is appropriate to define different geographic markets depending on the number of competing networks present (i.e. buildings with two competing networks, three competing networks, etc.). This approach is similar to the one adopted by Ofcom in its Telecoms Access Review, in which different geographic markets are defined based on the number of competing networks (referred to as

39 See Sections 4.5 and 8.

Area 1, Area 2 and Area 3). Note that these "areas" are not necessarily contiguous regions, but represent a collection of UK postcodes with a certain number of competing networks.[40]

4.3 Fixed local access network services

4.3.1 Fixed local access network services refer to the provision of access to last-mile fixed infrastructure necessary to deliver fixed internet access to end-users (i.e. this market is upstream of the retail fixed internet access services market).

4.3.2 FNOs may lay their own networks in buildings in order to directly access the customers' premises without the need to rely on access to other networks for provision of competing services. However, there may be physical limitations in common areas of buildings and rolling our parallel networks might not be practical in some cases. In that case, FNOs might rely on other networks to get access to end-customers.

4.3.3 In terms of the geographical market definition: in principle, competition in fixed local access network services takes place at a building level: competitive conditions may differ across buildings, and access to one building cannot be substituted with access to another. In practice however, it is impractical to conduct a full assessment on a building-by-building basis, so the local markets are often 'aggregated' up (e.g. to areas with similar competitive conditions). In this case, in line with the approach set out above for retail fixed internet access services, we consider separately buildings where the Merging Parties are present and there is (i) one other competing network, (ii) two competing networks and (iii) three or more competing networks.

4.4 Leased lines and mobile backhaul services

4.4.1 A leased line is a dedicated, private telecommunications circuit that provides a fixed, point-to-point connection for consistent and secure data transmission between two specific locations. Leased lines can be offered at wholesale level for a number of use cases, including to facilitate the supply of retail fixed telecommunications services to large business users, such as providing fixed voice services (e.g. dedicated voice circuit between different branches of a business) or fixed internet services (e.g. internet direct connectivity).

4.4.2 Leased lines can also be wholesale inputs to mobile telecommunications services, for instance leased lines used for mobile backhaul services. In OFCA's HKBN/WTT

40 Ofcom Telecoms Access Review 2026-31, page 5-6, available at: https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-1-10-weeks/consultation-telecoms-access-review-2026-31/main-documents/volume-1-overview-summary-and-structure.pdf?v=392944

decision, leased lines were considered together with mobile backhaul.[41] Ofcom also included these services in the same market in its Wholesale Fixed Telecoms Market Review, based on supply-side substitution.[42]

4.4.3 Nevertheless, given that mobile backhaul is an input to mobile telecommunications services, it merits a separate assessment given the vertical relationship the parties hold in the proposed transaction (HKBN is a provider of leased lines, whilst CMHK is an MNO). As such, in Section 7, we consider whether the competitive conditions in the provision of mobile backhaul are similar to those in the provision of leased lines more generally. And, if there are differences between the two, whether there are any theories of harm, specific to mobile backhaul, that need to be addressed.

4.4.4 In terms of geographic market definition, the availability of the relevant fixed network infrastructure will determine whether a geographic segmentation is justified.[43] We understand that there are a large number of providers who have the necessary licenses to install leased line infrastructure, and we are not aware of material differences between competitive conditions across the area of Hong Kong. As such, for the purposes of the Proposed Transaction, the relevant geographic market for leased line services can be defined as the administrative area of Hong Kong.

4.5 Retail multiple-play services

4.5.1 Multiple-play services combine various telecommunications services into a single package. 'Quadruple-play' bundles include fixed voice service, fixed internet access, mobile service, and TV service. Any bundles that include 2 or 3 of the above services are often referred to as 'double-play' or 'triple-play' bundles.

4.5.2 Given CMHK and HKBN's respective presence in mobile and fixed services, as well as in fixed-mobile bundles, the merger might impact the provision of FMC bundles to residential customers.

4.5.3 In the HKBN/WTT merger[44], OFCA left the question open as to whether retail multiple-play services constitute a separate market, distinct from the individual markets for each component of the bundle. Given concerns raised by third parties, we analyse the possible conglomerate effects arising in relation to FMC bundles,

41 HKBN/WTT merger assessment, page 68.

42 Ofcom's Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26, para 6.74.

43 BT Group plc (BT)/EE Limited (EE) decision, paragraphs 15.54-15.57, available at: https://assets.publishing.service.gov.uk/media/56992242ed915d4747000026/BT_EE_final_report.pdf

44 HKBN/WTT merger assessment, page 60-61.

but we ultimately leave the market definition open as the precise product market definition would not affect our conclusions.

4.5.4 We leave the relevant geographic market for fixed internet services and mobile services open. This is because it is unclear at this stage whether pricing of FMC bundles is uniform across Hong Kong or if it varies by area. However, as we discuss in Section 8 below, this does not impact our assessment of this market.

4.6 Retail local fixed voice services

4.6.1 Fixed voice services relate to telephony services provided at a fixed location. The Merging Parties are both active in the supply of fixed voice services.

4.6.2 In the HKBN/WTT merger, retail mobile voice services were considered part of a separate market from retail local fixed voice services, as business customers did not view mobile voice as a sufficiently close substitute for fixed voice.[45] We note also that most competition authorities have considered mobile to be in a separate relevant market to fixed,[46] and none of the stakeholders suggested that a wider market should be considered. For these reasons, we treat mobile voice services and fixed voice services as belonging to separate markets.

4.6.3 In the HKBN/WTT merger,[47] OFCA considered the fixed voice services market to include both VoIP and traditional wireline telephony services, based on the demand substitutability between the two (customers are likely to be largely indifferent about which technology their voice services are provided with). We also consider that due to demand substitutability, the market should not be segmented by technology.

4.6.4 Another consideration is whether the residential and business segments form separate markets. For the purposes of the Proposed Transaction, there is no need to come to a definitive view on this issue. This is because the inclusion of the business segment does not materially affect the market structure or the Merging Parties' share, and hence it would not impact our assessment of the competitive impact of the merger.[48] [49]

45 HKBN/WTT merger assessment, page 32.

46 See e.g. the BT/EE decision, Section 10.

47 HKBN/WTT merger assessment, page 31-33.

48 See analysis in Section 9.1.

49 In the HKBN/WTT decision, the market definition was also left open in this respect.

4.6.5 Regarding the inclusion of external telecommunications services (ETS).[50] The HKBN/WTT decision excludes this segment from the market for retail local fixed voice services, as the features of ETS differ considerably from those of the fixed voice. The provision of ETS is highly competitive, with numerous providers beyond the four main FNOs (PCCW-HKT, HKBN, HGC and Cable TV). ETS also differ significantly from traditional fixed voice services in pricing structure, as they typically have higher prices and are billed per minute, whereas traditional fixed voice services are often charged at a flat fee.[51] For these reasons, we exclude ETS from the market for retail local fixed voice services.

4.6.6 We define the geographical market for local fixed voice services as the administrative region of Hong Kong.

4.7 Retail mobile services

4.7.1 Mobile services encompass the provision of wireless communications services through mobile networks, enabling users to access voice, text, and data services on the move. These services are delivered using cellular technologies such as 3G, 4G, and 5G, and rely on infrastructure including base stations, radio access network equipment, as well as licensed spectrum.

4.7.2 The Merging Parties are both present in this market, although HKBN is only present as an MVNO, i.e. it does not have its own mobile network or spectrum, but instead supplies mobile services via a wholesale access agreement.[52]

4.7.3 In the recent UK Vodafone/Three merger,[53] retail mobile services have been treated as a single market without further segmentation. This approach considers all customer segments, technologies (e.g. 4G, 5G), and speeds as part of the same relevant market. The main argument supporting this approach is the principle of supply-side substitutability – this suggests that a mobile operator providing services to one customer group, such as residential consumers, can easily offer similar services to another customer group, such as business customers. Supply-side substitutability also applies in relation to the type of services (e.g. voice or data).

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50 The ETS market includes international/interregional voice services such as the use of calling prefixes, callback services, telephone calling card services, VPN services, etc.

51 HKBN/WTT merger assessment, page 33.

52 We note that CMI (which is part of CMHK's group) is also present as an MVNO.

53 VODAFONE / HUTCHISON CMA report, page 72-73, available at: https://assets.publishing.service.gov.uk/media/6756f990f96f5424a4b877b7/Final_report_9_December_2024.pdf

4.7.4 The evidence reviewed and submissions indicate that similar arguments apply in Hong Kong, so we include different customer segments, technologies and types of services/speeds in the same market.

4.7.5 An operator expressed a view that post-paid services should constitute a separate market from prepaid services due to post-paid services generating more revenue. The EC considers prepaid and post-paid services to belong to the same market, as supply-side substitutability applies in this case as well[54] - i.e. a provider offering one type of service is typically able to offer the other without significant additional investment. The same argument applies in Hong Kong, so we include post-paid and prepaid services in the same market. Additionally, the EC typically considers retail international roaming services to be part of the retail mobile services market, as such services are often offered as a bundled component of standard mobile plans.[55] Our understanding is that this is also generally the case in Hong Kong. Accordingly, we include retail international roaming services within the retail mobile services market in our assessment.

4.7.6 In line with international practice,[56] we define the geographical market for retail mobile services as the administrative region of Hong Kong.

4.8 Mobile access network services

4.8.1 Mobile access network services relate to the mobile wholesale services that MVNOs need to procure to supply mobile services to end-customers if they do not own mobile assets, such as mobile spectrum and mobile infrastructure. Given CMHK is an MNO and provides MVNO access to downstream operators, such as HKBN and its competitors, the Proposed Transaction might impact competition in the market for mobile access network services.

4.8.2 In the previous HKBN/WTT merger case, the mobile access market was not examined.[57] The EC[58] typically defines the mobile access market as including access as well as mobile call origination services. The latter are services provided by MNOs (alongside access services) to originate calls on their mobile network. For the purpose of the assessment of the Proposed Transaction, there is no need to arrive at a precise market definition, as our conclusions would be the same under

54 CASE M.7018 - TELEFÓNICA DEUTSCHLAND/ E-PLUS, page 15, available at: https://ec.europa.eu/competition/mergers/cases/decisions/m7018_6053_3.pdf

55 Case No COMP/M.3920 - France Télécom / Amena, page 4, available at: https://ec.europa.eu/competition/mergers/cases/decisions/m3920_20051024_20310_en.pdf

56 We restrict the geographic scope to the administrative region of Hong Kong as we understand that the set of operators that are active and the offers available differ between Hong Kong and Mainland China.

57 HKBN/WTT merger assessment.

58 Case M.8864 - VODAFONE / CERTAIN LIBERTY GLOBAL ASSETS, page 59.

all reasonable market definitions (due to the merger not having a material impact on the market structure).[59]

4.8.3 We define the geographical market for mobile access network services as the administrative region of Hong Kong.[60]

4.9 Access to external telecommunications facilities

4.9.1 Access to ETF refers to the infrastructure used to connect Hong Kong with the rest of the world. This includes facilities such as submarine cables, overhead cables, and satellites.

4.9.2 In the HKBN/WTT[61] merger, the precise market definition was not investigated given only one of the parties to the merger was providing these services. We also consider that there is no need to establish a precise market definition, as HKBN has a very limited presence in the provision of these services. As such, as our conclusions would be the same under all reasonable market definitions (due to the merger not having a material impact on market structure).[62]

4.10 External telecommunications services

4.10.1 ETS comprise of international or cross-border voice services such as the use of calling prefixes, call back services, telephone calling card services, VPN services, and telephone services carried out over data communication networks such as the internet.[63] These services rely on ETF (which we discuss in Section 9.4).

4.10.2 The EC has historically viewed the provision of international voice telephony services as a separate market,[64] but in a more recent decision, the EC viewed the IDD market as part of the fixed telephony/voice market.[65]

4.10.3 HKBN/WTT[66] merger assessment did not find it necessary to arrive at a conclusion at whether ETS constituted a separate market, as no competition concerns arose

59 See Section 9.3.

60 In e.g. the BT/EE and the Telefónica Deutschland/E-Plus mergers, the market was defined as national. We restrict the geographic scope to the administrative region of Hong Kong as we understand that the set of suppliers that are active differ between Hong Kong and Mainland China.

61 HKBN/WTT merger assessment page 92.

62 See Section 9.4.

63 HKBN/WTT merger assessment, page 86.

64 E.g. V/JV.15 – BT/AT&T (1999).

65 M.8131 – Tele2 Sverige/TDC Sverige (2016).

66 HKBN/WTT merger assessment, page 90.

regardless. Our conclusion is the same: as our analysis in Section 9.5 shows, no competition concerns arise even if ETS are treated as a separate market.

4.11 IT services

4.11.1 IT services include the day to day management and operations of computing infrastructure and business applications to business customers, systems integration services, data centre services and cloud services. Services related to data centres, cloud services and systems integration, can be considered as elements of IT service needs, particularly for larger business customers.

(a) Data centres are secure, temperature-controlled facilities that house large-capacity servers and data storage systems. They are equipped with multiple power sources to ensure uninterrupted power supply, environmental controls such as air-conditioning and fire suppression and high-bandwidth internet connections.

(b) Cloud services is the provision of computing resources (hardware and software) to customers over the Internet. The customer benefits from the flexible and easy use of these IT resources with high performance and reliability without needing to develop an in-house IT/networking team or permanently purchase such resources, thereby reducing costs.

(c) Systems integration (SI) services include project management in buildings, Wi-Fi availability for customers such as hotels and venue operators, structure cabling and annual equipment maintenance. SI is the process in which multiple systems are connected to one common platform, providing benefits in infrastructure management, maintaining data integrity, and reducing data error.

4.11.2 These services were also considered in the assessment of the HKBN/WTT merger. In that assessment the exact market definition was left open. No competition concerns were found given the presence of a large number of players in the market and the small share of the merging parties.[67] Our conclusion is the same: as our analysis in Section 9.6 shows, the same conditions hold in case of this merger.

67 HKBN/WTT merger assessment, page 101.

5 Fixed local access network services

5.1 Overview

5.1.1 In the market definition Section above, we defined two markets related to fixed internet services:

(a) Market for fixed local access network services; and

(b) Retail fixed internet access services.

5.1.2 As discussed in Section 4.3, the market for fixed local access network services can be considered as the upstream market, providing the infrastructure required to deliver services in the downstream retail fixed internet access services market. In this Section, we provide our assessment of the market for fixed local access network services. We then discuss the downstream retail market in the following Section (Section 6).

5.1.3 The number of independent fixed networks determines the number of competitors in the provision of fixed local access network services. These competitors, can also offer services at the retail level. There are also other telecoms licensees that can offer retail services without their own network, relying instead on the purchasing of fixed local access network services.

5.1.4 The Merging Parties both operate their own fixed networks. Therefore, by reducing the number of independent networks, the Proposed Transaction may weaken competition in the market for fixed local access network services, which in turn could lead to less competition at the retail level.

5.1.5 We note that some respondents raised concerns in relation to competition in fixed internet access services stemming from network access. E.g. [redacted] states in a submission that: "*After the Potential Transaction, as a fixed/mobile network operator with a significant market position, CMHK could leverage building access constraints to further strengthen its own position in retail internet access markets by excluding / hindering fixed retail competitors to enter the building…*".

5.2 Precedent

5.2.1 Europe has seen numerous recent mergers between fixed internet service providers, such as Orange/Jazztel (Spain), [68] Vodafone/Liberty Global

[68] CASE M.7421 – ORANGE / JAZZTEL, decision available at: https://ec.europa.eu/competition/mergers/cases/decisions/m7421_3169_4.pdf

(Germany),[69] Altice/Portugal Telecom (Portugal),[70] Tele2/Com Hem (Sweden).[71] In all these mergers, the merging parties had their own fixed network infrastructure and were active in the retail internet access services market. The relevant authorities investigated horizontal concerns in each case.

5.2.2 Competition authorities' assessment of these mergers varied depending on the number of independent fixed networks present, the geographical distribution of these networks, and the size of the merging parties' networks (as well as their overlap). Authorities' decisions ranged from clearing the merger without remedies (Tele2/Com Hem) to requiring the divestment of one merging party's physical network infrastructure (Orange/Jazztel).

5.2.3 We note that after Proposed Transaction, there would be 4 independent networks remaining in Hong Kong[72] - which is more than in case of each of the above precedents. This is an important factor that points towards the Proposed Transaction being less concerning than the above mergers.

5.3 Unilateral effects

5.3.1 Overview of the Hong Kong market

5.3.1 Hong Kong has multiple FNOs with extensive coverage. Table 2 shows the number of buildings covered by each operator's customer access network for those where data is available for all access technologies. Self-built customer access network coverage is greatest – in building terms – for PCCW-HKT (who is assumed to hold full or nearly-full coverage), HKBN (circa [redacted] buildings), and HGC (circa [redacted] buildings). Cable TV is [redacted] largest operator.

5.3.2 As far as the coverage of operators' residential networks is concerned, we identify five FNOs with network coverage: PCCW-HKT, HKBN, HGC, Cable TV and CMHK. HKBN is [redacted] largest provider in terms on building coverage. According to CMHK's forecast, its network covers approximately [redacted] households as of October

69 CASE M.8864 – VODAFONE / CERTAIN LIBERTY GLOBAL ASSETS, decision available at: https://ec.europa.eu/competition/mergers/cases/decisions/m8864_7363_3.pdf

70 CASE M.7993 – ALTICE / PT PORTUGAL, decision available at: https://ec.europa.eu/competition/mergers/cases/decisions/m7993_849_3.pdf

71 CASE M.8842 – TELE2 / COM HEM HOLDING, decision available at: https://ec.europa.eu/competition/mergers/cases/decisions/m8842_457_3.pdf

72 See coverage analysis below.

2023 and, before the merger, it planned to roll its network out to an additional [redacted] households during 2025-2027.[73] [74]

Table 2 Buildings covered by self-built customer access networks by operator, all technologies

	Residential buildings	Non-residential buildings	Total buildings
HKBN	[redacted]		
CMHK	[redacted]		
Merged Entity	[redacted]		
PCCW-HKT	[redacted]		
HGC	[redacted]		
Cable TV	[redacted]		
[redacted]			

Source: OFCA March 2024 self-built customer access network data supplemented by HKBN and CMHK's March 2025 RFI submissions

Note: PCCW-HKT data is not available; OFCA maintains a working assumption that PCCW-HKT has coverage in all buildings in Hong Kong (i.e. circa [redacted]). Buildings with both residential and non-residential services are included under residential buildings.

5.3.3 [redacted].

5.3.4 The above implies that after the Proposed Transaction, Hong Kong would still have four independent networks with widespread coverage. 5-to-4 mergers in this market are typically not considered to raise significant competition concerns as besides the Merged Entity, there will still be three other competing networks after the merger (see, for example, Vodafone NZ/TelstraClear in New Zealand in 2012 and TPG/iiNet in Australia in 2015).[75]

[73] In Annex 6 of its RFI response, CMHK outlines plans to increase coverage by [redacted] households in 2025, [redacted] in 2026, and [redacted] in 2027.

[74] Note that we are unable to assess safe-harbour thresholds directly as we cannot calculate conventional market shares for this market.

[75] We are not aware of appropriate examples of 5-to-4 mergers from the EU or the UK that were analysed in detail. For Vodafone NZ/TelstraClear, see: https://comcom.govt.nz/news-and-media/media-releases/archive/commerce-commission-clears-vodafones-purchase-of-telstraclear . For TPG/iiNet see: https://www.accc.gov.au/media-release/accc-to-not-oppose-acquisition-of-iinet-by-tpg .

5.3.5 However, it is not universally the case that each household in Hong Kong would have access to four different networks, which may mean that competitive conditions (and the impact of the merger) may vary at the building level. We analyse competition at the building level in the next subsection.

5.3.2 Competition at the building level

5.3.6 While there are five major FNOs with self-built customer access networks in Hong Kong, there are locations / buildings, where only three or four FNOs are currently present. In those buildings, the Proposed Transaction could effectively be a 4-to-3 or a 3-to-2 merger.

5.3.7 Building-level differences in competition could be exploited by operators, especially if price (or other offer terms) of internet packages can vary by customer. Evidence from some licensees indicates that there is price differentiation at the building level in Hong Kong, implying that the merger may give rise to significant lessening of competition in areas with a limited number of independent networks after the merger.[76]

(a) [redacted], explained that it does not offer uniform service packages across Hong Kong and that differences include "*any discounts offered to meet competition*".

(b) [redacted] states in relation to its pricing strategy that: "*Several factors influence* [redacted]*'s offers to customers, including the contract status, segment profile (such as desired speed of the customer), geographic location, building type, and the customer's current service plan.*".

(c) [redacted] states that its pricing makes "*corresponding adjustments based on competitions'* [sic] *pricing strategies*".

5.3.8 To assess how the Proposed Transaction might affect competition at the building level, we have conducted a building level overlap analysis. We consider the buildings with existing coverage from both CMHK and HKBN, i.e. buildings where there will be a reduction in the number of competing independent networks after the merger. We note that such buildings constitute almost the entirety of CMHK's network: more than [redacted]% of buildings covered by CMHK are also covered by HKBN.

5.3.9 Our analysis in Table 3 shows that, of the [redacted] buildings with coverage from both CMHK and HKBN, [redacted] (i.e. [redacted]%) have just one other competitor and [redacted] ([redacted]

76 Source: licensees' responses to OFCA's information request. [redacted] did not respond to OFCA's RFI. [redacted] stated that its "*pricing strategy is not based on different geographies in Hong Kong.*"

%) have coverage from two other operators.[77] The remaining [redacted] buildings are served by both CMHK/HKBN and at least three other operators.

Table 3 Competing network coverage in buildings where CMHK and HKBN's networks overlap, all technologies

	Residential buildings	Non-residential buildings	Total buildings
Overlap between HKBN and CMHK networks, of which are:	[redacted]		
Buildings with one other operator			
Buildings with two other operators			
Buildings with three or more other operators			

Source: *OFCA data as at March 2024 supplemented by Parties' March 2025 RFI responses*
Note: *Analysis based on OFCA's working assumption that PCCW-HKT has full coverage.*

5.3.10 Generally, the fewer competitors remain after the merger, the larger the relative impact of the Proposed Transaction on competition for a given building. It may be difficult for other operators to offset these effects by rolling out to the affected households. As we understand from OFCA as well as submissions from third parties, there are difficulties in accessing some buildings in Hong Kong for installation of their own in-building telecommunications systems therein for service provision to end-customers.[78] These barriers to entry could mean that the Merged Entity would be able to raise prices for households with limited choice, without the threat of new operators being able to enter.

5.3.11 We further note that in the counterfactual absent the merger, CMHK planned to roll out its network to additional [redacted] households between 2025 and 2027[79] and potentially more households thereafter. Given HKBN's substantial coverage, it would imply that in the counterfactual the overlap between HKBN's and CMHK's networks would be greater than [redacted] buildings.

5.3.12 Based on OFCA's data, there are around [redacted] buildings where HKBN is present and CMHK is not. Of those buildings, [redacted]% of buildings have only one or two other competing networks. It is reasonable to assume that in the counterfactual without

77 OFCA maintains a working assumption that PCCW-HKT has coverage in all buildings of Hong Kong, implying that there are no premises where CMHK/HKBN are the only network operators.

78 HKBN/WTT merger assessment, page 81.

79 See paragraph 5.3.2.

the merger, CMHK would roll out its network to some of these buildings (in order to achieve its objective of increasing fibre coverage). This would increase the number of competing networks to 3 and 4 in the counterfactual.

5.3.13 On the other hand, if the merger is approved, the number of competing networks would remain at its current level of 2-3 networks, which would represent a reduction in competition vis-à-vis the counterfactual (in which CMHK has rolled out its own network to these buildings). Therefore, the impact of the merger on competition at a building level is likely to be greater than Table 3 might suggest. That is, the merger could have a material impact on competition at a building level, with a significant share of buildings that are (i) currently covered by both networks or (ii) would be covered by both networks in the counterfactual, experiencing a reduction in competition from 3-4 networks to 2-3 networks.

5.3.14 Operators may be able to take advantage of such localised lessening of competition, by denying access to these buildings to their competitors, leading to an increased risk of higher retail prices to end-customers in those buildings, as we understand providers in Hong Kong have the ability to differentiate prices at a building level.

5.3.15 This issue is also raised in one of the submissions to OFCA. It states: “there is reason for concern that the Proposed Acquisition may result in CMHK having substantially increased ability and incentive to deny building access to its competitors in providing fixed-line services in a way that would substantially harm competition in Hong Kong to the detriment of end-users”.

5.4 Coordinated effects

5.4.1 As set out in the previous subsections, most households in Hong Kong would be covered by four independent networks even after the Proposed Transaction, which is generally expected not to raise competition concerns. However, there will be a number of buildings post-merger with only one or two networks competing with the Merged Entity.

5.4.2 There is in principle a risk of coordinated effects that would take the form of existing network operators in buildings refusing to offer access to their retail rivals to their in-building infrastructure. Considering the Airtours criteria set out in Section 3.4.4 in turn:

(a) This strategy could be sustainable if it is possible to monitor whether access to the in-building infrastructure of rivals has been granted to access seekers and by which operator (transparency criterium).

(b) In such a case, other operators could "punish" the deviating operator (that had offered access) by either also offering access to access seekers or by reducing retail prices (deterrence criterium).

(c) Such an outcome could be "stable", in buildings where there are difficulties in installing additional in-building telecommunications systems (external stability criterium).

5.4.3 As such, in buildings where the merger leads to a reduction in the number of network rivals to 1 and potentially 2, there could in principle be an increased risk of such coordinated effects.

5.5 Other concerns raised by third parties

5.5.1 A third party also raised a concern that the Merged Entity may become so large that other operators might not be able to match the Merged Entity in terms of investment, ultimately discouraging investment in the market. However, other third parties also raised a concern that HKBN might have more limited incentives to invest after the merger. While the Merged Entity may become a stronger competitor, it is unlikely that its market power will increase significantly (subject to the relevant remedies) – and the remaining 4 large players can be expected to continue to compete intensely. Therefore, it is unlikely that the merger would have a material detrimental effect on customer outcomes through a reduction in network quality due to falling investments.[80]

5.6 Conclusions

5.6.1 There are a majority of buildings in Hong Kong where fewer than five operators are currently present. Obtaining access to these buildings might be complicated due to e.g. space limitation preventing the installation of in-building systems. In these buildings, the merger might be equivalent to a 4-to-3 or a 3-to-2 merger which would imply a material lessening of competition. The merger would also prevent the increase in competition in many households that CMHK would roll out to in the near future absent the merger (with the majority of these households currently having only 2 or 3 networks).

5.6.2 Operators may be able to take advantage of such localised lessening of competition, as price differentiation at the building level appears to be present in the Hong Kong fixed internet market (i.e. operators may vary prices they offer

80 CMHK will have reduced incentive to continue expanding or upgrading its network given the access to HKBN's network. However, this is unlikely to materially affect customers outcomes given the continued competition between the remaining networks.

depending on the number of competitors present), and there can be barriers to entry that prevent other operators from rolling out in the affected buildings.

5.6.3 Given the above, there is the potential for the Proposed Transaction to substantially lessen competition as a result of a reduction in the number of independent fixed networks in some buildings in Hong Kong to two, and potentially three. This reduction in competition may have a detrimental effect on competition in the downstream retail internet access services market, as fixed operators may face higher local access costs or may be denied access to buildings, which has the potential to restrict price competition in the downstream market.

6 Retail fixed internet access services

6.1 Overview

6.1.1 Historically, PCCW-HKT was the sole incumbent in the fixed internet access services market. The introduction of market liberalisation in 2003 and the resulting increase in competition have driven significant investment in fibre network infrastructure. As of March 2025, the household penetration rate of internet access services in Hong Kong reached 97.3%, with approximately 93.7% of residential subscribers and 73.1% of non-residential subscribers using broadband services with connection speeds of 100 Mbps or above.[81]

6.1.2 There are 29 FNOs in the market, of these five operators have rolled out extensive networks for the provision of retail fixed internet access services: PCCW-HKT, HKBN, HGC, Cable TV and CMHK.

6.1.3 The Merging Parties compete with each other in the retail fixed internet access market for residential customers. As such, the Proposed Transaction could lead to a lessening of competition at the retail level, with the Merged Entity potentially having reduced incentives to compete on price and non-price terms. To assess this theory of harm, we consider the nature of competition in the retail fixed internet market and the closeness of competition between the Merging Parties.

6.1.4 We note that the outcomes in this market are closely linked to the upstream competition in the fixed local access network services market (discussed in Section 5). In particular, we have identified that competitive condition in the upstream market may differ across Hong Kong due to differences in network coverage and the difficulties operators may experience when trying to access buildings (which may lead to differences in retail internet access prices). To the extent that these upstream competition issue is addressed, competitive conditions in the retail internet access market should be sufficiently homogenous to conduct our assessment across the territory of Hong Kong. Our analysis proceeds on this basis; i.e. this Section considers whether there is competition concern beyond the ones stemming from issues in the upstream fixed local access network services market.

6.1.5 Note that the relevant precedent in relation to this market is the same as in relation to the fixed local access network services market (see Section 5.2).

81 Information from OFCA.

6.2 Unilateral effects

6.2.1 Market share analysis

6.2.1 As discussed in Section 5, there are five existing FNOs with good fixed internet coverage across Hong Kong. After the merger, the number of FNOs will reduce to four. The market shares for all providers across the residential and business segments and overall in the retail fixed internet market are shown in Table 4, Table 5, and Table 6 below.

Table 4 Retail residential broadband internet subscriptions by operator, February 2025 (number of subscriptions and market shares)

	<10 Mbps	10-100 Mbps	≥100 Mbps	Total
HKBN	[redacted]	[redacted]	[redacted]	[redacted]
CMHK	[redacted]	[redacted]	[redacted]	[redacted]
Merged Entity	[redacted]	[redacted]	[redacted]	[redacted]
PCCW-HKT	[redacted]	[redacted]	[redacted]	[redacted]
HGC	[redacted]	[redacted]	[redacted]	[redacted]
Cable TV	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	**2,523,404**	**2,696,639**

Source: OFCA data

Note: Access lines of broadband internet subscriptions as at February 2025. Values for HKBN, CMHK, [redacted] include all group subscriptions.

Table 5 Retail business broadband internet subscriptions by operator, February 2025 (number of subscriptions and market shares)

	<10 Mbps	10-100 Mbps	≥100 Mbps	Total
HKBN	[redacted]	[redacted]	[redacted]	[redacted]

	<10 Mbps	10-100 Mbps	≥100 Mbps	Total
CMHK	[redacted]			
Merged Entity	[redacted]			
PCCW-HKT	[redacted]			
HGC	[redacted]			
[redacted]				
Cable TV	[redacted]			
[redacted]				
Total	[redacted]		**211,551**	**289,751**

Source: OFCA data

Note: Access lines of broadband internet subscriptions as at February 2025. Values for HKBN, CMHK, [redacted] include all group subscriptions.

Table 6 Overall retail broadband subscriptions by operator, February 2025 (number of subscriptions and market shares)

	<10 Mbps	10-100 Mbps	≥100 Mbps	Total
HKBN	[redacted]			
CMHK	[redacted]			
Merged Entity	[redacted]			
PCCW-HKT	[redacted]			
HGC	[redacted]			
Cable TV	[redacted]			
[redacted]				
Total	[redacted]		**2,734,955**	**2,986,390**

Source: OFCA data

Note: Access lines of broadband internet subscriptions as at February 2025. Values for HKBN, CMHK, [redacted] include all group subscriptions.

6.2.2 As set out in Section 4.2, the relevant market is the residential market, without any segmentation by speed or technology (see Table 4, "Total" column). PCCW-HKT ([redacted]%) and HKBN ([redacted]%) are the two largest players in this market, with HGC, Cable TV, and CMHK together making up around [redacted]% of the market. With around [redacted] subscribers, CMHK has a relatively small share of the market.

Segmentation by speed

6.2.3 We note that segmenting the relevant market by speed would not affect our assessment. [redacted] are either not present or have de minimis presence in the <10 Mbps and 10-100 Mbps segments (meaning there could be no concerns in this market). The market structure in the 100+ Mbps segment mirrors the total market, meaning that assessing this segment would lead to identical conclusions as the assessment of the total market.

6.2.4 We have also considered whether a segmentation at higher speed might be relevant (although systematic data is not available for such a segmentation) noting that [redacted] primarily relies partially on a [redacted] to provide its fixed internet access services [redacted].

6.2.5 However, even for speeds above 1 Gbps, most customers would have the choice of three alternative fibre networks after the merger. Furthermore, as [redacted] is aiming to expand the reach of its fibre-based services, it may be able to increasingly compete on par with other operators. Looking at how the market is split between some of the main competitors, Table 7 below shows no material differences between the <1Gbps segment and ≥1Gbps segment.[82] This also indicates that competitive conditions don't differ materially across these segments.

Table 7 Market revenue split by speed, 2024 (not including PCCW-HKT)

Provider	<1Gbps	≥1Gbps
HKBN	[redacted]	
CMHK	[redacted]	
HGC	[redacted]	
Cable TV	[redacted]	

Source: RFI responses provided by licensees
Note: Data unavailable for PCCW-HKT. Values for [redacted] are based on [redacted] rather than speed.

82 Note that these are not market shares for the entire fixed internet access market: the analysis excludes PCCW-HKT as it has not provided data.

Inclusion of FWA

6.2.6 Third party respondents have raised that there may be substitutability between fixed internet access services and FWA services, which could imply that FWA should be considered part of the internet access services market.[83]

6.2.7 The inclusion of FWA in the relevant market for internet access services could be relevant to our conclusions if the market structure differed materially depending on whether FWA is excluded or included.

6.2.8 However, given its small size, including FWA would not lead to materially different market share estimates. In comparison to the number of retail residential fixed internet service subscribers (~3m), the number of customers using FWA services appears to be very low. While we do not have comprehensive data, HKBN reported having [redacted] FWA subscribers in 2024, and CMHK (which could be expected to be relatively strong in this segment) reported [redacted] subscribers as of 2024. Based on this, we do not expect the size of the FWA segment to be significantly greater than [redacted] subscribers.[84]

Safe harbour threshold analysis

6.2.9 The Proposed Transaction does not meet the safe harbour thresholds. Results for the relevant market are set out in the "Total" column of Table 8 below. After the Proposed Transaction, the market share of the residential segment of retail fixed internet access services for the four largest providers would be [redacted]%, of which the Merged Entity would make up [30% - 40%]. This means that the CR4 safe harbour threshold test is failed.[85] Similarly, the merger-related increment in HHI is [200 – 300], which is also above the safe harbour threshold.[86] Results for alternative hypothetical market definitions are set out in the rest of Table 8 as well as Table 9 and Table 10 – we do not focus on these for the reasons set out above.

83 This was raised e.g. by [redacted].

84 Assuming CMHK's share of the FWA segment is similar to its share of the mobile services market ([redacted]% excluding CMI, see Section 9.2), CMHK having [redacted] FWA customers implies [redacted] FWA customers in the market in total.

85 Where the post-merger CR4 is 75% or more, the safe harbour test requires that the merged firm has a market share of less than 15% (see Section 3.2).

86 With a post-merger HHI of [redacted], the safe harbour test requires an increment of no more than 50 (see Section 3.2).

Table 8 Retail fixed internet access safe harbour tests – residential segment

	<10 Mbps	10-100 Mbps	≥100 Mbps	Total
HHI				
Pre-Merger HHI	[redacted]			
Post-Merger HHI	[redacted]			
Increment	[redacted]			[200 – 300]
Result	**Pass**	**Pass**	**Fail**	**Fail**
CR4				
Joint market share	[redacted]			[30% - 40%]
CR4	[redacted]			
Result	**Pass**	**Pass**	**Fail**	**Fail**

Source: Frontier analysis based on OFCA data
Note: Market shares based on number of access lines as at February 2025

Table 9 Retail fixed internet access safe harbour tests – business segment

	<10 Mbps	10-100 Mbps	≥100 Mbps	Total
HHI				
Pre-Merger HHI	[redacted]			
Post-Merger HHI	[redacted]			
Increment	[redacted]			
Result	**Pass**	**Pass**	**Pass**	**Pass**
CR4				
Joint market share	[redacted]			
CR4	[redacted]			
Result	**Fail**	**Pass**	**Fail**	**Fail**

Source: Frontier analysis based on OFCA data
Note: Market shares based on number of access lines as at February 2025

Table 10 Retail fixed internet access safe harbour tests – overall (residential and business)

	<10 Mbps	10-100 Mbps	≥100 Mbps	Total
HHI				
Pre-Merger HHI	[redacted]			
Post-Merger HHI				
Increment				
Result	**Pass**	**Pass**	**Fail**	**Fail**
CR4				
Joint market share	[redacted]			
CR4				
Result	**Fail**	**Pass**	**Fail**	**Fail**

Source: Frontier analysis based on OFCA data
Note: Market shares based on number of access lines as at February 2025

6.2.10 Given the safe harbour thresholds are not met for the relevant market, we undertake a more detailed assessment below.

6.2.2 CMHK's competitive constraint

6.2.11 Notwithstanding the fact that the safe harbour thresholds are not met, CMHK's market share in the relevant market is relatively small, which normally indicates that the competitive constraint it is able to exert on its competitors is relatively limited. However, there are certain conditions under which CMHK could be a more important contributor to healthy competition than its market share would suggest.

6.2.12 In particular, if CMHK exerts a strong competitive constraint on HKBN, the Proposed Transaction may lead to an increase in prices (or a reduction in quality). In order to assess this in line with the Guideline, we consider:

(a) Whether the two Merging Parties are in particularly close competition with each other[87]; and

[87] The Guideline, paragraph 3.71.

(b) Whether CMHK has an aggressive pricing strategy and/or has the incentive to act as an 'ICF'.[88]

Closeness of competition

6.2.13 The Merging Parties may be considered to be close competitors if they are more similar to each other than to other market participants, e.g. in terms of the characteristics of their services and their prices. To assess this, we conduct a qualitative comparison of different operators' offers, as well as review data on customer switching. Switching data is relevant for our assessment, because when customers leave, they are likely to switch to the competitors that are the most similar to their current provider.

6.2.14 In terms of speeds, the offering of different operators appears quite similar across the market. While most operators offer speeds up to 2.5Gbps, [redacted] primarily relies on a [redacted] and is building and upgrading its network [redacted]. HKBN, HGC and PCCW-HKT offer speeds up to at least 10Gbps, which might imply somewhat closer competition between them than with CMHK (which only offers speeds up to 2.5Gbps).[89]

6.2.15 In terms of pricing, CMHK and HKBN do not appear to compete closer with each other than with other operators. Table 11 below presents internet access prices for a given address and speed, and overall ARPUs for services ≥1Gbps. While price data for HKBN is not available, prices offered by CMHK and PCCW-HKT are identical, which implies that HKBN and CMHK cannot be closer to each other in terms of pricing than HKBN and PCCW-HKT (at least in terms of the available data). The ARPU difference between CMHK and HKBN is significant - [redacted]. It is also similar to that between HKBN and some other operators ([redacted] compared to Cable TV).[90] This suggests that CMHK and HKBN are not close competitors.

Table 11 Internet access prices and ARPUs for major fixed internet service providers in Hong Kong

Provider	Monthly subscription price (HK$)	ARPU (for services ≥1Gbps) (HK$)
HKBN	Not available	[redacted]
CMHK	118	[redacted]

88 The Guideline, paragraph 3.33-3.35.

89 Information collected from operators' websites at the time of writing.

90 Subscription prices collected from operators' websites at the time of writing. ARPU data provided by operators in their RFI responses.

Provider	Monthly subscription price (HK$)	ARPU (for services ≥1Gbps) (HK$)
PCCW-HKT	118	[redacted]
HGC	159	[redacted]
Cable TV	88	[redacted]
[redacted]		

Source: Providers' websites and RFI responses

Note: Where this information was available, prices shown are for a 1Gbps subscription over a 24-month contract, offered at a specific address in Hong Kong. The price shown for Cable TV is for a 36- month contract.

6.2.16 In terms of customer switching: analysis based on the results of a survey provided in [redacted]'s RFI response indicates that, of those who responded, [redacted]% of fixed internet customers leaving [redacted] switched to CMHK. This figure is significantly higher than CMHK's February 2025 market share of [redacted]%, which could imply that CMHK's market share might understate the competitive constraint it imposes on [redacted]'s price setting. However, we place limited weight on this evidence given that only a small subsample of subscribers responded to [redacted]'s survey question.[91]

6.2.17 Based on the evidence available, it does not appear that HKBN and CMHK are particularly close competitors.

CMHK as an ICF

6.2.18 CMHK's recent growth (from [redacted]% of the fixed internet access market in September 2021 to [redacted]% in February 2025)[92] and its relatively wide coverage[93] raise the possibility that CMHK may be acting as an 'ICF', i.e. a firm that has more of an influence on the competitive process than their market shares or similar measures would suggest (e.g. by competing aggressively on prices or spurring innovation).[94] Such firms have the potential to increase the intensity of competition in a market – and if this was the case, the merger might lead to a significant lessening of competition.

6.2.19 However, the pricing data presented in Table 11 above indicates that CMHK does not have an aggressive pricing strategy relative to some other players. Both [redacted] and [redacted] appear to offer lower prices at comparable speed levels. The take-up of CMHK's services also appears low (it only has [redacted] subscribers) implying that it has not been particularly successful at attracting customers. Therefore, overall,

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91 Over 3 years, about [redacted] customers specified which operator they would be switching to, out of [redacted] customers that [redacted] asked.

92 Based on data from OFCA.

93 See Section 5.1.

94 See EC guidance on horizontal mergers, paragraphs 37-38.

based on the limited information available, it appears unlikely that CMHK is acting as an 'ICF'.

6.3 Coordinated effects

6.3.1 In line with our assessment of coordinated effects in the upstream fixed local access network services, coordinated concerns in the retail fixed internet access services market are most likely to arise where there are relatively few operators present.

6.3.2 However, given the relatively large number of independent networks present in Hong Kong (and assuming that local competition concerns identified in the upstream fixed local access network services market are addressed), it should be relatively easy for a services-based operator (SBO) to enter the market and provide internet services to households experiencing high prices – thus disrupting any coordination between the FNOs (meaning that the 'external stability' condition is not met). We do not consider such concerns therefore to be significant in this market.

6.4 Other concerns raised by third parties

6.4.1 A third party has raised a separate theory of harm: that CMHK might engage in predatory pricing in the fixed internet access services market after the merger (and possibly other markets). It is not clear why CMHK would have an incentive to engage in predatory pricing in the fixed internet access services market, given that it is not in a dominant position, and would be unlikely to be able to recoup any short term losses through higher prices in the future, in the presence of strong rivals that would be able to compete with CMHK. In any event, we understand that such allegations would have to be investigated ex-post under the Second Conduct Rule.

Finally, a third party raised a concern that the merger might have a detrimental impact on competition outside Hong Kong, in the Greater Bay Area, e.g. in relation to fixed internet access operators' ability to expand in this area. However, our understanding is that such concerns would have to be raised with the relevant authorities (as OFCA does not have jurisdiction outside Hong Kong). As such, we do not consider this further.

6.5 Conclusions

6.5.1 Subject to the competition concerns in the upstream fixed local access network services market being addressed, the evidence available indicates that the Proposed Transaction between CMHK and HKBN is not likely to materially lessen competition in the retail fixed internet access market. This is because CMHK is relatively small, it does not appear to compete particularly closely with HKBN, and it does not appear to be acting as an ICF.

7 Leased lines and mobile backhaul services

7.1 Overview

7.1.1 Over the past decade, the number of leased line subscriptions has remained stable; however, total capacity usage has grown exponentially. Currently, 15 operators provide leased line services. [redacted] is the largest provider by number of lines, while [redacted] leads in terms of total bandwidth provided.[95]

7.1.2 While CMHK does not have a significant presence in the leased line services market, the Merging Parties have a vertical relationship in the provision of leased line services – specifically in relation to mobile backhaul services, which are a type of leased line. As explained in the market definition Section, mobile backhaul services are an important input into the provision of mobile services. As a major fixed network services provider, HKBN currently provides mobile backhaul services to MNOs, while CMHK is a customer in the market for mobile backhaul services.

7.1.3 Some third parties to the merger (other telecommunications licence holders) raised either input foreclosure or customer foreclosure concerns in relation to mobile backhaul services.[96] Specifically, concerns were raised by [redacted] and [redacted]. They are either current or potential customers of HKBN's mobile backhaul services concerned about HKBN restricting access to mobile backhaul, or providers of mobile backhaul services concerned about the loss of demand from CMHK.

7.1.4 We present leased lines market shares and assess horizontal concerns in Section 7.2. We then analyse input foreclosure concerns in relation to mobile backhaul services in detail in Section 7.3, and we assess customer foreclosure concerns in Sections 7.4 and 7.5.

7.2 Leased line market shares

7.2.1 Table 12 below sets out market shares in the leased lines services market. HKBN has a [redacted]% market share when measures in terms of number of leased lines, whilst it has a [redacted]% market share when measured in terms of bandwidth. CMHK does not have a large presence using either measurement.

95 Information from OFCA.

96 See Section 3.4.2 for a high-level description of what input and customer foreclosure stands for.

Table 12 Leased line market shares by number of lines and bandwidth, February 2025

	No. of leased lines	Bandwidth of leased lines (Mbps)
HKBN	[redacted]	
CMHK		
Merged Entity		
HGC		
PCCW-HKT		
[redacted]		
Total	**136,651**	**291,692,909**

Source: OFCA data

Note: Market shares for HKBN and CMHK reflect group market shares. Market share for PCCW-HKT excludes internal use.

7.2.2 As set out in Table 13 below, the safe harbour threshold is passed when considering market shares based on the number of lines, however, it is not passed when considering market shares based on bandwidth.

Table 13 Leased line – safe harbour tests

	Number of leased lines	Bandwidth of leased lines
	HHI	
Pre-Merger HHI	[redacted]	
Post-Merger HHI		
Increment	[5-15]	[150 - 250]

	Number of leased lines	Bandwidth of leased lines
Result	**Pass**	**Fail**
CR4		
Joint market share	[20%– 30%]	[50% – 60%]
CR4	[redacted]	
Result	**Fail**	**Fail**

Source: *Frontier analysis based on OFCA data*
Note: *Based on market shares as at February 2025*

7.2.3 Nevertheless, the available evidence does not suggest that the Proposed Transaction raises horizontal concerns. CMHK's share is immaterial regardless of the market share measure used – and it appears to be only one of a number of small providers active in the market. As such, the Proposed Transaction will not materially change the market structure.

7.2.4 However, as set out in the Overview, vertical concerns need to be assessed in detail. The Merging Parties have a vertical relationship in relation to mobile backhaul services, which is a type of leased line service. We do not have the necessary data to calculate market shares specifically for mobile backhaul services, however the overall leased lines market share data indicates that HKBN may be a strong player in the provision of mobile backhaul, and a number of market players have raised concerns in relation to this service. We assess the relevant vertical theories of harm (input foreclosure and customer foreclosure) in the following sections.

7.3 Potential input foreclosure concern

7.3.1 The input foreclosure concern is related to HKBN potentially restricting or worsening terms of access to mobile backhaul services for operators competing with CMHK in retail mobile services. Such restricted access may take two forms:

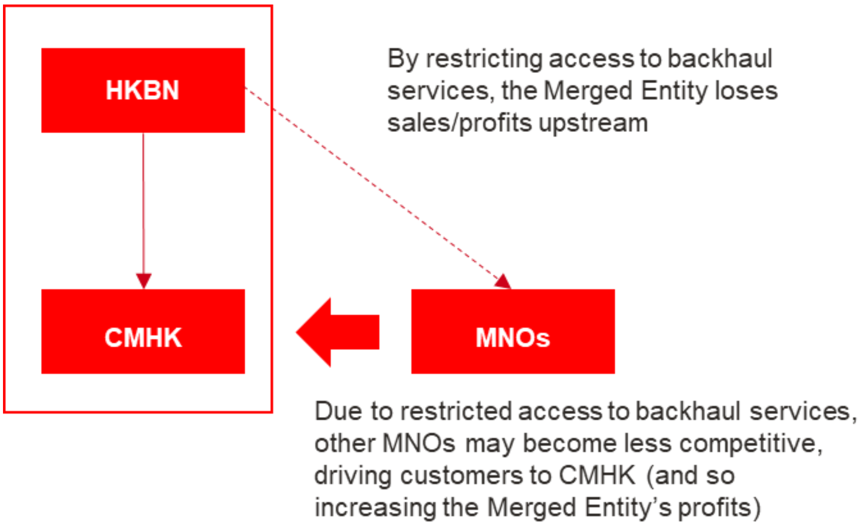
(a) a complete foreclosure of access to HKBN's mobile backhaul services (total foreclosure); or

(b) the provision of mobile backhaul services at higher prices or reduced quality of service (partial foreclosure).

7.3.2 Figure 1 below illustrates the effect of such strategies. Both of these strategies in principle are capable of undermining the position of CMHK's competitors in the downstream mobile services market, such as HTCL and SmarTone, which do not have extensive self-owned fixed network and rely on third party supply for mobile backhaul. This is because procuring mobile backhaul could become more difficult or costly for competitors and, as a result, deteriorate or impede the provision of mobile services for competitors, which could in turn strengthen CMHK's position in the retail mobile services market.

7.3.3 As detailed in Figure 1, the Merged Entity might benefit from input foreclosure if it is able to re-capture a significant proportion of the mobile customers lost by competing MNOs – which HKBN was unable to do prior to the merger. For the strategy to be profitable, the margins that the Merged Entity would gain from the mobile customers it recaptures would have to offset the loss of margins from sales in the mobile backhaul services market.

Figure 1 The effect of input foreclosure strategies



Source: Frontier Economics illustration

7.3.1 Precedent

7.3.4 Mobile backhaul input foreclosure concerns were analysed in the BT Group plc (BT)/EE Limited (EE) merger. BT was active in the provision of fixed services, including mobile backhaul, and EE was active mainly in the provision of mobile services. The CMA investigated concerns that the merged entity could engage in partial input foreclosure by reducing the quality or increasing the price of mobile backhaul services to competing mobile services providers in order for EE to gain a competitive advantage in the mobile services market.

7.3.5 The CMA concluded that these concerns were unfounded due to a number of reasons. BT was subject to some access regulation already; mobile backhaul costs made up a small share of overall MNO expenditure (representing on average 8%

of total cost of mobile services);[97] [98] and the presence of alternative providers meant that a foreclosure strategy would unlikely be profitable.[99] The CMA also found that the merged entity would be unlikely to be able to effectively discriminate on the basis of quality.[100] The CMA approved the merger with no remedies (despite BT being the main supplier of copper and fibre backhaul).

7.3.6 In their consultation response, a third party noted the Swisscom/Vodafone Italia merger in 2024 as a potentially relevant precedent where they claimed remedies were imposed in relation to mobile backhaul. However, there were no material concerns in relation to mobile backhaul in this merger. The wholesale access remedy referred to by the third party related to horizontal concerns in the provision of fixed internet services to business customers.[101]

7.3.2 Analysis of unilateral effects

7.3.7 As set out in Section 3.4.2, the relevant analytical framework for assessing unilateral input foreclosure involves analysing whether the merged entity would have (i) the ability, (ii) the incentive to foreclose competitors, having the capability to produce, and (iii) adverse effects of such potential foreclosure on prices and quality offered to end-customers.

7.3.8 There are multiple FNOs providing mobile backhaul services. In addition to HKBN, there are other operators (such as PCCW-HKT, HGC and TraxComm).

7.3.9 A number of third party MNOs have raised concerns that they are reliant on mobile backhaul services provided by HKBN, and that HKBN might foreclose access to these services to undermine the position of CMHK's competitors. The specific unilateral concerns raised are a reduction in the number of available suppliers due to HKBN ceasing to offer mobile backhaul services (i.e. total foreclosure), and HKBN offering mobile backhaul services to competing MNOs at a higher prices than to CMHK (partial foreclosure).[102]

7.3.10 Other than CMHK, only [redacted] has provided data on the volume of their mobile backhaul purchases from HKBN (which amount to [redacted]% of their backhaul expenditures – see Table 14). At the same time, HKBN's self-reported backhaul

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97 BT/EE decision, paragraph 16.22 and Table 16.1.

98 Although the share of mobile backhaul costs may increase with 5G deployment, this increase is likely to be less material in Hong Kong given its high population density.

99 BT/EE decision, paragraphs 16.144-16.145, 16.151.

100 BT/EE decision, paragraph 16.188.

101 See https://www.agcom.it/provvedimenti/delibera-509-24-cons

102 A respondent describes these theories of harm as "resilience and risk concentration" and "self-preferencing", respectively.

revenues ([redacted], presented in Table 15) appear [redacted] in comparison with CMHK's expenditure on mobile backhaul services [redacted]). However, this data does not appear entirely consistent with the views expressed by third party MNOs. A more comprehensive analysis is unfortunately not possible due to a lack of data.

Table 14 Mobile backhaul expenditure of MNOs by provider, 2024

Supplier	CMHK	SmarTone	PCCW-HKT	HTCL
PCCW-HKT	[redacted]	[redacted]		
HGC				
HKBN				
TraxComm				

Source: Parties' RFI responses

Note: [redacted]. Note that the breakdown based on bandwidth (where available) does not show a different picture than the breakdown by expenditure presented here.

Table 15 HKBN's provision of mobile backhaul and other leased lines, and associated revenues, calendar year 2024

	Number of lines	Revenue (HK$ million)	% of HKBN's total revenues
Backhaul total	[redacted]		
[redacted]			
Local data total	[redacted]		
[redacted]			

	Number of lines	Revenue (HK$ million)	% of HKBN's total revenues
Others	[redacted]		
Total	[redacted]		

Source: HKBN RFI submission

Note: 'Others' includes miscellaneous services provided to businesses in Hong Kong.

7.3.11 The Merged Entity's ability to foreclose CMHK's mobile rivals would likely be limited by the fact that backhaul services are generally considered to be a broadly homogenous product. Based on the available data, in the event that the Merged Entity attempted to engage in foreclosure, the MNOs supplied by HKBN would be able to procure mobile backhaul services from other providers, such as PCCW-HKT[103] and HGC, who the data indicates are relatively large operators, or would self-provide (e.g. by partnering with an operator to build backhaul connections). TraxComm may be another viable alternative in some areas.[104] This would limit the Merged Entity's ability to engage in foreclosure of backhaul services. As a result, competing MNOs would be unlikely to lose retail customers.

7.3.12 To establish if the Merged Entity has incentives to foreclose, one needs to compare incremental profits gained at the retail level (as a result of foreclosure) with loss at the wholesale level due to foreclosure. As discussed above, there are indications that incremental profits at the retail level would likely be immaterial, as MNOs could switch demand for mobile backhaul services to HKBN's competitors. In this case, any additional retail profits from a foreclosure strategy would not be material enough to offset the lost wholesale profits. The Merged Entity would therefore be unlikely to have incentives to foreclose.

Some MNOs have raised the concern that post-merger they could face a worsening of the terms of access to mobile backhaul or that they could lose access to mobile backhaul services from HKBN altogether. Most notably, [redacted], [redacted] have raised concerns in relation to the provision of mobile backhaul services from HKBN after the merger. For some of them, [redacted], the lack of access to such input (or significant worsening of access terms) in the short term could be disruptive given they are reliant on HKBN as supplier of backhaul. However, as elaborated above, the evidence and analysis undertaken suggest that the risk of foreclosure as a result of this potential theory of harm is rather limited.

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103 A third party raised that while [redacted] supply [redacted] mobile backhaul connections to them, [redacted] only supplies them with [redacted] bandwidth backhaul products. [redacted].

104 Note that in the UK, Ofcom does not regulate wholesale access to leased lines (and mobile backhaul) in areas where there are three operators present (BT plus two alternative operators) (see Ofcom Wholesale Fixed Telecoms Market Review 2021—26). Note that in Hong Kong, there are likely to be three operators present even after the merger: PCCW-HKT, HGC and the Merged Entity, plus further smaller operators. Therefore, the market for mobile backhaul is likely to remain competitive.

7.3.3 Analysis of coordinated effects

7.3.13 We also consider whether the Proposed Transaction might increase the risk of coordinated effects in mobile backhaul services market, i.e. that post-merger, if the Merged Entity foreclosed access to backhaul, whether the remaining providers of backhaul services would also have an incentive to follow such behaviour, and collectively deny access to backhaul services or increase price/ reduce quality of services. A respondent has also raised concerns about such tacit coordination on the wholesale price of mobile backhaul services.

7.3.14 Coordinated effects are made unlikely by the presence of multiple providers of backhaul with different incentives:

(a) For example, while PCCW-HKT could potentially have incentives to follow the same strategy (as it is a converged fixed-mobile player), HGC would unlikely follow the same strategy because it would not gain any downstream mobile customers (as it is not present in the mobile services market).

(b) Coordinated effects would also be hard to sustain given the presence of smaller players in the supply of backhaul services.

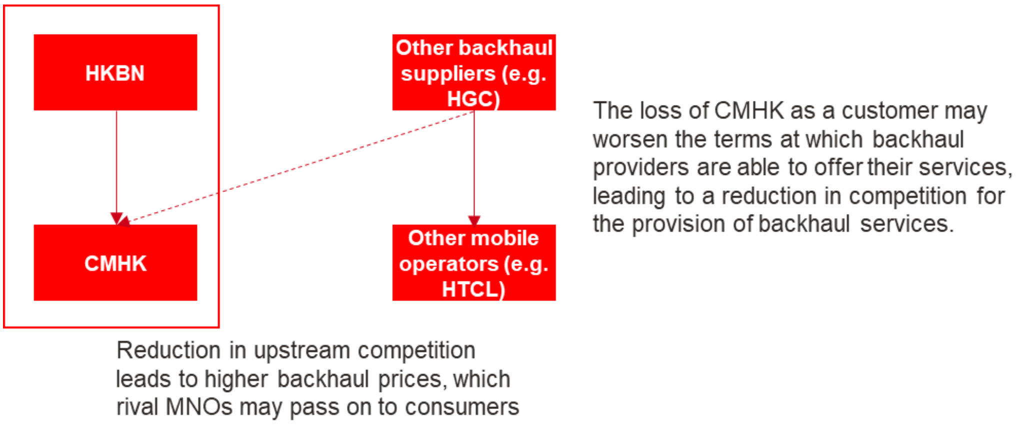
7.4 Potential customer foreclosure concern

7.4.1 Customer foreclosure is a concern related to the Proposed Transaction potentially restricting demand for mobile backhaul services, as a result of CMHK switching to self-supply of mobile backhaul from HKBN, rather than acquiring mobile backhaul services from other mobile backhaul services providers.

7.4.2 Figure 2 below illustrates the logic of a customer foreclosure strategy. In principle if a supplier of mobile backhaul services, such as PCCW-HKT and HGC, lost a large share of mobile backhaul revenues, this could undermine the suppliers' competitiveness (in extreme cases, these suppliers could be driven out of business). In turn, this would reduce competition in the market for mobile backhaul services, making it harder for MNOs to obtain mobile backhaul services at pre-merger conditions. As a result, the competitive constraint exercised by these MNOs on the Merged Entity's downstream arm may weaken.

7.4.3 A respondent did raise a concern about CMHK terminating mobile backhaul supply contracts with its current suppliers – we note that this is only cause for concern if it undermines suppliers' competitiveness as set out above (a loss of revenues for other FNOs is not in itself detrimental to competition). We address customer foreclosure concerns with this in mind below.

Figure 2 Customer foreclosure in mobile backhaul



Source: Frontier Economics illustration

7.4.1 Precedent

7.4.4 Backhaul customer foreclosure theory of harm was assessed in the BT/EE merger. The CMA found that BT/EE would have an incentive to self-supply backhaul given that the incremental cost of doing so would be lower than procuring backhaul from alternative providers. In fact, EE had been buying backhaul predominantly from BT before the merger and was unlikely to switch to alternative providers, absent the transaction.[105] Furthermore, there were other important customers for backhaul, apart from EE. In light of that evidence, the CMA concluded that BT/EE would not have the ability to foreclose upstream suppliers of mobile backhaul (even if it might have incentives to do so).[106]

7.4.2 Analysis

7.4.5 As discussed earlier, CMHK procures mobile backhaul from multiple FNOs, including [redacted]. Given that [redacted] and [redacted] are large FNOs and mobile backhaul typically represent a relatively small share of mobile costs[107], it is unlikely that the loss of CMHK's backhaul revenues would have a significant impact on [redacted]'s and [redacted]'s financial viability. While we don't have the relevant financial data available from [redacted] and [redacted], note that as per Table 15, HKBN's revenues from mobile

[105] CMA BT/EE decision, paragraph 17.22.

[106] Ibid, paragraph 17.39 – 17.40.

[107] See paragraph 7.3.5. According to the CMA, mobile backhaul typically represents a small share of mobile expenditure. [redacted].

backhaul are less than [redacted]% of their total revenues, and total revenues from leased lines make up only [redacted]%.

7.4.6 [redacted] is a smaller player and is potentially more reliant on CMHK as its mobile backhaul customer. However, there are other mobile operators that require mobile backhaul services – most notably HTCL and SmarTone. Therefore, even if CMHK were to self-supply mobile backhaul from HKBN post-merger, there would be demand for mobile backhaul from CMHK's competitors. In effect, the merger may lead to changes in commercial relationships – i.e. changes in who buys mobile backhaul from whom. This is not in itself a cause for concern.

7.4.7 Therefore, the available evidence does not suggest that the Merged Entity would have the ability to foreclose suppliers of mobile backhaul.

7.5 Concerns relating to network development services

The potential concern

7.5.1 In its RFI response, [redacted] shared details of a Memorandum of Understanding and a Network Development Agreement (NDA) with CMHK. As part of this NDA, we understand that CMHK committed to procuring fibre rental, network construction, and other related fixed network services (e.g. project management, provision of operation and maintenance services) from [redacted]; and that a [redacted] stem from this agreement. CMHK has an option to terminate the NDA at any point from [redacted].

7.5.2 [redacted] raised the concern that, after the Proposed Transaction, the Merged Entity may cease to require [redacted]'s services given it may be able to rely on HKBN's fibre network. This could lead to the termination of the NDA at the earliest possible date (i.e. [redacted]). [redacted] would therefore lose a key customer for network development services.

7.5.3 While the NDA includes fibre rental (which could be used for mobile backhaul), our conclusions drawn in relation to the backhaul services market in the previous subsections apply (given the Merging Parties' commitments, competition concerns are unlikely to arise in this market). However, in this subsection we assess whether concerns might arise in relation to the other services covered by the NDA, network construction and other related services.

7.5.4 The concern articulated by [redacted] could take the form of a customer foreclosure to the extent that losing CMHK as a customer would hinder or prevent [redacted] to provide network development services, weakening [redacted] and potentially restricting competition in downstream markets. Below we assess whether this might be detrimental to competition in downstream telecommunications markets.

Analysis

7.5.5 Given that the Merged Entity will have access to HKBN's extensive network infrastructure, it appears plausible that the Merged Entity might terminate the NDA with [redacted] as soon as contractually possible. The impact of this on [redacted] could be significant: [redacted].[108]

7.5.6 [redacted], it is not clear that the Proposed Transaction would lead to materially worse outcomes for [redacted] compared to a counterfactual absent the merger. This is because we understand that, even if the Proposed Transaction is approved, the Merged Entity will not normally be able to terminate the NDA before [redacted]. This implies that [redacted] could have [redacted] years from now to adjust its strategies and business model before the NDA can be terminated in [redacted].

7.5.7 In any event, it is unlikely that the termination of the NDA would be detrimental to competition. This is because network deployment services generally do not exhibit significant economies of scale. Indeed, up to 80% of network deployment costs are labour costs[109], which can be scaled up or down in proportion to the network deployment required. We have seen no evidence indicating that, if [redacted] lost its network deployment agreement with CMHK, this would undermine the ability of [redacted] or any other telecommunications operator to compete in other telecommunications markets.

7.6 Other concerns raised by third parties

7.6.1 Submissions from a third party raised a theory of harm related to the risk of the merged entity's refusal to provide wholesale access to SBOs.[110] One states that: "*the Proposed Acquisition may result in CMHK having substantially increased ability and incentive to cease providing wholesale access to HKBN's current wholesale customers.*"

7.6.2 Our understanding is that this theory of harm relates to the provision of access products relating to fixed network infrastructure (last-mile infrastructure, infrastructure elements further upstream, or any combination thereof). As such, this theory of harm can be considered a composite of the building access theory of harm discussed in relation to fixed local access network services (which relates

108 Based on information provided by [redacted].

109 See e.g. EC working document: "Proposal for a Regulation of the European Parliament and of the Council on measures to reduce the cost of deploying high-speed electronic communications networks", https://data.consilium.europa.eu/doc/document/ST-7999-2013-ADD-4/en/pdf#:~:text=%E2%80%A2-,A%20database%20where%20all%20planned%20civil%20works%20must%20be%20published,were%20to%20deploy%20it%20alone.

110 Submissions by third parties.

to in-building wiring)[111] and an input foreclosure theory of harm in relation to leased lines services (which relates to access to network elements further upstream in the network).

7.6.3 The available evidence does not suggest that this theory of harm should be a significant concern (in either the short term or the long term).

(a) Taking remedies and commitments into consideration, we do not find any competition concerns in relation to either of the markets involved (fixed local access network services and leased line services).

(b) HKBN is already vertically integrated in relation to the service in question: it provides wholesale access to SBOs (upstream market) and provides retail internet access services (downstream market). Given that CMHK is not currently active in the upstream market, this market (and HKBN's position in it) will not be materially affected by the Proposed Transaction. As such, HKBN's ability and incentive to foreclose access for other FNOs is unlikely to be materially affected by the Proposed Transaction.

7.6.4 Another concern raised by some respondents is that HKBN may acquire commercially sensitive information about CMHK's competitors (e.g. through supplying them with mobile backhaul or resale of fixed broadband services), which it might then pass on to CMHK. In principle, sharing of commercially sensitive information can be a concern in vertical mergers in certain situations – the EC guidance on non-horizontal mergers sets out that "*by becoming the supplier of a downstream competitor, a company may obtain critical information, which allows it to price less aggressively in the downstream market to the detriment of consumers […] It may also put competitors at a competitive disadvantage, thereby dissuading them to enter or expand in the market*".[112]

7.6.5 However, mobile backhaul supply contracts seem unlikely to have the potential to reveal commercially sensitive information, i.e. information that (i) could not be observed or inferred reasonably accurately based on publicly available information, and (ii) would offer an advantage to CMHK, such as those described by the EC. In line with this, we are not aware of such theories of harm commonly being considered in relation to mobile backhaul – e.g. it was not assessed in the BT/EE merger decision or the Vodafone/Liberty Global merger decision.[113] With respect to the resale of fixed broadband services, it is also unclear how competitor's fixed broadband customer information (e.g. broadband speed, installation address) could offer an advantage to CMHK's mobile business.

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111 See Section 5.

112 EC guidance on non-horizontal mergers, paragraph 78.

113 The Vodafone/Liberty Global merger is discussed in more detail in Section 8.3.

7.6.6 To the extent that mobile backhaul supply contracts could reveal commercially sensitive information, such risks should be minimised through bilaterally agreed contractual terms between MNOs and HKBN. This is demonstrated by the fact that MNOs purchase mobile backhaul services from PCCW-HKT, which is also a vertically integrated operator that competes in the retail mobile services market with the MNOs it provides mobile backhaul services to.

7.6.7 A respondent noted that CMHK may gain access to "*sensitive data such as mobile subscriber data, backhaul locations and bandwidth consumption at HKBN's base*". HKBN should not be expected to get access to mobile subscriber data of MNOs as part of mobile backhaul contracts (given mobile backhaul involves the transmission of aggregate traffic). In relation to the other two potential concerns:

(a) The location of mobile sites is likely to be observable publicly; and

(b) It is unclear how CMHK could benefit materially from competitors' bandwidth consumption information (considering that a large operator like CMHK will in any event very likely have estimates of traffic volumes by area).

7.6.8 Another concern raised was about customer foreclosure in relation to network equipment suppliers. The third party suggests that if the Merged Entity consolidates its network infrastructure equipment purchases, this may reduce the number of suppliers available in Hong Kong; making it more difficult for other operators to acquire network infrastructure equipment at competitive terms. However, as network infrastructure equipment providers are generally global providers, and contracts are negotiated at the operator level, it is unclear that the Merged Entity consolidating its approach to supplying this equipment could have a material impact on the terms other operators are able to get from equipment suppliers.

7.7 Conclusions

7.7.1 Taking into consideration the commitments offered by CMHK, the available evidence indicates that the Proposed Transaction is unlikely to lead to a lessening of competition via input or customer foreclosure in backhaul services.

7.7.2 Input foreclosure is unlikely to materialise for the following reasons.

(a) Mobile backhaul services are relatively homogenous and there are typically limited barriers preventing mobile operators from switching between wholesale backhaul providers.

(b) There will still be other alternative providers of backhaul after the merger (PCCW-HKT, HGC and TraxComm). Having at least three providers overall is typically considered to be sufficient for the market to remain competitive.

(c) HKBN's customers are likely to be able to find viable alternatives (given the presence of competing suppliers, the possibility of new suppliers entering the market and self-supply).

7.7.3 In relation to customer foreclosure, both precedent and the analysis of the provision of backhaul services in Hong Kong indicate that the transaction is unlikely to raise any material competition issues, as there will continue to be three large network providers of mobile backhaul services after the merger, and significant demand for mobile backhaul services from CMHK rivals in the retail mobile services market. The available evidence therefore indicates that the Proposed Transaction is unlikely to lead to a lessening of competition through customer foreclosure in mobile backhaul services, as such a strategy would be unlikely to affect materially competition in the provision of mobile backhaul services.

7.7.4 We have also assessed a specific concern that the merger would have a material impact on [redacted], as a result of the NDA between CMHK and [redacted] which could be terminated after the merger.

7.7.5 While this NDA with CMHK may constitute [redacted], if [redacted] were to lose these revenues, it should also be able to reduce its costs. This is because network deployment services generally do not exhibit significant economies of scale.[114] Indeed, up to 80% of network deployment costs are labour costs, which can be scaled up or down in proportion to the network deployment required. Hence, [redacted]'s profitability should not be materially affected, assuming it adjusts its costs in line with demand for its network deployment services.

7.7.6 We also understand that, even if the Proposed Transaction is approved, the Merged Entity will not normally be able to terminate the NDA before [redacted]. This implies that [redacted] has protection from current arrangements to adjust its strategies and business model before the NDA can be terminated in [redacted].

114 See e.g. EC working document: "Proposal for a Regulation of the European Parliament and of the Council on measures to reduce the cost of deploying high-speed electronic communications networks",https://data.consilium.europa.eu/doc/document/ST-7999-2013-ADD-4/en/pdf#:~:text=%E2%80%A2-,A%20database%20where%20all%20planned%20civil%20works%20must%20be%20published,were%20to%20deploy%20it%20alone.

8 Retail multiple-play services

8.1 Overview

8.1.1 A number of third parties to the merger (other telecommunications licence holders) raised concerns that the Merged Entity may be able to marginalise them by offering low-priced FMC bundles (also known as multiple-play services). The specific points raised are as follows.[115]

(a) "*CMHK's resources and market power are a key consideration (…) credible rivals might struggle to compete effectively with the bundled services given customers (at least in the short term) may be superficially attracted to that for convenience, price, or added features, resulting in reduced market dynamics*"

(b) "*CMHK will be able to provide bundle services plan (…) in a very low price or even a predatory price after the Proposed Transaction. It will cause customers of the other MNOs migrant [sic] to their services which will weaken the ecosystem of the current telecommunications sector*"

(c) "*The merger has, or is likely to have, the SLC Effect because there will be no countervailing power in the FMC Market after the merger […] After the merger, there is only one independent supplier in the FMC Market*"

8.1.2 Responses to OFCA's consultation raised similar concerns, mentioning "*enhanced incentive and ability to leverage market power across fixed and mobile markets*" and "*[the Merged Entity engaging] in anti-competitive foreclosure strategy by deploying bundling or tied sales*".

8.1.3 While we ultimately leave open the question of whether multiple-play services constitute a separate market, we do consider the conglomerate theory of harm that the merger might lead to a lessening of competition by strengthening the Merging Parties' position in the supply of FMC bundles (which they might leverage into the fixed internet and mobile services markets).

8.2 Relationship between the Merging Parties and a potential competition concern

8.2.1 HKBN has a strong position in the fixed internet access market, while CMHK has a strong position in the mobile services market.[116] Both Merging Parties currently offer FMC bundles; however, their ability to do so may be hindered by the fact that

115 Such concerns were raised by [redacted].

116 HKBN has a market share of [redacted]% in the fixed internet access market, while CMHK accounts for [redacted]% of the mobile services market (see Table 4 and Table 23).

each of them only has a strong position in one of the two markets involved.[117] Currently, PCCW-HKT is the only fully converged operator in Hong Kong post-merger (meaning an operator that is well established in both markets). The Merged Entity will become the second fully-integrated FMC operator with territory-wide coverage.[118] This integration could enable the Merged Entity to offer FMC bundles widely and at relatively low prices, which could strengthen its market position.

8.2.2 In particular, the Merged Entity may engage in bundling practices that allow it to increase its market share in both fixed internet and mobile services – either by only selling fixed internet and mobile services as a bundle (forcing customers to either buy both from the Merged Entity or none), or by offering bundles at significantly lower prices than what its competitors are able to offer them at.

8.2.3 Such practices could undermine the competitive position of non-converged competitors (who are unable to offer bundles as efficiently or at all), reducing their market share and potentially limiting their ability to compete effectively – this is in line with the concerns raised by third parties to the merger (set out above). This theory of harm is referred to as “conglomerate effects”.

8.3 Precedent

8.3.1 While competition authorities analyse conglomerate effects in mergers in the telecoms industry, it is uncommon for them to conclude that conglomerate effects per se would lead to a material lessening of competition.

8.3.2 For example, the EC recently considered this potential concern in the Vodafone/Liberty Global merger in Germany and Central and Eastern Europe[119]. This transaction is similar to the proposed CMHK/HKBN transaction as both involve the merger of a predominantly MNO with a predominantly FNO, where both operators are simultaneously present in fixed and mobile markets.

8.3.3 The EC’s main concern was that the merged entity would be able to significantly extend its presence in FMC bundles (including cable TV), given Vodafone’s position as an MNO and Liberty’s extensive cable network. This integration could have reduced the incentive for the merged entity to continue offering standalone services, which could have ultimately marginalised alternative providers that lacked the scale or infrastructure to match the converged service offering.

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117 According to their RFI responses, both CMHK and HKBN each report approximately [redacted] existing subscribers.

118 Both Merging Parties would benefit from the merger in this regard: HKBN does not currently have its own mobile network, so it has to rely on wholesale agreements to offer FMC bundles. CMHK’s fixed network infrastructure coverage is relatively limited compared to other large operators.

119 Case M.8864 - VODAFONE / CERTAIN LIBERTY GLOBAL ASSETS Pages 327, 344, 352, 368, 376.

8.3.4 The EC found that in Germany, FMC penetration was low, at 8.4% of households in 2017 (therefore, fixed and mobile products are likely to continue to be sold separately post-merger). The EC stated: "*Even if the merged entity were to focus its offer in (fixed-mobile) bundles at discounted prices compared to the price of the standalone components, the possible increase in bundles in the next years does not seem to allow a radical and rapid change of this situation to such an extent as to marginalise providers of standalone services reducing their ability and incentive to compete. In light of that, also in a scenario of increasing relevance of FMC offers in Germany, it is unlikely that standalone operators would be marginalised*"[120].

8.3.5 Therefore, the EC concludes that the merged entity was unlikely to have the ability to foreclose its non-converged rivals. Additionally, in Czechia, the EC found that competing providers, such as O2 and T-Mobile, offered FMC bundles and held a larger market share than Vodafone. As such the EC dismissed this theory of harm.

8.4 Analysis

8.4.1 After the merger, the Merged Entity can offer fully-integrated FMC bundles[121] to a wider customer base than the Merging Parties can do individually before the merger. This is due to the increase in fixed coverage CMHK will benefit from via HKBN's network: CMHK has a relatively limited coverage of [redacted]%, whilst after the Proposed Transaction the Merged Entity's network will cover approximately [redacted]% of buildings[122]

8.4.2 While in principle, being able to offer fully-integrated FMC bundles to more customers could increase the Merging Parties' competitiveness, there are a number of reasons why the Proposed Transaction is unlikely to increase the risk of foreclosure.

8.4.3 Based on the information available to us, FMC bundles are not in particularly high demand in Hong Kong. This makes it unlikely that any operator would have the ability to successfully leverage its competitive strength in providing FMC bundles into the mobile and fixed internet access markets, i.e. to steal a large number of non-FMC customers from competitors by attracting them with FMC bundles. There is little evidence to suggest that FMC penetration is currently high: both CMHK and HKBN report only around [redacted] subscribers of FMC bundles each, which is low

120 Ibid, Section 5.3.1, pages 335 – 336.

121 By fully integrated FMC bundles, we mean providing FMC bundles that rely entirely on the Merging Parties' own fixed and mobile infrastructure (rather than relying on wholesale access).

122 See Section 5.3 for a detailed discussion of coverage statistics. The total coverage of the Merged Entity will be around [redacted] buildings as CMHK's coverage [redacted] overlaps with that of HKBN.

compared to CMHK's mobile subscriber base of [redacted] and HKBN's fixed internet access subscriber base of [redacted].[123] [124]

8.4.4 Second, there are also alternative providers of standalone services, i.e. fixed and mobile services. Given this and the fact that there does not appear to be a strong preference among customers for FMC bundles (as set out above), if the Merged Entity were to stop offering standalone services (and only offer bundles), customers would have an ample supply of standalone service providers to switch to. This is very likely to make such a foreclosure strategy unprofitable – meaning that the Merged Entity would not have the incentive to engage in such a strategy in the first place.

8.4.5 Third, there are a number of providers in the Hong Kong market that are offering or would be able to offer FMC bundles, which limits the competitive advantages the Merged Entity could gain from the strengthening of its FMC offering. This is summarised in Table 16.

(a) There is another fully converged operator in the market: PCCW-HKT should be able to compete with the Merged Entity in the provision of fully converged FMC bundles.

(b) Other operators that are not able to offer fully-integrated FMC bundles are able to rely on wholesale access either for fixed or for mobile services and offer FMC bundles

(c) [redacted] and [redacted] are currently able to offer FMC bundles relying on a mix of own network and wholesale access agreements.[125] [redacted] could also pursue reciprocal network access deals, providing them with the ability to offer competitive FMC bundles.

Table 16 Existing FMC bundle offerings in Hong Kong

Operator	FMC bundle offering
CMHK	Existing supplier of FMC bundles as an add-on to post-paid mobile subscriptions.
HKBN	Existing supplier of FMC bundles including 4G to 5G and fibre.
PCCW-HKT	Existing converged player across fixed and mobile.

123 Source: Operators' RFI responses; OFCA data.

124 Some third party respondents have noted that the number of their FMC customers has grown at a fast rate. However, given the very small absolute volumes of FMC sales, these growth rates still do not indicate that the FMC segment is likely to become important in the next few years.

125 In addition, [redacted] offers bundles of mobile services and FWA.

Operator	FMC bundle offering
HTCL	Existing supplier of FMC bundles, coupling mobile with 5G fixed wireless home broadband and fibre.
Cable TV	Existing supplier of FMC bundles [redacted].

Source: Operators' websites and RFI responses

Note: Other MNOs (e.g. SmarTone) also offer bundles of mobile services with 5G home broadband which are additional to the suppliers reported in the table above.

8.4.6 Operators that rely on wholesale access either for fixed or for mobile services to offer FMC bundles would still be able to exert a competitive constraint on the Merged Entity. This implies that a strategy of pricing FMC bundles aggressively to attract customers from rivals that are not able to offer such packages, in order then to raise prices in the future, after the Merged Entity gained a position of strength in the provision of FMC bundles, would not be sustainable.

8.4.7 Finally, even if market power in relation to FMC bundles could be used to undermine competition in the fixed internet market and/or in the mobile market in Hong Kong, the Proposed Transaction is unlikely to increase the risk of this happening. This is because absent the merger, the fully converged operator PCCW-HKT could in principle engage in such strategies. By creating another fully converged operator, the merger is likely to intensify competition in FMC bundles and make any foreclosure strategy by a converged entity less likely to succeed than if there was only a single fully converged provider.

Other concerns raised by third parties

8.4.8 A respondent has raised a concern that the merger may lead to CMHK "*exploiting consumers*" through converged offers. However, the evidence presented in relation to this point suggests merely that in Mainland China, convergence enabled China Mobile to offer better products and thus expand its customer base and improve retention. This does not make it clear in what way CMHK might be able to exploit consumers as a result of the merger. Therefore, we consider that our conclusions about possible conglomerate effects still apply.

8.4.9 One of third parties views presented at the start of this Section also mentions the possibility of predatory pricing. However, as in case of fixed internet access services, we do not view this as a relevant consideration for this assessment.[126]

8.5 Conclusions

8.5.1 In line with the precedent, given that there is no evidence of high FMC bundle penetration, and given the presence of multiple suppliers who currently supply or

126 See Section 6.4.

who have the ability to supply FMC bundles, the Proposed Transaction is unlikely lead to a substantial lessening of competition due to conglomerate effects compared to a counterfactual where the merger does not take place.

9 Other services

9.1.1 This Section sets out our assessment of other markets that the Merging Parties are active in. As explained earlier, our analysis of these markets is less detailed given our initial assessment indicated limited prospects for significant competition concerns in these markets.

9.1 Retail local fixed voice services

9.1.2 As outlined in Section 4.6, the relevant market for fixed voice services comprises of telephony services provided at a fixed location. It includes – in line with HKBN/WTT precedent[127] – the supply of both traditional wireline and VoIP services.

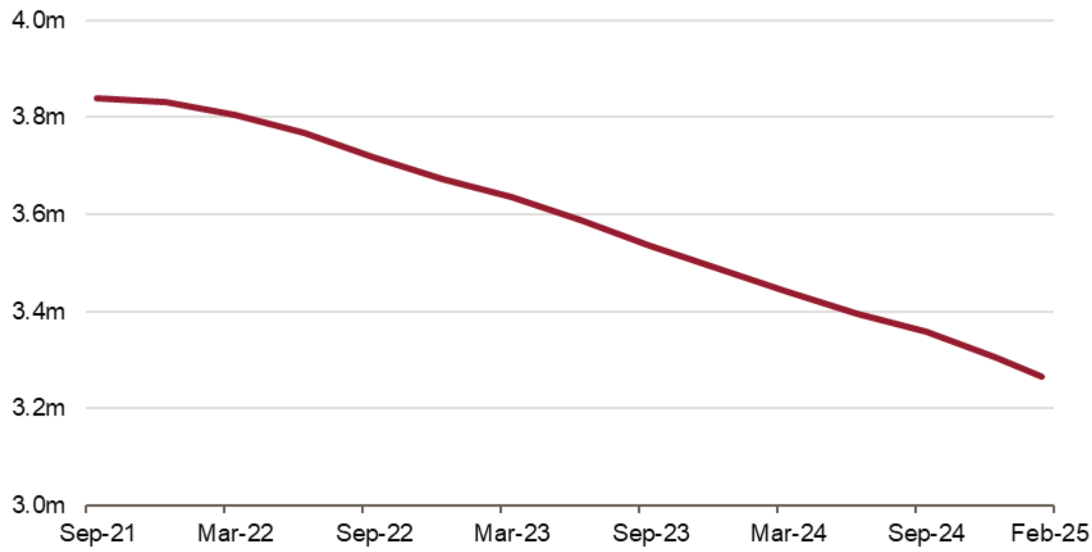
9.1.3 The market was originally dominated by a sole incumbent. However, a number of players have entered the fixed voice market since its liberalisation in the early 2000s. Currently, there are more than 20 operators active in the retail fixed voice market. As of February 2025, three main operators — PCCW-HKT, HKBN, and HGC — collectively account for more than [redacted]% of the total subscriber lines.[128]

9.1.4 The evidence indicates that the importance of the fixed voice services market is declining. Measured in number of lines, the overall size of the market is decreasing (see Figure 3 below), and customers are increasingly able to rely on other technologies for voice calls (e.g. mobile networks and fixed broadband networks).

[127] HKBN/WTT merger assessment page 31-33.

[128] Information provided by OFCA.

Figure 3 Number of fixed voice lines over time (Sep 2021 – Feb 2025)



Source: OFCA
Note: Data includes exchange lines and non-exchange lines

9.1.5 Table 17, Table 18, and Table 19 below presents operators' market shares based on number of subscriber lines broken down by technology across the residential and business segments, as well as the market as a whole. In both segments, it is clear that PCCW-HKT retains its significant presence as the largest player. Table 20, Table 21, and Table 22 then set out the safe harbour analysis for local fixed voice services.

Table 17 Residential fixed voice subscriptions by operator, February 2025

	Exchange lines	Non-exchange lines	Total
HKBN	[redacted]		
CMHK	[redacted]		
Merged Entity	[redacted]		
PCCW-HKT	[redacted]		
HGC	[redacted]		
[redacted]			

	Exchange lines	Non-exchange lines	Total
[redacted]			
Total	**677,265**	**1,017,286**	**1,694,551**

Source: OFCA

Note: Exchange lines (i.e. direct dialling in lines, facsimile lines, and datel lines) and non-exchange (i.e. mainly but not exclusively VoIP) lines for residential customers as at February 2025. Values for HKBN and CMHK are group totals.

Table 18 Business fixed voice subscriptions by operator, February 2025

	Exchange lines	Non-exchange lines	Total
HKBN	[redacted]		
CMHK	[redacted]		
Merged Entity	[redacted]		
PCCW-HKT	[redacted]		
HGC	[redacted]		
[redacted]			
Total	**1,160,113**	**411,400**	**1,571,513**

Source: OFCA

Note: Exchange lines (i.e. direct dialling in lines, facsimile lines, and datel lines) and non-exchange (i.e. mainly but not exclusively VoIP) lines for residential customers as at February 2025. Values for HKBN and CMHK are group totals.

Table 19 Total fixed voice subscriptions by operator, February 2025

	Exchange lines	Non-exchange lines	Total
HKBN	[redacted]		
CMHK	[redacted]		
Merged Entity	[redacted]		
PCCW-HKT	[redacted]		
HGC	[redacted]		

	Exchange lines	Non-exchange lines	Total
[redacted]			
Total	**1,837,378**	**1,428,686**	**3,266,064**

Source: *OFCA*

Note: *Exchange lines (i.e. direct dialling in lines, facsimile lines, and datel lines) and non-exchange (i.e. mainly but not exclusively VoIP) lines for residential customers as at February 2025. Values for HKBN and CMHK are group totals.*

Table 20 Local fixed voice services safe harbour tests – residential segment

	Exchange lines	Non-exchange lines	All lines
		HHI	
Pre-Merger HHI	[redacted]		
Post-Merger HHI	[redacted]		
Increment	[redacted]		[50 - 100]
Result	**Pass**	**Fail**	**Fail**
		CR4	
Joint market share	[redacted]		[20% - 30%]
CR4	[redacted]		
Result	**Fail**	**Fail**	**Fail**

Source: *Frontier analysis based on OFCA data*

Note: *Market shares based on number of lines as at February 2025.*

Table 21 Local fixed voice services safe harbour tests – business segment

	Exchange lines	Non-exchange lines	All lines
		HHI	
Pre-Merger HHI	[redacted]		
Post-Merger HHI	[redacted]		

	Exchange lines	Non-exchange lines	All lines
Increment	[redacted]		
Result	**Pass**	**Pass**	**Pass**
	CR4		
Joint market share	[redacted]		
CR4			
Result	**Pass**	**Fail**	**Fail**

Source: Frontier analysis based on OFCA data
Note: Market shares based on number of lines as at February 2025.

Table 22 Local fixed voice services safe harbour tests – overall (residential and business)

	Exchange lines	Non-exchange lines	All lines
	HHI		
Pre-Merger HHI	[redacted]		
Post-Merger HHI			
Increment			
Result	**Pass**	**Fail**	**Pass**
	CR4		
Joint market share	[redacted]		
CR4			
Result	**Fail**	**Fail**	**Fail**

Source: Frontier analysis based on OFCA data
Note: Market shares based on number of lines as at February 2025.

9.1.6 When considering fixed voice services as a single market, the merger passes the safe harbour test, as the HHI test is passed. When considering the residential segment separately, the merger fails the safe harbour test (though only marginally in relation to the HHI, where the increment threshold is 50).

9.1.7 In view of the very small market share of CMHK in this market, the overall market structure is not significantly affected by the merger: PCCW-HKT will continue to be by far the largest operator in the market, HGC is a significant [redacted] competitor, and the relative position of HKBN will not change significantly with the addition of CMHK's small fixed voice customer base.

9.1.8 We also note that, similar to retail fixed internet access services, retail voice services are also downstream of the local access network services market. Our findings in relation to the local access network services market and the remedies offered support the view that it is unlikely that significant competition issues will arise in the local fixed voice services market.

9.1.9 Therefore, the evidence is consistent with the merger not leading to a significant lessening of competition in relation to fixed voice services, regardless of whether the market is segmented into residential and business segments or not.

9.1.10 One stakeholder has raised a different theory of harm in relation to fixed voice services: that it may become difficult for this stakeholder to source 'soft switching services',[129] which are necessary for providing fixed voice services and which, according to this stakeholder, are not available from providers other than HKBN and CMHK. The available evidence does not suggest that the Proposed Transaction is likely to lead to a substantial lessening of competition in this respect given that the stakeholder in question does not have a material presence in the local fixed voice services market.

9.2 Retail mobile services

9.2.1 There are currently four MNOs providing retail mobile services in the Hong Kong market: PCCW-HKT, CMHK, HTCL, and SmarTone. In addition, there are more than 20 MVNOs active in the market, i.e. operators who do not own mobile network infrastructure or spectrum, but instead supply mobile services via wholesale access agreements. Beyond the four MNOs, two other companies – Genius Brand Limited and VNET – hold radio spectrum that could be used to provide retail mobile services; however, they are not currently active in the market.[130]

9.2.2 Table 23 and Table 24 set out market share data and the safe harbour measures for retail mobile services. [redacted] is the market leader with [redacted]% market share (in terms of customers), followed by [redacted] ([redacted]%) and [redacted] ([redacted]%). HKBN is an MVNO with [redacted]% market share.

129 We understand that that soft switching services refer to software-based voice switching solutions that manage and route telephone calls in IP-based or hybrid telecom networks.

130 Information from OFCA.

Table 23 Subscription volumes and associated market shares in the retail mobile services market

	Number of mobile subscribers ('000s)	Subscriber-based market share
CMHK	[redacted]	
HKBN		
Merged Entity		
PCCW-HKT		
HTCL		
SmarTone		
Other MVNOs*		
Total	**27,231**	

Source: *OFCA data*

Note: *'Other MVNOs' data includes all MVNOs except HKBN and CMI (the latter of which is included in the figures for CMHK). Without CMI, CMHK's market share is approximately [redacted]%. Total retail mobile subscriber base as at February 2025.*

Table 24 Retail mobile services – safe harbour tests

	Overall result for retail mobile market
HHI	
Pre-Merger HHI	[redacted]
Post-Merger HHI	
Increment	[50 – 100]
Result	**Fail**
CR4	
Joint market share	[30% - 40%]
CR4	[redacted]
Result	**Fail**

Source: *Frontier analysis based on OFCA data*

Note: *Based on market shares as at February 2025.*

9.2.3 While the merger marginally fails the safe harbour test in relation to the market for mobile services, we do not consider that this evidence warrants a detailed assessment of this market. Firstly, HKBN does not have its own mobile network (it is an MVNO), which means infrastructure-based competition will be unchanged. Secondly, the market structure will not be materially affected by the merger given that CMHK's size and market power relative to its competitors will not change materially.

9.2.4 Third parties to the merger have raised concerns in relation to CMHK's strength in retail mobile services, CMHK's acquisition of HKBN's mobile customers representing an "*[elimination of] competition by removing the* [redacted] *competition-driven process to acquire new customers*", as well as the Proposed Transaction reducing the number of operators and increasing prices. Given that the Proposed Transaction will not materially affect CMHK's competitive position in the retail mobile services market, such concerns are not justified. For the reasons explained above, we consider that the Proposed Transaction raises neither unilateral nor coordinated concerns in the retail mobile services market and therefore does not lead to a lessening of competition.

9.2.5 A third party also raised a concern that in case of a merger between an FNO and an MNO, the Merged Entity will usually be required to divest any mobile customers the FNO might have through MVNO arrangements. Given the limited number of mobile customers HKBN has, no horizontal concerns arise that could justify requiring such a divestment. It is unclear what the third party's claim is based on, as there are precedents where such divestments were not required.[131]

9.3 Mobile access network services

9.3.1 As set out in Section 4.8, mobile access network services relate to the provision of access to mobile networks that enable operators without their own mobile network or spectrum to provide retail mobile services. There are 4 MNOs who are able to provide such services and 24 MVNOs that purchase such service.[132]

9.3.2 CMHK is active in the mobile access network services market as it has its own mobile network infrastructure and offers MVNO access. HKBN is not active in this market, however, it is active in the mobile services market as an MVNO (i.e. downstream of the mobile access network services market). HKBN relies on the mobile networks of CMHK, SmarTone and HTCL for the provision of mobile services.

9.3.3 The number of mobile networks in the market will not change as a result of the merger. CMHK is already vertically integrated given it is also active as a retailer in

131 E.g. the Virgin/O2 merger in the UK. See: https://www.gov.uk/government/news/cma-provisionally-clears-merger-of-virgin-and-o2.

132 Information from OFCA.

the mobile services market. The merger is unlikely to affect its ability or incentive to engage in input or customer foreclosure.

(a) **Input foreclosure**: CMHK's incentives to offer MVNOs access are unlikely to change post-merger. Indeed, if CMHK were to deny access to MVNOs (or to increase price/ reduce quality of access), there would still be three other mobile networks for MVNOs to choose from (PCCW-HKT, HTCL and SmarTone). Therefore, CMHK would not be able to gain from foreclosing MVNOs.

(b) **Customer foreclosure**: If HKBN were to switch its demand for MVNO access from SmarTone and HTCL to CMHK exclusively, this is unlikely to have a material impact on HTCL and SmarTone for two reasons: (i) HKBN mobile customer base is small (only [redacted]% of mobile customers in Hong Kong) and (ii) there are other MVNOs present in the market (which excluding HKBN and CMI collectively comprise [redacted]% of mobile customers in Hong Kong – as illustrated by Table 23).

(i) We note that whilst a third party raised concerns about the impact on their MVNO business of losing HKBN as a customer, this does not constitute a competition concern in itself (the Guideline sets out that merger control is about "*protection of the process, not the competitor").*[133]

9.3.4 In light of the above evidence, the merger is unlikely to lead to a lessening of competition in this market.

9.4 Access to external telecommunications facilities

9.4.1 As of December 2024, there are more than 40 operators authorised to provide ETF services. Most external capacity services are delivered through submarine and/or overland cables, with very few operators providing satellite services. CMHK is authorised to provide external fixed services through CMI. Therefore, the Merging Parties are both in the supply of ETF services.[134]

9.4.2 Table 25 to Table 29 set out market share data and the safe harbour measures in relation to the market for ETF.[135] [136] As set out in Section 4.9, the relevant market encompasses all different technologies, as well as cross-border connectivity and

133 The Guideline, paragraphs 3.26-3.27.

134 Information from OFCA.

135 Given that CMHK and CMI are part of the same group, we treat them as a single entity in the calculations in this section (i.e. we add their market shares together).

136 We do not present safe harbour tests for the satellite segment given that neither HKBN nor CMHK are active in this segment.

non-cross-border connectivity – we therefore focus on the market wide figures for the rest of this analysis (rather than the figures by technology).

Table 25 Access to external telecommunications facilities (activated & equipped), December 2024 - Total

	Activated (Mbps)	Equipped (Mbps)
CMHK	[redacted]	
HKBN	[redacted]	
Merged Entity	[redacted]	
[redacted]		
Total	**239,279,527**	**284,130,563**

Source: OFCA data

Note: "Activated Capacity" refers to the capacity of the external circuits, which are being used by the customers. “Equipped Capacity" refers to the capacity of the external circuits, which are equipped with the necessary termination equipment so that the capacity is readily available to customers in Hong Kong upon request.

Table 26 Access to external telecommunications facilities (activated & equipped), December 2024 - Cables

	Overland cable		Submarine cable	
	Activated (Mbps)	Equipped (Mbps)	Activated (Mbps)	Equipped (Mbps)
CMHK	[redacted]			
HKBN	[redacted]			
Merged Entity	[redacted]			
[redacted]				
Total	[redacted]			

Source: OFCA data

Note: "Activated Capacity" refers to the capacity of the external circuits, which are being used by the customers. "Equipped Capacity" refers to the capacity of the external circuits, which are equipped with the necessary termination equipment so that the capacity is readily available to customers in Hong Kong upon request.

Table 27 Access to external telecommunications facilities (activated & equipped), December 2024 - Satellite

	Activated (Mbps)	Equipped (Mbps)
CMHK	[redacted]	
HKBN	[redacted]	
Merged Entity	[redacted]	
[redacted]		

	Activated (Mbps)	Equipped (Mbps)
[redacted]		
Total	**2,306**	**6,402**

Source: *OFCA data*

Note: *"Activated Capacity" refers to the capacity of the external circuits, which are being used by the customers. "Equipped Capacity" refers to the capacity of the external circuits, which are equipped with the necessary termination equipment so that the capacity is readily available to customers in Hong Kong upon request.*

Table 28 Access to external telecommunications facilities safe harbour tests – All technologies

	Based on activated capacity	Based on equipped capacity
	HHI	
Pre-Merger HHI	[redacted]	
Post-Merger HHI		
Increment	Less than 50	Less than 50
Result	**Pass**	**Pass**
	CR4	
Joint market share	[redacted]	
CR4		
Result	**Fail**	**Fail**

Source: *Frontier analysis based on OFCA data*

Note: *Based on market shares as at December 2024*

Table 29 Access to external telecommunications facilities safe harbour tests – Cables

	Overland (activated)	Overland (equipped)	Submarine (activated)	Submarine (equipped)
		HHI		

	Overland (activated)	Overland (equipped)	Submarine (activated)	Submarine (equipped)
Pre-Merger HHI	[redacted]			
Post-Merger HHI				
Increment				
Result	**Pass**	**Pass**	**Pass**	**Pass**
CR4				
Joint market share	[redacted]			
CR4				
Result	**Fail**	**Fail**	**Fail**	**Fail**

Source: Frontier analysis based on OFCA data
Note: Based on market shares as at December 2024

9.4.3 The merger passes the safe harbour test in relation to ETF, as the HHI test result is far below the 50 increment threshold. As such, the available evidence indicates that a detailed assessment of horizontal concerns in this market is not warranted.

9.4.4 A number of third parties have raised concerns in relation to CMHK's strong position in ETF, and that after the merger, CMHK might foreclose access to ETF. This would involve the Merged Entity either refusing to supply access to ETF facilities or worsening the terms of supply offered to FNOs and MNOs. The Merged Entity may benefit from this input foreclosure strategy if it manages to undermine the competitive strength of its competitors in the retail internet fixed access services market or the retail mobile services market.[137] In addition, during initial inquiry, [redacted] submitted a comment asserting that CMHK may benefit from cross subsidisation and suggesting that available capacity within the China Mobile group could be deployed to support CMHK's operations in Hong Kong and urge OFCA to further consider the risk of CMHK cross subsidizing from its Mainland and international businesses. The submission further implied or claimed that CMHK's business operates under the management and direction of China Mobile group leading to an alleged lack of segregation between its respective businesses activities.

9.4.5 With respect to input foreclosure into the retail mobile services market: the merger does not materially change CMHK's position in either the ETF market (as set out above) or in the retail mobile services market (as set out in Section 9.2). As such,

137 See detailed description of input foreclosure theories of harm in Sections 3.4.2 and 7.3.

the merger would not lead to a material change in CMHK's ability or incentive to foreclosure; meaning that this concern is not justified.

9.4.6 With respect to input foreclosure into the retail internet access services market: While CMHK's position in the ETF market will not change materially, it will become a stronger player in the retail internet access services market (as set out in Section 6). However, it is not clear that CMHK would have the ability to foreclose given there are a number of other large players in the market; and that these operators have spare capacity equivalent to 16% of the total equipped capacity in the market (i.e. in the event of foreclosure attempt by CMHK, their customers would be able to switch to other providers).[138]

9.4.7 With respect to submission which raised concerns about potential cross subsidization between CMHK and its Mainland affiliates or parent group of companies: this does not appear to be a concern arising from the Proposed Transaction. Furthermore, the submission does not include documentary evidence, verifiable financial analysis or market analysis capable of substantiating the existence of cross subsidisation or demonstrating its effects on competition in any defined telecommunications market in Hong Kong.

9.4.8 Given the above, the available evidence indicates that concerns mentioned above about the Proposed Transaction giving rise to an SLC Effect are not justified.

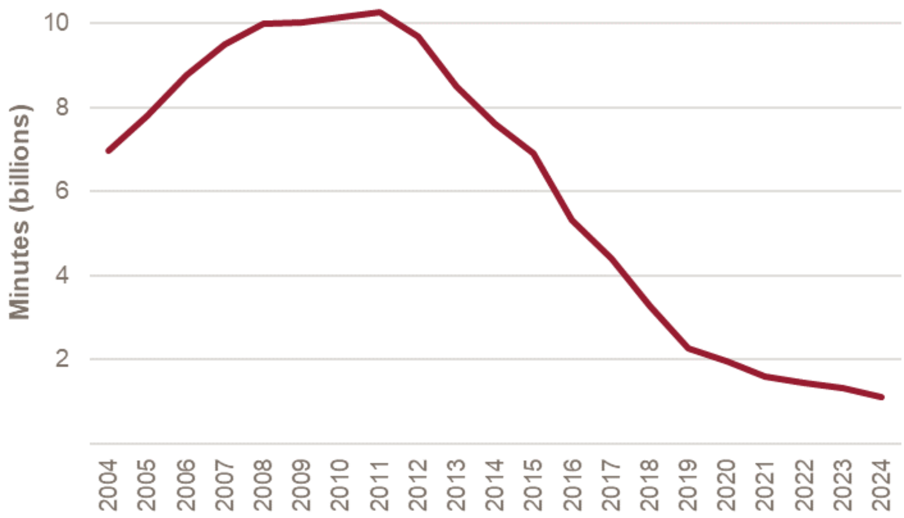
9.5 External telecommunications services

9.5.1 As Figure 4 shows, external telecommunications services volumes have been declining rapidly with the number of minutes falling from 2.3bn to 1.3bn in the five years to 2023. The HKBN/WTT assessment identified switching to cheaper and higher quality instant messaging and VoIP services as the key driver of this trend.[139] The breakdown of this traffic by incoming route and outgoing destination is shown in Table 30.

138 Spare capacity estimate based on market data from OFCA.

139 HKBN/WTT merger assessment, page 86.

Figure 4 External telecommunications services (billions of minutes)



Source: OFCA data

Table 30 External telecommunications traffic by incoming route and by destination, 2024

Incoming route / Outgoing destination	Incoming minutes ('000s)	Outgoing minutes ('000s)
Australia	8,588	6,106
Canada	39,732	7,328
France	66	1,768
Germany	36	758
India	2,375	6,668
Indonesia	444	13,189
Japan	649	12,150
Macau	5,377	5,290
Mainland China	118,147	387,531
Malaysia	18,363	7,843
New Zealand	389	689
Philippines	1,099	6,220
Singapore	9,148	4,963

Incoming route / Outgoing destination	Incoming minutes ('000s)	Outgoing minutes ('000s)
South Korea	443	2,203
Taiwan	1,140	8,112
Thailand	893	7,251
United Kingdom	1,058	5,062
United States of America	3,681	11,662
Others	165,845	238,161

Source: OFCA

9.5.2 Over the past few years, we have observed a notable decline in the total external telecommunications traffic volume in minutes, as highlighted in Figure 4, indicating a diminishing significance of the market. Additionally, HKBN's relatively low share of the market in 2018 (5-10%),[140] declining volumes as well as the existence of substitutes are all consistent with the Proposed Transaction being unlikely to lead to competition concerns in relation to external telecommunications services.

9.5.3 A third party has raised a specific concern that if the Merged Entity introduces ultra-low-priced or free bundled IDD services with its fixed-line internet access services to capture market share, it may pose significant challenges for competitors. The available evidence does not indicate that the Proposed Transaction would raise competition concerns in this regard. Even absent the merger, CMHK is able to offer such bundles (given its presence in the ETF market and the retail internet services market).

9.6 IT services

9.6.1 Both Merging Parties are in the provision of IT services (e.g. cloud services, cybersecurity, services related to data centres). CMHK estimates that it has a very small share [redacted] of the IT services market.[141] We estimate that HKBN's share of the market is likely to be about [redacted]% or less.[142] The Merging Parties' small share and the disaggregated market structure suggest that the Proposed Transaction is not likely to give rise to any competition concerns in relation to IT services.

140 HKBN/WTT merger assessment, page 90.

141 CMHK RFI response.

142 HKBN's 2024 Annual Report states that HKBN earned ~HKD1.2bn from "Technology solutions and consultancy services". Even if all these revenues were related to IT services (which they may not be), [redacted]. See HKBN 2024 Annual Report, page 179 (available at: available at: https://reg.hkbn.net/WwwCMS/upload/pdf/en/e_AnnualReport_2024.pdf).

10 Commitments offered by the merging parties

10.1.1 Parties can offer commitments under Section 60 of the Competition Ordinance to mitigate anti-competitive effects that would otherwise result from a merger. In order to be accepted, these *"should be able to eliminate or avoid the effect of substantially lessening competition in a relevant market that is, or is likely to be, brought about by the merger or proposed merger*".[143]

10.1.2 The Proposed Transaction might substantially lessen competition in the market for fixed local access network services. This effect, discussed in Section 5, would be concentrated in areas where (i) the fixed networks of CMHK and HKBN currently overlap or (ii) where they might overlap in the future (given that CMHK would continue to roll out its own network in the counterfactual absent the merger), and where competitors of the Merging Parties do not currently have access to the buildings and could require access in the future. This has the potential to have undesirable knock-on effects in the downstream retail internet access market.

10.1.3 To address this concern, CMHK has offered an 'In-Building System Commitment'.[144] This guarantees that:

(a) where an FNO encounters difficulties accessing buildings to install its own in-building telecommunications systems where HKBN owns the in-building telecommunications systems, the Merged Entity will facilitate access to this system for such FNOs,[145]

(b) the terms and conditions for such access will be commercially negotiated on a fair and reasonable basis,[146] and

(c) if the parties cannot come to an agreement on the terms, CA "*may select from among alternative costing methods what it considers to be a fair and reasonable costing method*".

10.1.4 CMHK has also offered a 'Procurement Commitment' that is aimed to ensure that all entities within its group also abide by the In-Building System Commitment; and

143 The Guideline, paragraph 5.11.

144 Commitments given by CMHK to the CA pursuant to section 60 of the Competition Ordinance (Cap. 619).

145 This includes but not limited to (a) any in-situ blockwiring circuits, be they copper-based or fibre-based, vertical or horizontal; (b) lead-in ducts/cables for accessing a relevant building; (c) cabinet space in the telecommunications and broadcasting equipment (TBE) room; (d) vertical cable risers; and (e) horizontal conduits.

146 The Merged Entity may require the Requesting Operator to provide evidence to demonstrate that there are no other feasible means of access to that Relevant Building for the purposes of installing any elements of an in-building telecommunications system for the provision of fixed telecommunications services to end-customers within that building.

a 'Reporting Commitment' that commits CMHK to submitting written reports to OFCA on compliance with the In-Building System Commitment.[147]

10.1.5 Furthermore, in response to the views expressed in the representations regarding to the concern over the access to HKBN's network for provision of mobile backhaul services under current contractual arrangement, CMHK has voluntarily offered an extension of the In-Building System Commitment to include mobile backhaul services for a period of three years to preserve the terms and conditions of existing contracts signed with the MNOs for provision of mobile backhaul services which is therefore referred to as "**In-Building System and Mobile Backhaul Services Commitments**". The Procurement Commitment and Reporting Commitment also applies to the In-Building System and Mobile Backhaul Services Commitments. This should ensure that HKBN continues providing backhaul services to any MNO at prevailing market terms and conditions or on terms and conditions which are no less favourable than those currently offered to that MNO or other market players.

Assessment

10.1.6 The competition concern identified was in relation to those buildings and areas (i) where both CMHK and HKBN have existing network coverage or (ii) where they could both have coverage if CMHK continued rolling out as an independent operator, and where the number of networks post-merger would be fewer than four.

10.1.7 Absent the merger, if a provider of fixed retail internet access services wished to offer such services in a building where it had not installed its own in-building telecommunications system, it could do so by either (a) installing such a system or (b) where this was uneconomic or impractical, seek access to an in-building system that was already installed by an FNO.

10.1.8 In buildings where installing an additional in-building telecommunications system is uneconomic or impractical, the merger could lead to a reduction in the number of FNOs with installed in-building telecommunications systems. The competition concern is that where such reduction led to 2 and potentially 3 FNOs with installed in-building telecommunications systems, a rival retail provider of internet access services could be foreclosed as the FNOs in such buildings could have a reduced incentive to offer access to their retail rivals.

10.1.9 Our understanding of the proposed In-Building System Commitment (jointly with the Procurement Commitment) is that it encompasses all of these buildings, and

147 Commitments given by CMHK to the CA pursuant to section 60 of the Competition Ordinance (Cap. 619).

would enable retail rivals to the Merging Parties to be able to offer retail internet access services in such buildings.[148]

10.1.10 In addition, CMHK has taken into account the views expressed in the representations and has voluntarily offered an extension of the In-Building System Commitment to include mobile backhaul services for a period of three years. This addresses concerns in relation to access to mobile backhaul services at least three years post-merger, whilst the available information suggests that in the longer term, there are unlikely to be issues in relation to this market.

10.1.11 The Reporting Commitment should facilitate OFCA's monitoring of the implementation of the Commitments.

10.1.12 In summary, if the remedies are implemented as committed, they will remove the competition concerns identified in the relevant markets.

Concerns raised by third parties

10.1.13 Some operators raised concerns in relation to the provision of mobile backhaul services (see paragraph 7.1.3). In response to these concerns, we understand that, as an expansion to its infrastructure access commitments proposed in relation to the fixed local access network services market, CMHK has voluntarily offered the revised commitments. The major revision to the commitments is on the extension of the In-Building System Commitment to include mobile backhaul services for a period of three years to preserve the terms of existing backhaul contracts for three years. In particular, such commitments should ensure HKBN continues providing backhaul services to any mobile operator at prevailing market terms and conditions or on terms and conditions which are no less favourable than those currently offered to that MNO or other market players. These obligations would last for a period of three years starting from the effective date.

10.1.14 The revised commitments should mitigate any concerns regarding potential mobile backhaul foreclosure at least for three years post-merger, while ensuring continuity of service and facilitating effective planning for backhaul customers.

10.1.15 Some operators raised concerns around the range of buildings covered under the proposed In-Building System Commitment. Some respondents stated that the commitment should cover all buildings covered by either HKBN or CMHK (rather than just those covered by HKBN); as well as buildings HKBN may roll out to after the merger. Our understanding is that all buildings where the competition concern

148 Note that it is sufficient to impose this remedy on the HKBN network only (rather than on both networks) given its high degree of overlap with CMHK's network (well over [redacted]%).

identified would be raised are covered by the commitment.[149] To the extent there are building access issues in other buildings (unrelated to the Proposed Transaction), it is not appropriate to address these via remedies on the Proposed Transaction. It is also not necessary that the remedy serve as an alternative to FNOs rolling out their own network where there are no barriers to this.

10.1.16 We note that third parties have also raised concerns regarding implementation details such as requesting operator, dispute resolution, procurement commitment and reporting commitment. For example, [redacted] requested that a prescribed timeframe be set for CMHK to respond to any access request in order to ensure the commercial viability of the commitment. As these do not relate directly to economic considerations, we do not comment on them.

10.1.17 Some operators proposed alternative commitments for OFCA's consideration, such as investment commitment and divesture of fixed assets of the Merged Entity. For example, [redacted] submitted that the Merged Entity should either divest its overlapping fixed assets or, alternatively, be subject to regulatory separation in order to preserve the current level of competition. [redacted] also submitted that the Merged Entity should be required to invest a specified amount of capital for certain period to upgrade or demonstrate its commitment to its network infrastructure. However, our assessment of the commitment indicates that it should be able to address the competition concern identified.

149 Note that there is no reduction in the number of available networks in buildings where one of the Merging Parties is present via leased network, so it is not necessary for the remedy to cover such buildings.

Annex A Additional activities where the Merging Parties may overlap

A.1 Interconnection services

A.1.1 Interconnection services refer to the provision of interconnection between different networks (fixed or mobile) when a call originates on one network but terminates on another. Each network is normally considered to constitute a separate relevant market, as there is no substitute for call termination on a specific network – i.e. the operator of the network has monopoly power over providing interconnection services for its network.

A.1.2 Hong Kong operates a deregulated call origination and termination system with terms and conditions for interconnection freely set by operators via commercial negotiations. Regulatory guidance on fixed-to-fixed interconnection charges (FFIC) was withdrawn in 2014, whilst regulatory guidance on fixed-to-mobile interconnection charges (FMIC) was withdrawn in 2009.[150]

A.1.3 It should be noted that the level of interconnection charge is entirely subject to commercial negotiations, operators are therefore constrained from raising interconnection prices by the threat of reciprocation if an operator raises the interconnection fee charged to a competitor, that competitor can respond by raising their interconnection fees. Whether a merger could have a detrimental effect on interconnection prices depends on whether it leads to a material increase in market power in local fixed voice services (which may reduce the relative threat of reciprocal price increases).

A.1.4 The available evidence indicates that the Proposed Transaction would not lead to a material change in either the local fixed voice services market or the mobile services market as discussed in Section 9. Furthermore, regulatory safeguard is in place should operators be unable to agree on the terms of interconnection. Although the interconnection charge in Hong Kong is not subject to regulatory guidance, Section 36A of the Telecommunications Ordinance (Cap. 106) stipulates that licensees may seek the CA's determination on the terms and conditions of interconnection including the level of charges. The CA is obliged to determine the charge pursuant to reasonable cost.[151]

A.1.5 Furthermore, in relation to fixed voice services, as this market is of declining importance, customers would be unlikely to be materially affected by price

150 Information from OFCA: see https://www.coms-auth.hk/en/media_focus/press_releases/index_id_366.html

151 See HKBN/WTT merger assessment, page 83.

increases (partly due to the availability of services that are increasingly substitutable, e.g. mobile voice).

A.1.6 Therefore, the available evidence suggests that the Proposed Transaction is unlikely to raise concerns in relation to fixed interconnection services.

A.2 Wholesale roaming services

A.2.1 Wholesale roaming services refer to the provision of interconnection between mobile networks across borders or countries. Hong Kong residents travelling in Mainland China or in other countries rely on such roaming agreements between their mobile services provider and mobile operators at their destination region or country to be able to access mobile services while travelling. Similarly, visitors to Hong Kong rely on these agreements to get access to mobile services, while in Hong Kong.

A.2.2 One operator contested that CMHK's strong position in Mainland China would allow it to increase its wholesale roaming tariffs. We set out in Section 9.2 that the Proposed Transaction is unlikely to have a material impact on the mobile services market, as HKBN is very small and does not operate its own network. As such, the Proposed Transaction is unlikely to change CMHK's bargaining position and incentives in wholesale roaming negotiations. Therefore, neither roaming prices for CMHK customers nor prices for visitors roaming on CMHK's network are likely to be affected by the Proposed Transaction.

Annex B Glossary of technical terms

Table 31 Glossary of technical terms

Call origination services	**Call origination** services refer to the telecommunications services that handle the initial stage of a phone call - that is, when a user initiates or "originates" a call from their device. These services are responsible for routing the call from the caller's network to the appropriate destination network, which may be another fixed or mobile network, or an international gateway.
[redacted]	[redacted].
ETF	**External Telecommunications Facilities (ETF)** refer to facility-based telecommunications services that connect Hong Kong with locations outside its borders, using infrastructure such as submarine cables, overland cables, and/or satellites.
ETS	**External Telecommunications Services (ETS)** include a range of international/interregional communication services such as international/interregional voice calls, callback services, calling card services, virtual private network services, and voice services delivered over data networks like the internet.
Exchange/non-exchange lines	**Exchange lines** are fixed telephony lines that are physically connected to the local telephone exchange. Direct dialling in lines, facsimile lines, and datel lines are all types of exchange lines, whereas non-exchange lines are mainly (but not exclusively) comprised of IP telephony services and wireless fixed telephony services.
FMC	**Fixed-Mobile Convergence (FMC)** is a concept that refers to the integration of fixed and mobile services to provide users with bundled services.
FNO	A **Fixed Network Operator (FNO)** is a telecommunications service provider that owns, operates, and maintains fixed-line infrastructure to deliver communication services such as voice calls, internet access and television.
FWA	**Fixed Wireless Access (FWA)** is a telecommunications technology that delivers internet access internet and voice services to fixed locations using wireless technology instead of traditional wired infrastructure such as copper or fibre.

ICF	An **Important competitive force (ICF),** refers to any entity that significantly influences the intensity of competition in a particular market.
MNO	A **Mobile Network Operator (MNO)** is a telecommunications provider that builds, operates, and maintains its own mobile network infrastructure to offer mobile services, including voice calls and data connectivity to end users.
Mobile backhaul	**Mobile backhaul** refers to the communication links that connect base stations such as cell towers to the core network. These connections collectively form what is known as the backhaul network.
Multiple-play services	**Multiple-play services** refer to bundled telecommunications offerings that combine various services into a single package. For example, a quadruple-play bundle typically includes fixed voice service, fixed internet access, mobile service, and television service.
MVNO	A **Mobile Virtual Network Operator (MVNO)** does not hold its own radio spectrum and depends on an MNO for network access and interconnection to deliver mobile services to its customers.
UCL	The **Unified Carrier Licence (UCL)** is a type of license issued by the CA in Hong Kong. It allows the licensee to operate both fixed and mobile telecommunications services under a single license framework.
VoIP	**Voice-over-IP (VoIP)** telephony enables users to make and receive calls using an internet access internet connection rather than a conventional telephone line.
3G, 4G and 5G	Different generations of cellular network technologies (i.e. 5G stands for fifth generation), which have different capabilities e.g. in terms of bandwidth.