



**Malaysian Communications and Multimedia Commission**

# **Market Definition Analysis**

**Definition of Communications Market in Malaysia**

**24 September 2014**

This document contains the final views on MCMC's market definition. The information in this document is intended as a guide only. For this reason it should not be relied on as legal advice or regarded as a substitute for legal advice in individual cases. The information contained in this document may be subjected to changes without notice.

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## **ABBREVIATIONS AND GLOSSARY**

ACCC	Australian Competition and Consumer Commission
ACMA	Australian Communications and Media Authority
ADSL	Asymmetric Digital Subscriber Line
ASEAN	The Association of Southeast Asian Nations
ASP	Application Service Provider
ATM	Asynchronous Transfer Mode
BEREC	Body of European Regulators for Electronic Communications
BT	British Telecom
CBD	Central Business District
CIIP	Common Integrated Infrastructure Provider
CMA	Communications and Multimedia Act 1998
DEL	Direct Exchanged Line
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DTCS	Domestic Transmission Capacity Services
DTT	Digital Terrestrial Television
DTTB	Digital Terrestrial Television Broadcast
EC	European Commission
EIC	External Interconnection Cable
EPL	European Premiere League
ESA	Exchange Service Area
F2M	Fixed to Mobile
FA	Football Association
FAD	Final Access Determination
FIFA	International Federation of Football Association
FTA	Free to Air
FTAS	Fixed Terminating Access Service
FTTB	Fibre to the Business
FTTH	Fibre to the Home
Gbit	Giga Bit Per Second
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HD	High Definition
HSBB	High Speed Broadband Network
HSPA	High Speed Packet Access
IDA	Info-Communications Development Authority of Singapore

IEEE	Institute of Electrical and Electronic Engineers
IMT	International Mobile Telecommunications
IPLC	International Private Leased Circuit
IPTV	Internet Protocol Television
IPVPN	Internet Protocol Virtual Private Network
ISDN	Integrated Services Digital Network
ITS	International Telephone Services
ITU	International Telecommunications Union
IXP	Internet Exchange Point
Kbps	Kilo Bit Per Second
LLC	Local Leased Circuit
LMDS	Local Multipoint Distribution Services
LSS	Line Sharing Service
LTE	Long Term Evolution
Mbps	Mega Bit Per Second
MCMC	Malaysian Communications and Multimedia Commission
MDA	Media Development Authority of Singapore
MDF	Main Distribution Frame
METRO-E	Metro Ethernet
MMS	Multimedia Messaging Service
MNO	Mobile Network Operator
MTAS	Mobile Terminating Access Service
MVNO	Mobile Virtual Network Operator
MyIX	Malaysian Internet Exchange
NBA	National Basketball Association
NBN	National Broadband Network
NRA	National Regulatory Authority
OFCOM	The Office of Communications of UK
OPTA	The Independent Post and Telecommunications Authority of Netherlands
OSI	Open Systems Interconnection
OTT	Over-the-Top
PDH	Plesiochronous Digital Hierarchy
POI	Point of Interconnection
POP	Point of Presence
PSSB	Puncak Semangat Sendirian Berhad
PSTN	Public Switched Telephone Network
PTS	Postal Telecommunications Authority of Sweden
RTR	Austrian Regulatory Authority for Broadcasting and Telecommunications

SD	Standard Definition
SDH	Synchronous Digital Hierarchy
SDSL	Symmetric Digital Subscriber Line
SEA	South East Asia
SKA	Sender Keeps All
SME	Small and Medium Enterprise
SMS	Short Messaging Services
SSNIP	Small but significant non-transitory increase in price
SUKMA	Sukan Malaysia
TRA	Telecommunications Regulatory Authorities
TVRO	Television Received Only
UHF	Ultra High Frequency
ULL	Unbundling of local loop
UMTS	Universal Mobile Telecommunications System
UNE	Upstream Network Element
VDSL	Very High Bit Rate Digital Subscriber Line
VHF	Very High Frequency
VOD	Video on Demand
VOIP	Voice Over Internet Protocol
VPN	Virtual Private Network
VSAT	Very Small Aperture Terminal
WIMAX	Worldwide Interoperability for Microwave Access
WLR	Wholesale Line Rental
3G	Third Generation
4G	Fourth Generation

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## Part A Background, objective and approach

### 1 Background

- 1.1 The Malaysian Communications and Multimedia Commission (**MCMC**) has conducting a study on the assessment of dominance in the communications market and has published a Public Inquiry Report on the Assessment of Dominance in a Communications Market dated 24 September 2014.
- 1.2 In 2003, the MCMC undertook a dominance study which resulted in the publication of a public inquiry report on 8 December 2004 (**2004 Dominance Study**). This study was followed by a Commission Determination on Dominant Position in Communications Market (**Determination**) under section 137 of the *Communications and Multimedia Act 1998 (CMA)*, in which a number of licensees were found to be dominant in specified communications market. The Determination was valid for a period of two years and has since lapsed.
- 1.3 Since the 2004 Dominance Study, the communications sector in Malaysia has experienced (and continues to experience) significant technological and product innovation. In the broadcasting sector, this has included the movement from linear to on-demand supply, the emergence of new cable operators, an increase in intermodal competition (for example IPTV versus traditional media platforms) and a planned migration from analogue to digital broadcasting scheduled to begin in 2015. In the telecommunications sector this has included the allocation of spectrum bands to support 4G technologies, the emergence of OTT services and the introduction of triple-play bundles.
- 1.4 The MCMC has determined that it is timely to conduct another dominance study that addresses changes in the communications market (**Dominance Study**). Central to the MCMC's Dominance Study is the definition of what constitutes a 'communications market', which is the purpose of this Market Definition Analysis.
- 1.5 Work on the Dominance Study and this Market Definition Analysis commenced in November 2013. The first phase of the project involved gathering data and information on the Malaysian communications sector and key participants. For this purpose, a questionnaire was sent to all major licensees.
- 1.6 Following the issuing of the questionnaire, the MCMC met with licensees in November 2013. The purpose of these meetings was to introduce the Dominance Study and this Market Definition Analysis to licensees and discuss any questions from licensees arising from the questionnaire. The MCMC had posed a series of questions in the Market Definition Analysis document dated 7 April 2014 in relation to each proposed market. Feedback that has been received to those questions were used to verify and improve the accuracy of the MCMC's proposed market definitions.

- 1.7 Any information that was provided to the MCMC on a confidential basis and which the MCMC is satisfied is not otherwise available from public sources has been redacted and marked with the reference “c-i-c” (i.e. commercial-in-confidence). This information has been used by the MCMC in formulating its views, but not disclosed due to confidentiality restrictions.
- 1.8 Lastly, it should be noted that it is often difficult to define the boundaries of a relevant market with precision. While the analytical tools for defining markets discussed below provide a useful framework for defining markets, generally the process of defining the market involves value judgments and a balancing of the available evidence.

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## **2 Feedback**

- 2.1 This Market Definition Analysis sets out the MCMC’s proposed market definitions for a range of communications-related products, services and facilities. A list of proposed communications market are set out in section 6 of Part A below.
- 2.2 An informal consultation process was held to provide selected licensees with an opportunity to review the MCMC’s proposed market definitions. Parties were given 30 days to provide feedback on the proposed communications market by 7 May 2014.
- 2.3 Any comments that were received at the conclusion of the review period were considered by the MCMC and fed into a formal public inquiry process. The formal public inquiry process was used to finalise the communications market definitions, which then was used to complete the Dominance Study.
- 2.4 In accordance with sections 134 and 138 of the CMA, the MCMC has also circulate revised guidelines on dominance and “substantially lessening competition” as part of the informal consultation process. These two guidelines will then be used, along with the final communications market definitions, to make a finding of dominance for particular communications market (where applicable).
- 2.5 Moving forward, the final definitions that are determined for the communications market identified in this Market Definition Analysis will ultimately be used to assist the MCMC in its ongoing oversight and enforcement of the ‘General Competition Practices’ provisions contained in Chapter 2 of Part VI of the CMA.
- 2.6 The MCMC will take a dynamic approach to market definition. As economic markets are inherently dynamic and continually changing, the MCMC will not be bound by the final market definitions that result from the formal public inquiry process. Instead, it is necessary that the MCMC retain the ability to review its market definitions on an ongoing basis when examining conduct in the future.



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### 3 Analytical framework for determining economic markets as set out in the Dominance Guidelines

#### The concept of a market

- 3.1 Market definition is an economic tool used by regulators and courts around the world to help identify the products and firms that compete with each other for the purposes of applying competition policy.<sup>1</sup>
- 3.2 This Market Definition Analysis focuses on the definition of 'communications market' in the Malaysian context. Under section 6 of the CMA, 'communications market' is defined to mean *"an economic market for a network service, or an applications service, or for goods or services used in conjunction with a network service or applications service, or for access to facilities used in conjunction with a network service or an applications service."*<sup>2</sup>
- 3.3 A relevant market is typically defined by reference to its product and geographic dimensions.<sup>3</sup> In some communications market it will also be necessary to closely consider the functional and time dimensions of the market. However, in many cases, the functional and temporal market dimensions will often be considered as part of the product and geographic dimensions of the market.<sup>4</sup>
- 3.4 The MCMC's approach to defining relevant communications market focuses on the identification of the product, geographic and functional dimensions of the market. While definition of a relevant market may also require consideration of a time dimension, where relevant, the MCMC has considered the time dimension as part of the delineation of the relevant product market. This is consistent with the approach taken by regulators in other jurisdictions.<sup>5</sup>

#### Product dimension

- 3.5 The product dimension is generally understood to comprise *"all those products and/or services which are regarded as interchangeable or substitutable by the consumer, by reason of the products' characteristics,*

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<sup>1</sup> For example, see European Commission, Notice on the Definition of the Relevant Market for the Purposes of Community Competition Law, *Official Journal of the European Community* [1997] C 372/5 paragraph 2.

<sup>2</sup> *Communications and Multimedia Act 1998*, section 6.

<sup>3</sup> O'Donoghue and Padilla, *The Law and Economics of Article 82 EC* (Hart publishing, 2006) page 64.

<sup>4</sup> The functional and temporal dimensions of the market are often considered as part of the product and geographic dimensions of the market. The Office of Fair trading has stated at paragraph 5.3 of its *Market definition: Competition law guideline* that: "To some extent, the time dimension is simply an extension of the product dimension: i.e. the product can be defined as the supply of train services at a certain time of day." Similarly, the Australian Competition and Consumer Commission (ACCC) states at paragraph 4.8 of its *Merger Guidelines* (2008) that: "The ACCC focuses on two key dimensions of substitution in characterising markets: the product dimension and the geographic dimension. In some cases, market definition requires close attention to the functional levels of the supply chain that are relevant to a merger or the particular timeframe over which substitution possibilities should be assessed. Generally, however, these functional and temporal considerations form part of the product and geographic dimension analysis."

<sup>5</sup> For example, at paragraph 4.8 of the Australian Competition and Consumer Commission, *Merger Guidelines* (November 2008), the ACCC states that: "Generally, however, these functional and temporal considerations form part of the product and geographic dimension analysis."

*their prices and their intended use.*"<sup>6</sup> The purpose of defining the relevant product market is to determine which collection of products or services fall within the same market.

- 3.6 To be considered part of the same product market, communications products and services must be substitutable. The concept of substitutability is discussed further below.

#### *Geographic dimension*

- 3.7 The geographic dimension of the market is defined by the European Commission (**EC**) to comprise "*the area in which the undertakings concerned are involved in the supply and demand of products or services, in which the conditions of competition are sufficiently homogeneous and which can be distinguished from neighbouring areas because the conditions of competition are appreciably different in those areas.*"<sup>7</sup>
- 3.8 The process of defining the relevant geographic market also involves the concept of substitutability. In particular, it involves considering whether a product or service supplied in one geographic region is substitutable for a product or service supplied in another geographic region. In general, the more the conditions of supply in neighbouring geographic regions diverge, the less likely it is that the products supplied in those geographic regions will be considered substitutable.
- 3.9 The purpose of defining the relevant geographic market is to determine the collection of geographic areas that are likely to fall within the same market. In particular, the analysis will identify whether the relevant communications market are national in scope or whether, for example, there are separate state-based or other geographic markets.

#### *Functional and Temporal dimensions*

- 3.10 The functional dimension of the market refers to the level of the supply chain at which products and services are supplied (for example, the wholesale or retail levels of the supply chain). While substitutability is the principle test used to define the relevant product and geographic dimensions of the market, it is less applicable for defining the relevant functional market. In determining the relevant functional market, the key issue for consideration is whether the behaviour of firms operating at one functional level of the market is constrained by substitution between products or geographic sources of supply at another functional level.<sup>8</sup>
- 3.11 The temporal dimension of the market refers to time characteristics of the market, such as cyclical patterns of demand or innovation/inter-generational products. For example, if services have differences in the level of demand during peak and off-peak times, it will be necessary to consider

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<sup>6</sup> European Commission, Notice on the Definition of the Relevant Market for the Purposes of Community Competition Law, *Official Journal of the European Community* [1997] C 372/5 paragraph 7.

<sup>7</sup> European Commission, Notice on the Definition of the Relevant Market for the Purposes of Community Competition Law, *Official Journal of the European Community* [1997] C 372/5 paragraph 8.

<sup>8</sup> *Australian Competition and Consumer Commission v Metcash Trading Limited* [2011] FCAFC 151 at [252].  
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whether services supplied during peak times are in a separate market to services supplied during off peak times. Further, if customers can defer the purchase of an existing product because a new product may be introduced in the future, it will be necessary to consider whether the new product and the existing product form part of the same market.

- 3.12 In determining the relevant time dimension of the market, the key issue for consideration is whether it is possible for customers or suppliers to substitute between time periods. In relation to, for example, inter-generational products, this will require a consideration of the extent to which customers consider existing products to be substitutable for products that may be introduced in the future. Factors such as the period of time in which the new product is expected to be introduced and the characteristics of the new product compared to existing products will be of particular relevance.
- 3.13 While consideration of the time dimension may be required when defining relevant communications market, typically analysis of the time dimension occurs as part of the analysis of the product dimension of the market.<sup>9</sup>

## **Substitutability**

- 3.14 A central concept in market definition is substitutability. Substitutability refers to the ability of a customer or supplier to switch from one product or service to an alternative in response to a change in the relative price, service or quality of the first product or service. In general, a product or service is considered to be 'substitutable' for another product or service if it is a close alternative to that product or service.
- 3.15 The importance of the concept of substitutability in market definition is highlighted by section 2 of the Competition Act 2010 which provides that:

*"a market in Malaysia or in any part of Malaysia, and when used in relation to any goods or services, includes a market for those goods or services and other goods or services that are substitutable for, or otherwise competitive with, the first-mentioned goods or services."*<sup>10</sup>

- 3.16 While the Competition Act 2010 does not govern the exercise by the MCMC of its powers under the CMA, the definition of a market under that Act provides useful guidance in defining communications market for the purposes of the CMA.
- 3.17 There are two types of competitive constraint that must be considered in a market definition exercise: demand side substitution, which refers to the willingness of customers to switch from one product or geographic region to

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<sup>9</sup> For example, see the Australian Competition and Consumer Commission, Merger Guidelines (November 2008) paragraph 4.8 <<http://www.accc.gov.au/system/files/Merger%20guidelines.pdf>>; see also Office of Fair Trading, 'Market definition: understanding competition law' *Competition law Guideline* (2004) paragraph 5.3 <[http://www.oft.gov.uk/shared\\_of/business\\_leaflets/ca98\\_guidelines/oft403.pdf](http://www.oft.gov.uk/shared_of/business_leaflets/ca98_guidelines/oft403.pdf)>.

<sup>10</sup> *Competition Act 2010*, section 2.  
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an alternative product or geographic region, and supply side substitution, which refers to the ability of suppliers to switch from supplying one product or geographic region to another.

- 3.18 Analysis of both demand side and supply side substitution is required in order to define the relevant product and geographic dimensions of the market.<sup>11</sup> However, for two or more products or services to be regarded as part of the same market, it is not necessary for those products to be substitutable on both the demand and supply sides.<sup>12</sup> A market can exist where there is a sufficient degree of substitutability on only one of the demand side or the supply side of the market.
- 3.19 It is proposed that the analysis of the relevant communications market for the purposes of this Market Definition Analysis will first involve a consideration of demand side substitutability. If there is no, or limited, demand side substitutability between products or geographic regions, then the extent to which supply side substitutability may exist will be explored. This approach is consistent with the approach taken by regulators around the world.<sup>13</sup>

#### *Hypothetical monopolist test*

- 3.20 The standard analytical tool used by antitrust regulators and the courts to identify and evaluate substitution possibilities is the "the hypothetical monopolist test". This test is also known as the "**SSNIP test**" which means a "small but significant non-transitory increase in price".
- 3.21 The SSNIP test starts with identifying the narrowest possible set of products and/or a particular geographic region and then asks whether a hypothetical monopolist supplier could profitably impose a small but significant non-transitory increase in price (most commonly between 5 and 10%).<sup>14</sup> If substitution by customers or suppliers would make the increase in price unprofitable, the product or geographic region to which customers or suppliers are likely to switch is included in the relevant market. The test is then repeated until a set of products and geographic regions are identified over which a hypothetical monopolist could profitably impose an increase in price. The smallest area in terms of products and geographic region over which the hypothetical monopolist can profitably impose the increase indicates the relevant boundaries of the market.

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<sup>11</sup> Case 6/72 *Europemballage Corp & Continental Can Co Inc v Commission* [1973] ECR 215.

<sup>12</sup> *Auskay International Manufacturing and Trade Pty Ltd v Qantas Airways Limited* [2010] FCAFC 96 at [42]. See for example the EC decision to define a market in terms of supply side substitution in Case IV/M166 *Torras/Sarrio* OJ [1992] C58/00, [1992] 4 CMLR 341 and see also paragraph 3.18 of the Office of Fair Trading, 'Market definition: understanding competition law' *Competition law Guideline* (2004) <[http://www.oft.gov.uk/shared\\_of/business\\_leaflets/ca98\\_guidelines/oft403.pdf](http://www.oft.gov.uk/shared_of/business_leaflets/ca98_guidelines/oft403.pdf)>.

<sup>13</sup> European Commission, 'Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services' *Official Journal of the European Communities* (2002/C 165/03) paragraph 38; Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) page 49; Australian Competition and Consumer Commission, *Merger Guidelines* (November 2008) paragraphs 4.11-4.12 <<http://www.accc.gov.au/system/files/Merger%20guidelines.pdf>>.

<sup>14</sup> *Australian Competition and Consumer Commission v Metcash Trading Limited* [2011] FCAFC 151 at [247].

- 3.22 A strict application of the SSNIP test involves a quantitative assessment of the impact of a change in price on demand. However, this requires substantial data on a range of variables including costs, prices, revenue and sales over a substantial period of time, which was not always available to the MCMC when defining each communications market.
- 3.23 As a result of the difficulties in obtaining the required data, antitrust regulators do not usually apply the SSNIP test strictly.<sup>15</sup> Rather, the test is used as an 'intellectual aid to focus the exercise' as part of a qualitative assessment of the product and geographic dimensions of the market.<sup>16</sup> The MCMC has applied a similar approach and used the market data it has collected to broadly determine whether trends can be identified as evidence of substitutability for the purposes of defining relevant communications market.
- 3.24 The MCMC takes a dynamic approach to determining markets. During the public inquiry process, the MCMC has defined markets across the communications section. However, as markets are dynamic and continually changing, the MCMC will not be bound by these markets and reserves the right to review its market definitions when examining conduct in the future.

## 4 International approaches

- 4.1 The MCMC has applied international best practice in its definition of the relevant communications market in Malaysia.
- 4.2 The EC is often viewed as a global leader in its regulation of competition in the European communications sector. A summary of the evolution of EC definitions for European communications market are set out below.

**Figure 1: Progression of identified communications market in the European Union**

First recommendation 2003		Second recommendation 2007		Third recommendation 2014 (suggested) <sup>17</sup>
Retail PSTN	1	1	Retail fixed access	
	2			
Retail fixed voice telephone	3			
	4			
	5			
	6			
Retail leased lines	7			

<sup>15</sup> European Commission, 'Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services' *Official Journal of the European Communities* (2002/C 165/03) footnote 26; Office of Fair Trading, 'Market definition: understanding competition law' *Competition law Guideline* (2004) paragraph 2.6 <[http://www.offt.gov.uk/shared\\_offt/business\\_leaflets/ca98\\_guidelines/oft403.pdf](http://www.offt.gov.uk/shared_offt/business_leaflets/ca98_guidelines/oft403.pdf)>; Australian Competition and Consumer Commission, *Merger Guidelines* (November 2008) paragraph 4.22 <<http://www.accc.gov.au/system/files/Merger%20guidelines.pdf>>.

<sup>16</sup> *Seven Network Limited v News Limited* [2007] FCA 1062 at [1786].

<sup>17</sup> In 2013, the European Commission published a report ('Future electronic communications market subject to ex-ante regulation: final report') that assesses the existing market definitions in the European Union and suggests some amendments to these definitions which are set out in this table. However, these remain "suggested" and are scheduled to be reviewed and finalised by the end of 2014.

First recommendation 2003		Second recommendation 2007		Third recommendation 2014 (suggested) <sup>17</sup>	
(minimum set)					
Fixed voice call origination	8	2	Fixed voice call origination		
Fixed voice call termination	9	3	Fixed voice call termination	1 a	Call termination on fixed network
Fixed voice call transit	1 0				
Unbundling of local loop	1 1	4	Unbundling of local loop	2	Wholesale local access
Wholesale broadband access (bitstream)	1 2	5	Wholesale broadband access	3	Mass market wholesale central access in sub-national markets
				4 a	Business grade wholesale central access
Leased lines terminating segment	1 3	6	Leased lines terminating segments	4 b	High-quality business data connectivity
Leased lines transit segment	1 4				
Mobile access and call origination	1 5				
Mobile voice call termination	1 6	7	Mobile voice call termination	1 b	Call termination on mobile networks
Mobile roaming	1 7				
Broadcasting transmission	1 8				

(Source: Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) at pages 33 and 39)

- 4.3 The MCMC has considered the European position where possible. However, in many cases the EC market definitions apply only at a high level and are more applicable for guidance only.
- 4.4 The MCMC has also considered the position in Singapore. Under the Telecom Competition Code<sup>18</sup>, the Infocomm Development Authority of Singapore (**IDA**) may classify licensees as dominant. The classification in Singapore is applied on an entity basis. That is, the entire entity is classified as dominant for all facilities it operates and for all services it provides so that the entity is effectively classified as dominant in all markets in which it operates. The IDA does not determine markets upfront but deals with markets for which dominant operators seek exemptions from the dominant licensee requirements under the Telecom Competition Code from time to time (so-called reclassifications from dominant to non-dominant licensees).<sup>19</sup>
- 4.5 The MCMC has considered the IDA's approach and has referred in this paper to relevant cases where the IDA has determined market definition when considering exemption applications. However, the MCMC has not adopted the entity-based approach at this stage in Malaysia. The MCMC believes that determining markets is the most appropriate way of applying

<sup>18</sup> Code of Practice for Competition in the Provision of Telecommunications Services 2012.

<sup>19</sup> Section 2.3 of the Telecom Competition Code (Singapore)  
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the relevant provisions of the CMA in relation to dominance. Furthermore, considering markets at this point will provide useful assistance to licensees and the MCMC itself when considering whether conduct has the effect of substantially lessening competition. The MCMC will use the markets determined in this process as a starting point when considering the effect on communications market of particular conduct engaged by a dominant licensee.

- 4.6 Accordingly, the MCMC is not inclined to take the IDA's entity-based approach to dominance at this time. The MCMC considers that it will be most useful for the purposes of considering conduct in the future, to determine market boundaries and dominance of licensees in those markets at this time, even if those markets may change over time.
- 4.7 Some of the other jurisdictions considered in this Market Definition Analysis include:
- (a) Australia;
  - (b) Austria;
  - (c) Bahrain;
  - (d) Ireland;
  - (e) the Netherlands;
  - (f) New Zealand;
  - (g) Sweden; and
  - (h) the United Kingdom.
- 4.8 Where possible, the MCMC has considered international approaches to market definition which are reflected in this Market Definition Analysis accordingly. However, it is important to note that the MCMC's role is to define markets by reference to local market conditions, which may not necessarily align with international positions. For example, the recent introduction of a single digital terrestrial television broadcast service in Malaysia has an impact on how the market for broadcasting transmission services should be defined, which is specific to the local circumstances.

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## **5 Trends in the communications sector**

- 5.1 In this section, the MCMC has summarised a few trends in the communications sector which are evident across markets. Rather than repeating each issue multiple times throughout this report, the key trends are summarised here. The MCMC has had regard to these trends when considering market boundaries in the remaining sections of this report.

## Bundling

- 5.2 Bundled service offerings are a growing phenomenon in the communications sector, so it is worth considering the extent to which bundled services may impact market definition. Bundling is an issue that spans a range of communications market (e.g. fixed and mobile telephony, broadband and data, etc.), so it will be discussed throughout this Market Definition Analysis, particularly in relation to the fixed and mobile services in layers 1, 2 and 3+ of the Open Systems Interconnection model (**OSI model**).
- 5.3 At the retail level, the market analysis is based on the supply and consumption of a single service. In retail markets for communications services, it is common for suppliers to offer a bundle of services. This bundle might be for related services in a "bucket plan". For example, a bundle of 200 minutes of mobile calls and 200 short messages for X Ringgit per month. Alternatively, it might be a triple play offering of voice services (with or without calls included), broadband internet (up to a certain download limit) and video services.
- 5.4 While the supply of bundles in a market does not change the approach to market definition outlined above (that is, the concept of substitutability remains paramount), it does increase the number of products or services that will need to be considered for the purposes of determining the boundaries of the relevant product dimension.
- 5.5 When defining a market which is characterised by bundled products, the assessment of the product dimension of the market will involve analysing whether the bundle is substitutable for other bundles offered in the market (if any) and whether the bundle is substitutable for its individual components. For example, in relation to triple play offerings, the following will be considered for the purposes of defining the boundaries of the relevant product market:
- (a) whether the individual components of the bundle are viewed by customers as complementary parts of a single "bundled" product;
  - (b) whether the bundle is substitutable (from the demand and supply side) for other bundles offered in the market, such as a telephony and broadband bundle; and
  - (c) whether the bundle is substitutable for its individual components (e.g. for fixed line broadband services).
- 5.6 Bundling is referred to throughout this Market Definition Analysis as it applies across many areas (e.g. telephony, broadband, etc.).



## Convergence

5.7 A related issue is the growth in convergence across the communications sector which is re-defining the way traditional communications market are viewed.

5.8 Convergence is occurring in a number of areas. In relation to media, the Australian Communications and Media Authority (**ACMA**) defined media convergence as:

*"the phenomenon where digitisation of content, as well as standards and technologies for the carriage and display of digital content, are blurring the traditional distinctions between broadcasting and other media across all elements of the supply chain, for content generation, aggregation, distribution and audiences."*<sup>20</sup>

5.9 Technological convergence is the tendency for different technological systems to move toward performing similar or overlapping tasks. Convergence can refer to previously separate technologies such as telephony features, data and applications services, and video that now share resources and interact with each other synergistically.

5.10 A clear example of convergence in the communications sector can be seen in the blurred division of telecommunications and pay-TV sectors. Telecoms operators and cable TV providers have traditionally operated in separate markets, but the growing preference for online products and services has now brought players within these sectors into direct competition with one another. For example, many telecoms operators now offer some form of pay-TV or other IPTV service. Similarly, various cable operators have moved into the telecoms space (e.g. BskyB in the United Kingdom).

5.11 This can make market definition difficult as the lines between traditionally distinct markets are becoming blurred. However, it is an important consideration when attempting to identify substitutable products for the purposes of market definition.

## Over-the-top (OTT) services

5.12 Over-the-top (**OTT**) content refers to the delivery of video, audio and other media over the Internet without the direct involvement of system or network operators in the control or distribution of the content.

5.13 Mass consumption of OTT services has taken off in recent years. OTT services are now offered in a number of the more traditional communications market, such as telephony (e.g. Skype or Viber), messaging services (e.g. Whatsapp) and content distribution (e.g. Netflix).

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<sup>20</sup> Australian Communications and Media Authority, *Digital Australians—Expectations About Media Content in a Converging Media Environment: Qualitative and Quantitative Research Report* (2011), 7.  
Market definition analysis

- 5.14 The result is the introduction of potential rival or substitute services that must be accounted for when attempting to define communications market. The entry and potential role of OTT services is discussed in relation to several of the layers 1-3+ of the OSI model in the communications market set out in this Market Definition Analysis.

## **Digital television**

- 5.15 Digital terrestrial television (**DTT**) is the transmission of audio and video by digitally processed and multiplexed signal. Many countries are currently in the process of replacing traditional broadcast analogue television with DTT and allowing other uses of the television radio spectrum.
- 5.16 DTT is seen as having several advantages over analogue television. Digital channels take up less bandwidth and the bandwidth needs of digital channels tend to be variable, so that digital broadcasters can provide more digital channels over the same space as required. For example, high definition television services or other non-television services (e.g. multimedia or interactivity) may be offered by digital broadcasters depending on available bandwidth. DTT also permits special services such as multiplexing, electronic program guides and additional languages (spoken or subtitled) which are services that were previously not available over analogue television.
- 5.17 Malaysia is currently in the process of transitioning from analogue to digital television broadcasting for all local FTA broadcasters. On 8 January 2014, the MCMC announced that Puncak Semangat Sdn Bhd (**PSSB**) was successful in its bid to build, operate and manage the infrastructure for Digital Terrestrial Television Broadcast (**DTTB**) service in Malaysia.
- 5.18 PSSB will develop the DTTB infrastructure, which will include a digital multimedia hub and a network of high, medium and low powered DTT transmitters nationwide. These transmitters will begin by offering the technical capability of carrying up to 45 standard definition (**SD**) or 15 high definition (**HD**) digital television channels.
- 5.19 The migration to digital will only be for the current government-owned and private stations to begin with (i.e. TV1, TV2, TV 3, ntv7, 8TV, TV9, TV AlHijrah and Bernama TV). The final mix of channels will be determined commercially between the PSSB and the broadcasters. The current radio channels can also be carried on the DTTB platform.

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## **6 Summary of findings**

- 6.1 The MCMC's final views on the markets definitions that will apply in the communications sector in Malaysia are as follows:

**Figure 2: Summary of proposed communications market in Malaysia**

No	Communications market	Geographic scope
<b>Retail</b>		
1.	Fixed telephony services (including VoIP) (a) Access line and local calls (Business) (b) Access line and local calls (Residential) (c) National calls (separate Business/Residential) (d) International calls (separate Business/Residential) (e) Fixed-to-mobile calls (separate Business/Residential)	National market
2.	Fixed broadband and data (a) High speed and quality (Business) (b) Low speed and quality (Residential)	National market
3.	Mobile telephony	National market
4.	Mobile broadband and data (including WiMAX)	National market
5.	Mobile messaging services (including SMS and OTT messaging)	National market
6.	Directory services (c) Voice or call centre services (d) Online directories (e) Published directories	National market
7.	Broadcasting services (a) Free-to-air ( <b>FTA</b> ) (b) Subscription television	National market
8.	Transmission (tails) or local leased lines	National market
9.	Transmission (international) or international private leased circuits ( <b>IPLCs</b> )	National market
10.	Domestic managed data services	National market
11.	International managed data services	National market
<b>Wholesale</b>		
12.	Transmission (inter-exchange)	National market, excluding the route from Peninsular Malaysia to East Malaysia
13.	Transmission (tails) or local leased lines	National market
14.	Transmission (international) or IPLCs	National market
15.	Transmission to submarine cable landing stations and earth stations	Boundaries of each individual point of presence
16.	Fixed telephony (including VoIP)	National market

No	Communications market	Geographic scope
	(a) Access Line (Business) (b) Access Line (Residential) (c) Local calls (Bus/Res) (d) National calls (Bus/Res) (e) International calls (Bus/Res) (f) Fixed-to-mobile calls (Bus/Res)	
17.	Fixed broadband and data (Bus/Res)	National market
18.	Mobile telephony	National market
19.	Mobile broadband and data (including WiMAX)	National market
20.	Broadcasting transmission: (a) to broadcast towers (b) for digital transmission	National market
21.	Content acquisition: (a) Premium content (b) Other ordinary content	National market
22.	Termination (fixed and mobile) calls and messages	Each terminating network
23.	Origination (fixed and mobile) calls	Each originating network
24.	Inter-connect links	National market
25.	Wholesale Internet interconnection	National market
26.	Access to facilities and upstream network elements (a) Access to lead-in ducts and manholes (b) Access to inter-exchange and mainline ducts (c) Access to towers (d) Access to exchange buildings and co-location (e) Access to submarine cable landing stations and earth stations (f) Access to local access services, including unbundling of local loop, sub-loops, line sharing and bitstream services (g) Access to dark fibre (h) Access to main distribution frames and associated in-	Individual markets for access to each facility and network element, except: <ul style="list-style-type: none"> <li>▪ state based market for access to towers;</li> <li>▪ national market for lead-in ducts and manholes;</li> <li>▪ national market for access to inter-exchange and mainline ducts;</li> <li>▪ national market for access to local access services; and</li> <li>▪ national market for access to dark fibre</li> </ul>

No	Communications market	Geographic scope
	building wiring (and other in-building facilities)	
	(i) Access to common in-building mobile systems	

6.2 It should be noted that the finding of a market does not pre-empt a finding of dominance. Markets simply identify the boundaries of the field of rivalry that exists in the communications sector. In some markets, effective competitive constraints may exist and no dominance finding will need to be made. In other markets, effective competitive constraints may be dormant or inhibited and a finding of dominance may be made.

6.3 This Market Definition Analysis is structured as follows:

- in Part B, the markets for those fixed services that are situated in what is commonly known as layers 1-2 of the OSI model (e.g. fixed telephony, broadband and data, etc.) are assessed;
- in Part C, the markets for mobility services that are also found in layers 1-2 of the OSI model (e.g. mobile telephony, broadband and data, etc.) are identified;
- in Part D, the application services that operate above the more simple telephony and data services (at layers 1-2) are discussed to define the relevant markets that are situated in layers 3+ of the OSI model (e.g. messaging services, directory, etc.);
- in Part E, the relevant markets for access to interconnection services (e.g. termination, origination, inter-connect links, etc.) are identified; and
- in Part F, the markets for infrastructure-based network facilities (also referred to as upstream network elements or **UNEs**) that are situated at layer 0 of the OSI model (e.g. dark fibre, towers, local loops, etc.) are assessed.

6.4 The MCMC has followed the approach of using the OSI model to functionally categorise the different layers used in the supply of services in the communications sector. The MCMC has split fixed services and mobility services into two separate chapters for the sake of convenience and readability, but does so without pre-empting whether fixed and mobile services are provided in the same market. Substitution can also occur between layers (e.g. an active service at layer 2 or 3 can potentially substitute for a passive service at layer 1). These substitution possibilities are also considered in this report and the above split does not pre-empt the possible market definition findings.

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## Part B Fixed services (Layers 1-2)

### 1 Introduction

- 1.1 Part B of this paper focuses on fixed services delivered over Layers 1 and 2 of the OSI model. The market for fixed telephony services (including VoIP), fixed broadband and data, and the various forms of transmission (i.e. inter-exchange, tails, international and broadcast) has been assessed and defined accordingly. Layers 1 and 2 of the OSI model are the physical and data link layers. Layer 2 in particular involves the establishment of data links on an end-to-end basis.
- 1.2 The MCMC separately licenses certain basic telephony and data services as applications services. These include public switched telephone network (**PSTN**) telephony, internet access and public switched data services. These applications services are dealt with in this Part B.
- 1.3 Note that mobility services delivered over Layers 1 and 2, application services that operate at a higher layer (e.g. messaging and directory services), and access provided to facilities at Layer 0 are discussed separately in Parts C, D and E, respectively.
- 1.4 We have split the sections of this paper in the above manner for convenience and readability purposes. Nevertheless, we have still considered substitution possibilities between the relevant services including across different layers of the OSI model.

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## 2 Fixed telephony services (including VoIP)

### Brief overview of Malaysia

- 2.1 The PSTN is the traditional mode of communications for fixed telephony services in Malaysia. As at the end of 2013, there were 2,247,000 fixed household subscriptions in Malaysia, at a penetration rate of 32.4%. There were also 1,499,000 non-household fixed subscriptions.<sup>21</sup>
- 2.2 The Direct Exchange Line (**DEL**) penetration rate varies across Malaysia, although urban DEL penetration (at 76.7 DELs per 100 households) far outstrips rural DEL penetration (at 23.3 DELs per 100 households) as at the end of 2012. The highest concentration of DEL penetration is in Penang followed by Malacca at 50 and 46.9 DELs per 100 households. The lowest levels of DEL penetration as at 2013 exist in Kuala Lumpur (15.2%) and Kelantan (16.5%).<sup>22</sup>
- 2.3 DEL penetration rates have been falling in all states of Malaysia over the past few years.

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<sup>21</sup> MCMC, *Communications and Multimedia Pocket Book of Statistics Q4 2013* at page 24.

<sup>22</sup> MCMC, *Communications and Multimedia Pocket Book of Statistics Q4 2013* at page 25-26.  
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- 2.4 Telekom Malaysia is the largest provider of DELs and fixed telephony services in Malaysia. Maxis and TIME also provide DELs and fixed telephony services in Malaysia.
- 2.5 Telephony calling services are provided by the DEL providers described above, as well as licensed VOIP providers such as P1. OTT service providers also offer telephony services over fixed broadband connections.

## **Product characteristics**

- 2.6 The fixed telephony service comprises two main functions:
  - (a) connection or access to the public telephone network which is fixed at a particular geographic location; and
  - (b) making and receiving telephone calls or related services (e.g. fax) that may be subject to certain quality requirements.<sup>23</sup>
- 2.7 Another feature of fixed telephony services is that they have historically been provided over a legacy PSTN/ISDN. The extent to which effective substitutes for telephony calls are available (e.g. VoIP over a broadband network) will play a significant role in the way the MCMC assesses market definition and dominance in relation to fixed telephony services. The ability of these services to act as effective substitutes to traditional fixed telephony services will also depend on whether they are able to get the necessary access to the PSTN/ISDN.
- 2.8 The fixed telephony service (including VoIP) is provided at retail and wholesale levels, to be distinguished from other fixed telephony wholesale services (e.g. call origination or ULL) which are discussed elsewhere in this Market Definition Analysis. The wholesale substitution possibilities are discussed in the functional dimension section below.
- 2.9 Further, the extent to which mobile services act as a possible substitute for fixed telephony services has also been considered by the MCMC in defining the market for fixed telephony services.

## **Product dimension**

- 2.1 Historically, all telephony services were provided over fixed-line copper networks (i.e. PSTN and later ISDN). However, with the continued increase in technological convergence, alternative access networks now offer comparable telephony services over other mediums (e.g. broadband, mobile, etc.).
- 2.2 Therefore, it is necessary to assess the potential for a fixed telephony services market that extends beyond traditional fixed-line services and includes similar services that are provided over alternative networks, namely VoIP and mobile telephony.

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<sup>23</sup> Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) page 77.  
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### *Fixed access and calling markets*

- 2.3 Fixed telephony services tend to be comprised of two separate pricing components:
- (a) a fixed recurring charge for basic access to a line for connection to the fixed telephony service (e.g. a set monthly fee for a home or business phone); and
  - (b) a rate list for various calling services (i.e. local, long distance, international and fixed to mobile (**F2M**) calls that will only be charged once the user makes a particular type of call.
- 2.4 The MCMC's final view is that both of these core components for fixed telephony services should be viewed as separate and distinct markets, except that there is a single market for access to the access line and local calls. This is because exactly the same infrastructure is used to supply access to the line and access to local calls. Therefore, these services would appear to be provided in the same market.
- 2.5 The MCMC's view is consistent with the view taken by the ACCC in Australia, which specifies the prices that may be charged for fixed-line services in a Final Access Determination (**FAD**).<sup>24</sup>
- 2.6 Apart from local calls, the fixed line connection is separate from and not functionally substitutable for the calling service provided over the fixed line.
- 2.7 Furthermore, the calling charges that are accrued by a user are billed separately from the basic access fee that is paid, so that the fees for making a particular type of call are paid on top of the regular monthly access fee for use of a fixed telephony service.
- 2.8 The MCMC's approach is consistent with the position that the EC has taken in the past. In 2003, the EC identified a retail PSTN (access line) market separately from a retail fixed voice telephone market. More recently, the EC identified a fixed voice telephony market ('Market 1/2007'), which it defined as:

*"the provision of a connection or access (at a fixed location or address) to the public telephone network for the purpose of making and/or receiving telephone calls and related services."*<sup>25</sup>

### *Local, long distance, international and F2M calls*

- 2.9 Four types of telephony services are generally offered over the fixed network:
- (a) local calls;

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<sup>24</sup> See:

<http://registers.accc.gov.au/content/item.phtml?itemId=1062460&nodeId=070c262152a987c1277355843cd76318&fn=Final%20access%20determinations%20as%20varied%20on%2029/06/2012.pdf>.

<sup>25</sup> Explanatory Note to the Recommendation at page 21.  
Market definition analysis



- (b) national long distance calls;
  - (c) international calls; and
  - (d) F2M calls.
- 2.10 The MCMC considers that each of these types of fixed telephony services will constitute a separate retail calling market (except local calls, which will be treated to be in the same market as the access line). Each service has distinct price characteristics based on the type of call that is made. In addition, different prices are applied to each service depending on whether a call is made to a local, national long distance, international or mobile telephone number.
- 2.11 In many instances, the pricing between each call type can differ quite significantly. For example, in Figure 3 below, we see that Telekom Malaysia charges only 4 sen per minute (after the first two minutes) for local calls, but up to 70 sen per minute for F2M calls and 85 sen per minute for other national long distance calls. These are significant differences that are linked to the type of call that is made over a fixed line.
- 2.12 For these reasons, the MCMC considers that separate and distinct markets exist in the retail market for each of fixed national long distance, international and F2M calls.
- 2.13 As noted above, there tends to be a single market for access to the access line and locals. As such, local calls will not be included in the proposed market for fixed national long distance, international and F2M calls.

#### *VoIP over broadband as a substitute to PSTN telephony services*

- 2.14 On the demand side, it is likely that most customers now view the telephony services offered over PSTN/ISDN as being comparable to similar services provided over broadband networks (i.e. VoIP). Both services provide users with the basic ability to make telephone calls (e.g. local, long distance, international and F2M), which is the basic threshold for identifying a potential demand side substitute.
- 2.15 The general trend downward in DEL penetration in Malaysia and the growth in VoIP usage<sup>26</sup> supports this basic premise.<sup>27</sup>
- 2.16 The decline in DEL penetration has also been accompanied by a downward trend in PSTN minutes, which further suggests substitution between traditional fixed telephony services and VoIP. For example, between 2010 and 2012, a fixed operator reported declines in revenue for interconnect minutes by approximately 1/3<sup>28</sup> and for PSTN minutes by a factor of over 3.<sup>29,30</sup> The reduction in interconnect minutes and revenues from PSTN that

<sup>26</sup> MCMC, *Hand phone users survey 2012* (2012) at page 21.

<sup>27</sup> Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) pages 78-79.

<sup>28</sup> A drop from RM183,466,834 in 2010 to RM121,399,403 in 2012.

<sup>29</sup> A drop from RM 10,467,689 in 2010 to RM 2,714,236 in 2012.

<sup>30</sup> Response from a fixed operator to MCMC Questionnaire at 1.11(a).

were reported by a fixed operator suggests a growing preference for VoIP over fixed-line services (as well as increased mobile penetration).

- 2.17 'Managed' VoIP provided over broadband has also been considered. From a technological perspective, voice-over-narrowband services offer less functionality than voice-over-broadband services. However, the range of services that are available over both networks is roughly similar. For example, services such as voice, fax, voice-messaging, etc. are offered over both PSTN/ISDN and broadband networks.
- 2.18 On the supply side, providers of fixed telephony services generally offer VoIP services as well (such as Telekom Malaysia's iTalk service) and it is likely that a supplier would move between narrowband and broadband calling services if a SSNIP occurred. Accordingly, a level of supply side substitution occurs for calling services. There is also likely to be a level of one-way substitution in respect of the fixed connection from DEL fixed line connections to broadband fixed line connection if a SSNIP occurred in relation to the latter. However, substitution from broadband to DEL is unlikely in the case of a SSNIP on DEL pricing.
- 2.19 The MCMC considers broadband-based VoIP services as a sufficient substitute to fixed-line telephony services. As such, both will be considered as forming part of the same fixed telephony market. This is broadly consistent with the approach taken by the EC.<sup>31</sup>
- 2.20 There has also been a growing use of 'unmanaged' VoIP services that are typically offered as OTT services (e.g. Skype, Viber, etc). However, the pricing structure for these OTT services is often very different to traditional PSTN pricing and managed VoIP pricing. These unmanaged services do not offer the same range of services (e.g. fax, internet, etc.) and are usually free for calls made within the service (e.g. Skype to Skype), although the subscriber still pays in the form of a broadband line and the data usage is included in the end user's data allowance.
- 2.21 Accordingly, the MCMC does not view 'unmanaged' VoIP services as substitutes for PSTN/ISDN and 'managed' VoIP telephony services. 'Unmanaged' VoIP services are further discussed when considering broadband and data services markets below.

#### *Business and residential service substitution*

- 2.22 The MCMC has also considered whether there are separate markets for business and residential fixed line connections and calling services.
- 2.23 On the demand side, business customers tend to demand fixed line telephony services that are capable of offering a higher degree of functionality (e.g. through PBX-based services) and quality of service. The MCMC believes that these additional demands of business customers for improved functionality and quality of service means that it is unlikely that a

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<sup>31</sup> Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) pages 86.  
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business grade user would acquire a residential DEL in the case of a SSNIP in respect of the business DEL pricing.

- 2.24 The MCMC also notes that the fixed per month pricing of business DELs is more expensive than residential DELs, although the listed call charges for telephony services from business DELs and residential DELs appears to be the same. Having said that, there appear to be many more bundled offerings which include a DEL in business packages, compared with the relatively fewer bundled services and products that are typically offered to the residential end user.
- 2.25 These fixed monthly charges and the offer of business-grade bundles support the view that business customers are more willing to invest in fixed-line services that are capable of providing the added functionality and quality of service that they require to run their business.
- 2.26 On the supply side, it is possible for a residential DEL provider to begin offering business DELs if there is a SSNIP in relation to business DELs. However, the different needs of business customers (e.g. more comprehensive service levels, 24 x 7 availability, etc.) could make it difficult for a residential provider to transition to the provision of business DELs in a short time period.
- 2.27 Further, it seems less likely that a business DEL provider would offer residential DELs if there is a SSNIP in relation to residential DELs. This is because the residential market often requires specific knowledge and significant investments on marketing or advertising processes and customer care that are targeted at a wider and more diverse customer base.
- 2.28 The MCMC notes the approach taken by the IDA in Singapore which distinguishes between residential and business in relation to the International Telephone Services (**ITS**) market as follows:
  - (a) the Residential Retail ITS Market, which consists of services that enable residential end users to make and receive voice telephone calls between Singapore and locations outside of Singapore; and
  - (b) the Commercial Retail ITS Market, which consists of services that enable business end users to make and receive voice telephone calls between Singapore and locations outside of Singapore.<sup>32</sup>
- 2.29 On balance, the MCMC believes that there are separate markets for business and residential fixed line connections and calling services, although the issue is more finely balanced than other issues.

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<sup>32</sup> IDA, *Explanatory Memorandum issued by IDA of Singapore – Request of Singtel for exemption from dominant licensee obligations with respect to the international telephone services market* (12 November 2003) at pages 4-5.

*Mobile telephony as a possible substitute for fixed telephony*

- 2.30 On the demand side, fixed and mobile telephony services offer the same basic functionality to end users – they both provide the ability to make and receive calls (as well as some other basic services). However, there are some important differences between the two technologies which leads the MCMC to consider that there are likely to be separate fixed and mobile retail markets.
- 2.31 Mobile telephony permits users to make or receive calls while on the move and in different locations. This is a fundamental deviation from the core capabilities of fixed-line services, which provide access to telephony services at a particular location.
- 2.32 Further, there are significant differences in the pricing strategies that are adopted by fixed and mobile providers. The prices listed in Figure 3 illustrate this point. First, the rates for fixed calls tend to be higher than mobile equivalents. For example, Telekom Malaysia and P1 charge up to 85 sen per minute for a “national” call, while the mobile providers charge in the range of 10 to 30 sen per minute for the same call (or cheaper if it is an “on net” call).
- 2.33 Second, the pricing structures for fixed and mobile services tend to differ. There is generally less innovation in the way that fixed telephone services are priced (i.e. customers pay a set monthly fee for a fixed home or business phone). However, mobile operators tend to be more creative in the way they price and market their offerings, such as by offering a ‘bucket’ of free minutes or text messages to attract new subscribers.
- 2.34 Similarly, the distinction between “off net” and “on net” calls is a creation of the mobile industry that tends not to exist for fixed telephony calls. For example, while “off-net” mobile calls are comparable to calls on a fixed network, the prices for “on-net” mobile calls are offered for free or at a discount to attract customers. A comparable aggressive pricing strategy is not applied by fixed-line providers.

**Figure 3: Fixed and mobile telephony pricing in Malaysia**

	Telekom Malaysia	Maxis	DiGi	Celcom	U Mobile	P1	Yes/YTL
<b>Local</b>	8 sen (1 <sup>st</sup> 2 min); 4 sen/min (subsequent)					18 sen (1 <sup>st</sup> 2 min); 4 sen/min (subsequent)	
<b>National</b>	10-85 sen/min					10 – 85 sen/min	
<b>F2M</b>	20-70 sen/min					20 – 70 sen/min	
<b>M2M (on-net)</b>		8-12 sen/min	Free minutes included	Free minutes included	Free minutes included		Free minutes included
<b>M2M (off-net)</b>		15-30 sen/min	10-30 sen/min	10-20 sen/min	18-20 sen/min		9 sen/min

(Source: Pricing information published by service providers)

2.35 The industry position is mixed on these issues. Telekom Malaysia appears to support the notion of fixed and mobile substitution.<sup>33</sup> On the other hand, Celcom have stated that they view their main competitors at the retail level as other MNOs and MVNOs. Telekom Malaysia (the largest provider of fixed-line telephony services in Malaysia) is notably missing from Celcom's perceived list of competitors.<sup>34</sup> Similarly, Maxis identify U Mobile, DiGi, Celcom and Tune Talk as the main competitors of their retail mobile services, but do not identify any fixed telephony providers as rivals.<sup>35</sup>

2.36 In its recent assessment of a potential market for fixed and mobile services, the EC concluded that:

*"...the relevant retail market in the representative Member State does not (and will not in the future) include mobile networks."<sup>36</sup>*

2.37 The EC came to this conclusion for several reasons. First, it did not consider mobile access to be a substitute for those PSTN users that are potentially 'captive'. Second, with fixed VoIP service as a relatively low-priced add-on to a fixed broadband connection, the EC argued that most people would continue to subscribe to a fixed broadband connection in addition to a mobile subscription to ensure they had connectivity both at home and on the road. Ultimately, the EC concluded that most VoIP users currently do not regard Internet access via mobile networks as a viable substitute for Internet access over a fixed network. As such, the market for fixed and mobile telephony should continue to be viewed as separate markets.<sup>37</sup>

<sup>33</sup> For example, Telekom Malaysia claim to base their pricing strategy on fixed-to-mobile substitution (see: Telekom Malaysia, *Response to MCMC Questionnaire* at 1.5(b)).

<sup>34</sup> Celcom, *Response to MCMC Questionnaire* at 2.1(b).

<sup>35</sup> Maxis, *Response to MCMC Questionnaire* at 2.1.

<sup>36</sup> Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) pages 87.

<sup>37</sup> Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) pages 87.

- 2.38 On the supply side, the MCMC has also concluded that mobile and fixed services are not readily substitutable. The technologies are fundamentally different for each type of network. While there is some common infrastructure between fixed and mobile networks, particularly in the backbone transmission network, the access networks are entirely different and the barriers to entry in the access network are high. Furthermore, for a fixed operator to move into the provision of mobile services, the fixed operator would need to acquire spectrum or obtain access to a mobile network in some way. This is likely to be difficult and costly to do quickly given that all of the mobile spectrum in Malaysia has already been allocated. A fixed operator could become an MVNO but there is likely to be a reasonably high degree of dependence on the MNO in doing so.
- 2.39 Further, the regulatory and licensing regimes for fixed and mobile networks are different enough to make it more difficult for a mobile operator to quickly and easily commence the supply of services over a fixed network. This point was raised by Telekom Malaysia which noted that more stringent regulation of fixed services and facilities was a key factor behind an operator's decision to invest in mobile over fixed networks.<sup>38</sup>
- 2.40 Hence, there would appear to be limited substitution possibilities on the supply side between fixed and mobile services.
- 2.41 For the reasons stated above and consistent with the view of the EC, the MCMC is of the view that fixed and mobile services should not be considered as substitutable in Malaysia and hence are separate markets.

## **Geographic dimension**

- 2.42 The demand for a fixed-line connection is limited to the immediate location at which the telephony service is sought. However, on the supply side, the market is characterised by economies of scale derived when providers are able to provide connection to customers across a wide geographic area.
- 2.43 The concept of any-to-any connectivity is also important when determining geographical boundaries of the fixed telephony services market. On the demand side, an end user expects to be able to call any person in Malaysia (indeed, any person globally). On the supply side, suppliers have rights to interconnect with other suppliers' networks to offer a full end-to-end service. The need for any-to-any connectivity strongly suggests a national market.
- 2.44 Finally, the pricing of fixed line services and telephony calling services are generally set on a national level. The MCMC notes that in some limited cases separate pricing is nominated on a sub-national basis. For example, Telekom Malaysia applies separate pricing for Sabah and Sarawak in some cases, although the pricing only differs in respect of the fixed charge for

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<sup>38</sup> Telekom Malaysia, *Response to MCMC Questionnaire* at 2.13(e).  
Market definition analysis

business lines in Sabah and Sarawak where the number of lines exceeds 500.<sup>39</sup> All other pricing appears to be the same nationally.

- 2.45 For these reasons, the MCMC has identified fixed telephony services as supplied in a national market. This position appears to be consistent with international competition decisions.<sup>40</sup>

## Functional dimension

- 2.46 Fixed-line telephony services have both a retail and a wholesale element. In the retail dimension, fixed telephony services are supplied by an operator directly to an end user as a basic retail service.
- 2.47 It is also common for a licensee to be provided with wholesale access to another licensee's network, which is then used to supply end users with a retail fixed telephony service. There is a clear supply chain from the network operations, through a wholesale channel to retail in the provision of fixed telephony services in Malaysia (although there is also direct to retail selling). In the fixed telephony services sector, the most prevalent form of wholesaling is resale, including in the form of wholesale local access and wholesale local calling services.

### *Wholesale substitution*

- 2.48 The MCMC has also considered the prospect of substitution between wholesale products and whether this means that there is a broader wholesale market for fixed services. For example, a retailer that wishes to supply a retail telephone service over another licensee's network may purchase a wholesale telephone service from that licensee and resell that service. Alternatively, the retailer may acquire a ULL or line sharing service and supply telephony services in that way.
- 2.49 The MCMC has considered whether wholesale telephony services are likely to be substitutable for access to local infrastructure such as ULLs. The MCMC is of the view that they are not substitutable and hence are in separate markets.
- 2.50 The level of investment required to enter the market using wholesale telephony services is significantly lower than the level of investment required to acquire local infrastructure, such as ULLs. This has been recognised in economic literature as the 'ladder of investment' where a retailer may enter the market at a low rung on the ladder of investment (e.g. reselling wholesale telephony services), but then slowly makes greater investments in its own infrastructure. These investments may include the investment necessary to support the provision of telephony services using ULLs, up to the full scale investment necessary to provide a

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<sup>39</sup> For example, see Telekom Malaysia, *Response to MCMC Questionnaire* at 1.5.

<sup>40</sup> For example, in *Michelin v Commission*, the Commission of the European Communities confirmed that a firm targeting a particular market (e.g. the Netherlands market) could be used to support the finding of that particular market as the geographic dimension of a product market (Case 322/81, *Nederlandsche Banden-Industrie Michelin v. Commission*, [1983] ECR 3461 at page 3478).

fixed line connection to an end user. These different levels of investment are likely to constitute separate markets in the MCMC's view.

- 2.51 This issue has recently been considered by the ACCC in Australia, where it has said:

*"The ACCC considers that the network access services, and services supplied over alternative networks, are limited substitutes for the resale services in supplying fixed voice services. The substitutability of the ULLS for the WLR service is limited by the limited geographical footprint of access seekers' exchange equipment and the substantial costs of investing in expanding their footprint."*<sup>41</sup>

- 2.52 Furthermore, the MCMC is of the view that a retailer is unlikely to acquire local infrastructure such as ULLs simply for the purposes of supplying a local telephone service. The returns achievable to simply supply telephony services are probably insufficient to substantiate the case for substitution to occur between wholesale telephony services and local infrastructure access.
- 2.53 The retailer is more likely to acquire a ULL to supply a broadband service. The issue of substitution between wholesale DSL and local infrastructure access is considered again when dealing with broadband and data markets below.

## **Final view**

- 2.54 The MCMC considers that there are separate national retail and wholesale markets for access to fixed telephony services, which is separated into business and residential markets. The separate product markets are:
- (a) access to the fixed line connection and local calling services; and
  - (b) separate calling markets (including PSTN and VoIP) for:
    - (i) national long distance calls;
    - (ii) international calls; and
    - (iii) fixed-to-mobile calls.
- 2.55 The MCMC's view is that mobile services do not constitute an effective substitute for fixed-line telephony services at this time. The MCMC is also of the view that 'unmanaged' VoIP services are not substitutes for the fixed line calling markets described above.

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<sup>41</sup> ACCC, *Fixed Services Review – Declaration Inquiry, Public inquiry into the fixed line services declarations (Draft Report)* (December 2013) at page viii.  
Market definition analysis



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### 3 Broadband and data

#### Brief overview of Malaysia

- 3.1 Broadband services are provided by a number of means in Malaysia. At the end of 2013, there were 1,962,500 fixed (wired) broadband household connections in Malaysia. There were 411,900 fixed (wired) broadband non-household connections. Fixed wired broadband connections were provided by way of ADSL, SDSL, VDSL, fibre, satellite and fixed wireless.<sup>42</sup>
- 3.2 The fixed (wired) broadband household connection penetration rate is 67.1 across Malaysia. The highest concentration of fixed (wired) broadband penetration tends to be in highly urbanised areas, namely Kuala Lumpur (111.7%) and Putrajaya (81.9%). The lowest levels of fixed (wired) broadband penetration exist in Kelantan (41.9%) and Perak (51.7%).<sup>43</sup>
- 3.3 The main providers of fixed (wired) broadband services are Telekom Malaysia, Maxis and TtdotCom.
- 3.4 Telekom Malaysia is also building a high speed broadband network (**HSBB**). As at February 2014, the MCMC reported that Telekom Malaysia had rolled out its HSBB network to 103 HSBB exchanges and that 1,496,214 ports had been installed.<sup>44</sup>
- 3.5 Low speed data connections also continue to be provided in Malaysia including by way of internet dial-up connections. For example, Telekom Malaysia continues to offer dial-up Internet services over its PSTN which can reach speeds of up to 56.6 kbps.<sup>45</sup>
- 3.6 The MCMC separately considers managed data services in section 6 below.

#### Product characteristics

- 3.7 Broadband service is usually understood to be a connection that provides high-speed Internet access at data transmission rates above a specific threshold.
- 3.8 The minimum data transmission rate for a service to be considered broadband is currently set at 256 kbps.<sup>46</sup> This minimum data transmission rate is broadly recognised as a global standard and, as such, the MCMC has applied the 256 kbps threshold for the purposes of defining the relevant broadband markets in Malaysia.
- 3.9 Some of the more common types of fixed-line technologies that offer broadband include:
  - (a) digital subscriber line (DSL or xDSL);

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<sup>42</sup> MCMC, *Q4 2013 Communications & Multimedia Pocket Book of Statistics*.

<sup>43</sup> MCMC, *Q4 2013 Communications & Multimedia Pocket Book of Statistics*.

<sup>44</sup> Telekom Malaysia, Report to MCMC

<sup>45</sup> Telekom Malaysia, *Response to MCMC Questionnaire* at 1.2.

<sup>46</sup> OECD, 'Indicators of Broadband Coverage' DSTI/ICCP/CISP(2009)3/FINAL (10 December 2009) at page 38.

- (b) cable networks (i.e. cable modem);
  - (c) fibre to the premises (i.e. High Speed Broadband FTTH/B for homes and businesses); and
  - (d) satellite.
- 3.10 Most modern technologies are capable of meeting the 256 kbps threshold with the exception of dial-up services, which are still offered to some subscribers in Malaysia.
- 3.11 Mobile and other wireless services (e.g. WiMAX) also offer sufficient data transmission rates to be considered broadband services. However, the MCMC's view is that these services are not sufficiently close substitutes with fixed broadband services to be considered to be in the same market (e.g. fixed location versus mobility, different pricing and speeds, etc.). Therefore, mobile and other wireless services have not been considered in this section. A complete discussion on this issue is set out in Part C of this Market Definition Analysis.
- 3.12 Managed data services also form part of the family of data services. Managed data services are offered at the domestic and international levels, including Ethernet and Metro-E, ATM, Frame Relay and VPN services. These are highly managed services that are generally only acquired by large corporate and government customers. Managed data services are considered further in sections 6 and 7 below.

### **Product dimension**

- 3.13 The MCMC has applied a technology neutral approach to the definition of fixed broadband markets in Malaysia. Although technology is an important consideration for defining fixed broadband markets, technical features and capabilities can quickly change so the following discussion focuses on speed and quality of broadband services without specific regard to the technology that is used.

#### *Residential and business-grade broadband*

- 3.14 On the demand side, the MCMC considers the primary drivers for demand of a particular broadband service to be speed and quality of service (and the price of that service, discussed further below).
- 3.15 This is broadly the approach that is applied in many other jurisdictions. For example, in the United Kingdom, Ofcom recently found a new product market for very high bandwidth services, which was defined to include "services with bandwidths greater than 1 Gbit/s and services of any bandwidth delivered with [wavelength-division multiplex] equipment at customers' premises."<sup>47,48</sup>

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<sup>47</sup> Ofcom, *Business connectivity market review - final statement* (28 March 2013) at Executive Summary.  
Market definition analysis

- 3.16 A further step is also applied in many European jurisdictions where speed and quality of service are broadly equated with a residential (or “mass market”) versus business market for fixed broadband services. This approach was recently re-affirmed in a report commissioned by the EC<sup>49</sup> and it is the approach that was used by the Dutch regulator (**OPTA**) and Austrian regulator (**RTR**).<sup>50</sup>
- 3.17 The MCMC’s view is to apply a similar approach to market definition and has defined two fixed broadband markets in Malaysia as follows:
- (a) a “business”-grade services market, which offers a higher degree of quality of service and reliability of the broadband service; and
  - (b) a “residential”-grade services market, which places less emphasis on quality of service and is concerned more with pricing and speed of the broadband service.

3.18 Figure 4 broadly summarises this approach:

**Figure 4: Overview of fixed broadband options for residential and business users**

Quality	Speed	
	High	Low
High	Business	Business
Low	Residential	Residential

Notes:

1. Figure excludes mobility broadband.
2. High speed refers primarily to fibre, DSL (or equivalent), etc.

- 3.19 In general, demand by residential (and some small business) customers is different in terms of bandwidth, performance and price of their service. For example, most large corporate customers that are highly dependent on connectivity and have low tolerance for downtime would likely be willing to pay a premium for a better quality broadband connection and additional support features (e.g. service levels, 24 x 7 customer service, etc.).
- 3.20 However, given the number of residential (and SME) customers, the typically low value per user and the relatively limited configurability of the service on a mass-usage basis, broadband providers tend to respond to this demand by offering several standard options from which customers can

<sup>48</sup> Note that recognition of a market for speeds over 1 Gbps was made to address the recent rollout of FTTx across the country, so such a high bit rate would not be appropriate for Malaysia at this time. However, the example does serve to illustrate the tiered approach to market definition that is based on broadband speed and quality of service.

<sup>49</sup> See: Ecorys, Future electronic communications market subject to ex-ante regulation: final report (18 September 2013).

<sup>50</sup> See: Independent Regulator Group, *IRG Expert Group Report: Opening of Phase II investigation pursuant to Article 7(4) of Directive 2002/21 EC – Wholesale broadband access* (2009).

choose. Most residential and small business users will be satisfied with these products and will not be willing to pay for the added features supplied as part of the business-grade packages.<sup>51</sup>

- 3.21 On the other hand, business customers are generally more likely to prefer broadband packages that offer speed as well as a higher degree of quality of service and reliability. The Body of European Regulators for Electronic Communications (**BEREC**) have identified the following factors as helping to distinguish “high end retail business services from others”:
- (a) technical parameters, such as higher specification technical parameters concerning speed, jitter, ability to host websites, etc.;
  - (b) location, particularly the availability to offer services across multiple sites from a single supplier;
  - (c) range and bundling of services, which could include a range of products and services to be offered by the supplier or in some cases individually selected and packaged by the customer; and
  - (d) service details, such as higher service levels to ensure heightened service quality, guarantees of low downtime, helpdesk services and premium fault finding and repair.<sup>52</sup>
- 3.22 The precise line that divides ‘business’ and ‘residential’ users may be difficult to identify, but the above factors help to define this distinction.
- 3.23 One way to help make this distinction is to consider the manner in which licensees package and offer their products, which can be used as evidence of how the providers view the nature of the market.<sup>53</sup>
- 3.24 In practice, this can be seen in the way various consumer-grade and business-grade services are offered by Malaysian providers. Some examples include:
- (a) Telekom Malaysia offers its ‘Office in a Box’ bundle and ‘Streamyx and Phone Package (Consumer Broadband)’ bundle;<sup>54</sup>
  - (b) Maxis offers an Enterprise Fixed Service and a Home Services (Fixed);<sup>55</sup> and
  - (c) TIME offers TIME Fibre Business Internet and TIME Fibre Home Broadband.<sup>56</sup>
- 3.25 In many cases, the provider’s business offering is negotiated directly with the customer (e.g. by means of a tender) to ensure that a more nuanced

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<sup>51</sup> Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) at 127.

<sup>52</sup> BEREC, *BEREC report on relevant market definition for business services* (February 2011) at pages 17-18.

<sup>53</sup> *Aberdeen Journals Limited v Office of Fair Trading (No 2)* [2003] Cat 11 at 175.

<sup>54</sup> Telekom Malaysia, *Response to Questionnaire* at 1.6(b).

<sup>55</sup> Maxis, *Response to MCMC Questionnaire* at 1.2(a).

<sup>56</sup> TIME, *Response to MCMC Questionnaire* at 1.2.

and tailored product is supplied that meets the customer's particular commercial needs.

3.26 We also note that in TIME's submission to the MCMC, it identified the key features of its typical business and residential customers as follows:

- (a) Residential – mainly broadband and voice services;
- (b) SME – mainly broadband, leased lines and voice services; and
- (c) Large businesses – mainly leased lines, IPVPN, internet access, managed services and voice services.<sup>57</sup>

3.27 The extended range of services that are provided to TIME's business customers in comparison to its residential customers supports the position that separate 'residential' and 'business' markets exist in the Malaysian fixed broadband market. We note that the products provided to the "SME" customers would likely be considered as 'residential' for the purposes of market definition because the more nuanced and business quality products (e.g. private networks and managed services) are missing from its offering to "SME" clients. However, ultimately this would need to be determined on a case-by-case basis.

3.28 Therefore, based on the above, it appears that two distinct fixed broadband markets, 'residential' and 'business', may be identified in Malaysia. The key difference between each market is the business users' preference for higher quality of service and willingness to pay for tailored broadband packages that meet their commercial needs.

3.29 On the supply side, the RTR in Austria has argued that the different needs for business customers cannot be met by other specialised operators in a short time. Conversely, the residential market requires specific knowledge and adequate investments regarding marketing or advertising processes and customer care.<sup>58</sup> The MCMC considers that these same factors would also apply in Malaysia, which further supports separate markets for residential and business customers.

3.30 However, the MCMC also notes that a single wholesale market is likely to apply uniformly for both residential and business grade services. This issue is discussed further below in the discussion of the functional dimension of the broadband and data market.

#### *Broadband pricing trends*

3.31 The MCMC has also considered pricing trends for the purposes of defining relevant markets for fixed broadband services offered in Malaysia. Figure 5 sets out the basic broadband pricing structures of the more prominent fixed broadband providers:

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<sup>57</sup> TIME, *Response to MCMC Questionnaire* at 1.8.

<sup>58</sup> Independent Regulator Group, *IRG Expert Group Report: Opening of Phase II investigation pursuant to Article 7(4) of Directive 2002/21 EC – Wholesale broadband access* (2009) at 1.2.1.  
Market definition analysis

**Figure 5: Broadband pricing per month for fixed retail services**

	Telekom Malaysia	Maxis	P1	TIME
<b>FTTH, Fibre, and VDSL2</b>	RM 149-249 (bundle)	RM 149-249 (bucket)	RM 109-269	RM 119-399
<b>ADSL</b>	RM 60-188 <sup>59</sup>	RM 78-128	N/A	N/A

(Source: Pricing information published by service providers)

- 3.32 It is difficult to conduct a direct comparison between the technologies because they tend to vary widely by speed, downloads, bundled offerings, etc. However, there are a few notable trends arising from this pricing information.
- 3.33 Broadband pricing packages tend to fall within a broad price range, with ADSL being somewhat cheaper than FTTH, fibre and VDSL2 services. However, the price differential is unlikely to give rise to separate markets for ADSL and FTTH, fibre and VDSL2 services. Customers are likely to change their demand between underlying technologies for fixed broadband services if a SSNIP occurred.

## Geographic dimension

- 3.34 To a certain degree, broadband demand is specific to the location to which the service is required. However, on the supply side, in practice fixed broadband providers appear to make their commercial decisions on a national scale. The clearest example of this can be seen in how providers set the prices for their fixed broadband offerings, which are priced uniformly across Malaysia. This is confirmed in submissions received from P1<sup>60</sup> and Telekom Malaysia.<sup>61</sup>
- 3.35 Accordingly, the MCMC believes that there is a national market in relation to the fixed broadband markets (residential and business).

## Functional dimension

- 3.36 The residential and business-grade broadband pricing products discussed in this section are typically provided directly to end users at the retail level.
- 3.37 However, we note that there is also a wholesale market for fixed broadband and data which should be considered, such as Wholesale ADSL services. That is, a wholesale supply chain exists in the market which suggests separate retail and wholesale functional dimensions.
- 3.38 The wholesale supply of fixed broadband and data services typically applies uniformly to all end users. For example, the pricing for Telekom Malaysia's DSL Wholesale product is composed of a one-time charge (e.g. for installation) and recurring charges (e.g. for activation fees), which applies

<sup>59</sup> Telekom Malaysia offers a Streamyx 4Mbps package for RM 268 per month. However, this service is only available in a limited number of 'selected areas' (see: <https://www.tm.com.my/Home/Broadband/Streamyx/Pages/StandardPackages-4Mbps.aspx>).

<sup>60</sup> P1, Response to MCMC Questionnaire at 1.3.

<sup>61</sup> Telekom Malaysia, Response to MCMC Questionnaire at 1.3.  
Market definition analysis

uniformly to all end uses (e.g. residential, business, etc.).<sup>62</sup> Therefore, the MCMC has decided that a single wholesale market will apply to both residential and business grade services.

3.39 In particular, we note that:

- (a) Telekom Malaysia also offers two Layer 3 wholesale services for DSL and HSBB; and
- (b) Maxis provides some basic wholesale products (e.g. backhaul services, local access for domestic and international carriers, etc.).

#### *Wholesale substitution*

3.40 As discussed in relation to fixed telephony services, the MCMC has also closely considered the issue of wholesale substitution. That is, whether Layer 3 wholesale ADSL and HSBB products are adequate substitutes for access to local infrastructure such as ULLs and line sharing.

3.41 Ultimately, each of these wholesale products can be used to provide a retail broadband service, so the question arises whether there is a single market for wholesale broadband services or whether there are individual markets (e.g. wholesale high speed broadband market as separate from the market for facilities such as ULLs and line sharing).

3.42 This issue has also been considered by the ACCC recently:

*"Self-supplying broadband services using its own equipment and the ULLS or LSS gives an access seeker greater control over the quality of their product offerings and greater scope to provide innovative products to the end user. There are barriers to entry in self-supplying broadband services which include the costs of investing in exchange equipment and access to exchanges. These barriers are not present when access seekers resell wholesale broadband services purchased from Telstra or another access seeker. Therefore self-supply and purchase of resale services from Telstra, for the purposes of supplying retail broadband services, are not fully substitutable, from an access seeker's perspective."*<sup>63</sup>

3.43 The MCMC is of the view that Telekom Malaysia's Layer 3 wholesale ADSL and HSBB services are not substitutes for access to local infrastructure using ULLs or line sharing. The MCMC is of the same view as the ACCC that ULLs or line sharing provides the access seeker with greater control over the retail service compared with the Layer 3 services. Layer 3 service

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<sup>62</sup> Telekom Malaysia, *Products and Services – DSL Wholesale* (accessed on 19 March 2014) available online at: < <http://tmwholesale.tm.com.my/productsandservices/accessservices/DSL-Wholesale/Pages/Overview.aspx> >

<sup>63</sup> ACCC, *Fixed Services Review – Declaration Inquiry, Public inquiry into the fixed line services declarations (Draft Report)* (December 2013) at page 27.

offerings are highly managed services and are not significantly configurable by the purchaser of the wholesale service.

- 3.44 Accordingly, the MCMC considers that the markets for wholesale broadband services (business grade and residential grade) are separate from the markets for access to local infrastructure, such as ULLs and line sharing. Further information about the markets for access to local infrastructure is discussed in Part F below.

## **Final view**

- 3.45 The MCMC is of the view that there are separate retail fixed broadband markets, each consisting of:
- (a) a business market that focuses on high speed and quality of service for the broadband service; and
  - (b) a residential market that places less of an emphasis on quality of service and speed (and pricing) of the services.
- 3.46 The MCMC also considers there to be a separate wholesale fixed broadband market, which apply uniformly to both residential and business-grade services.
- 3.47 The market for access to local infrastructure, such as ULLs and line sharing, are considered in Part F.

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## **4 Inter-exchange transmission**

### **Brief overview of Malaysia**

- 4.1 Inter-exchange transmission is often referred to as the backbone network. Backbone networks may be provided using a range of different physical technologies, but are principally fibre based and, in some areas, microwave.
- 4.2 The total distance of fibre optic links across Malaysia is estimated at approximately 194,005 km. The major fibre optic providers are Telekom Malaysia, TIME, Fiberail and Fibrecomm.<sup>64</sup>
- 4.3 In Peninsular Malaysia, there are approximately 1,017 exchanges and 95 HSBB exchanges in place. In Sabah Sarawak, there are approximately 150 exchanges and 8 HSBB exchanges.<sup>65</sup>
- 4.4 The owners of backbone networks in Malaysia who make available inter-exchange transmission to third parties includes:

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<sup>64</sup> MCMC, *Fibre optic site & link 2014 stock take for Peninsular Malaysia and Sabah Sarawak*.

<sup>65</sup> MCMC, *Fibre optic site & link 2014 stock take for Peninsular Malaysia and Sabah Sarawak and Report by Telekom Malaysia to MCMC*.



- (a) Telekom Malaysia owns an extensive backbone network across Peninsular Malaysia, across to East Malaysia and within East Malaysia itself;
  - (b) TIME owns and operates a national fibre optic backbone network in Peninsular Malaysia;
  - (c) Fiberail has a backbone network within Peninsular Malaysia along the major rail, road and pipeline corridors;
  - (d) Fibrecomm has a backbone network throughout Peninsular Malaysia and Sabah;
  - (e) Maxis has some terrestrial fibre backbone network in Peninsular Malaysia;
  - (f) Celcom Timur has a relatively extensive backbone network in East Malaysia; and
  - (g) Jaring has some backbone network infrastructure in Peninsular and East Malaysia and across to East Malaysia.
- 4.5 Not all operators who own backbone networks make available their backbone networks for third party use (i.e. they are used for internal network purposes only).
- 4.6 In addition, some licensees make available inter-exchange transmission over backbone networks in more localised areas, such as Sacofa in Sarawak.

## Product characteristics

- 4.7 Transmission service is a technology neutral term that refers to high capacity data links that carry large volumes of communications traffic (e.g. voice, data or video communications) over long distances. Inter-exchange transmission services are generally supplied at the wholesale level by a transmission network owner to access seekers, to carry traffic between two locations.<sup>66</sup>
- 4.8 Transmission services permit licensees with access networks to connect to backbone networks where they do not otherwise own a backbone network. In effect, transmission services provide operators with a means of connecting their core networks with points of service delivery (e.g. transmission between exchanges) across Malaysia.
- 4.9 In determining the product dimension of the market, the MCMC considers plesiochronous digital hierarchy (**PDH**), synchronous digital hierarchy (**SDH**) and Ethernet as being technologies used to supply inter-exchange transmission, being services that run over Layer 2.

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<sup>66</sup> ACCC, *Domestic Transmission Capacity Service – An ACCC Discussion Paper reviewing the declaration for the Domestic Transmission Capacity Service* (July 2013) at 2.1.  
Market definition analysis

- 4.10 In terms of underlying physical technologies used to deliver inter-exchange transmission services, the MCMC has considered fibre and microwave as potentially providing substitutable services. However, based on feedback received from licensees, the MCMC noted that inter-exchange transmission largely occurs over long distances and access seekers are likely to have a preference for fibre based transmission where it is available. In addition, MCMC is aware that LTE services in the mobile sector are data hungry and that fibre connectivity to base stations is important. The MCMC has formed a view that only fibre transmission will be considered as part of this market

## Product dimension

- 4.11 On the demand side, licensees that own access networks which generate voice, broadband, video and text traffic rely on the availability of transmission to connect their access networks to other access networks in distant locations or to access networks of other licensees via points of presence on these transmission networks. Access to transmission capacity is also required for service providers to supply downstream customers and end users.
- 4.12 It is common for access to key transmission routes to be regulated, particularly where competitive access is found to be deficient. In many areas where transmission networks are limited, such as in certain regional areas, an operator's network may form a natural monopoly. Australia is an example of a country that regulates access to transmission services by means of its declaration of 'Domestic Transmission Capacity Services' (**DTCS**) along uncompetitive routes.<sup>67</sup>
- 4.13 The ACCC has stated its reasons for regulating DTCS along uncompetitive routes for the following reasons:
- (a) Transmission networks are generally capital intensive and require large sunk investments, which makes it economically inefficient for competitors to build competing transmission network infrastructure in certain areas.
  - (b) Transmission networks are required for nearly every telecommunication service and are critical for the supply of downstream retail and wholesale communications services, particularly along routes that are considered to be natural monopolies.
  - (c) Telstra (the incumbent) remains the dominant supplier of transmission services across Australia, particularly in regional areas. Therefore, access to transmission infrastructure on routes that are considered to be natural monopolies is critical to ensure that access seekers are able to achieve end-to-end connectivity in order to supply downstream customers.

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<sup>67</sup> *Domestic Transmission Final Access Determination 2012*.  
Market definition analysis

- (d) Transmission services will be necessary to support the delivery of next generation access services over the National Broadband Network (**NBN**). In particular, retail service providers will require transmission services to carry traffic between the NBN points of interconnection and their points of presence.<sup>68</sup>
- 4.14 The MCMC believes that most of the ACCC's arguments would also apply to the Malaysian context. While some inter-exchange transmission networks are likely to be considered competitive (e.g. in urban areas where there tends to be greater incentives for competitors to invest in rival infrastructure), the MCMC is interested in identifying the extent to which access to inter-exchange transmission service is limited and may pose threats to competition.
- 4.15 On the supply side, in many instances it will be unlikely that a rival inter-exchange transmission service would be able to enter the market in response to an increase in prices. The construction costs, duplication of infrastructure and time it would take to build the transmission line mean that barriers to entry are high.
- 4.16 The MCMC considers that all fibre and microwave based services function as substitutes. The MCMC notes that this is different to the position taken by the ACCC in Australia which has found that microwave services are not a substitute for fibre on capital-regional routes given that microwave cannot support the entire range of downstream services. However, the MCMC considers that in the Malaysia context, microwave technology is used and supports similar downstream uses to fibre technologies and regards both as substitutes. The MCMC welcomes comments on this aspect of its preliminary findings.

## **Geographic dimension**

- 4.17 Demand for inter-exchange transmission services may be assessed on a route-by-route basis. This is the approach used elsewhere (e.g. Australia). In making this assessment, the MCMC will look at the number of existing lines along a particular transmission route, which will be considered in relation to demand for transmission along each route.
- 4.18 The MCMC will also consider the possibility of transmission along a particular route being supplied by an alternative means. For example, if direct access to inter-exchange transmission between Johor Bahru and Kuala Lumpur is prohibitive, it may be possible to access an alternative supply by means of a less direct route on another operator's network (e.g. by acquiring transmission service via Singapore).
- 4.19 Having said that, the MCMC notes the ACCC's position that alternative routes are not likely to be suitable:

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<sup>68</sup> ACCC, *Domestic Transmission Capacity Services - An ACCC Discussion Paper reviewing the declaration for the Domestic Transmission Capacity Service (July 2013)* at 2.3.  
Market definition analysis

*"The ACCC has previously established the geographic dimensions of the market by identifying whether there are any substitutes for the supply of transmission services in alternative regions. In most cases, access seekers are likely to purchase [inter-exchange transmission] as a point to point route and alternative routes are unlikely to be suitable."<sup>69</sup>*

- 4.20 However, the MCMC is of the view that the market for inter-exchange transmission should be considered on a national level. Although individual routes must be considered, it is at the national level that the MCMC believes demand side and supply side substitution occurs. For example, the decision to build rival infrastructure along a particular route by a competitor will often be determined by reference to an operator's network portfolio across the entire country.
- 4.21 Furthermore, on the demand side, national access to inter-exchange transmission will be required by a licensee to offer end-to-end capability for telephony services (although the MCMC acknowledges that this may be less important for access to data and internet services). The only means of providing this end-to-end capability is to acquire access to national backbone networks.
- 4.22 From a pricing perspective, the MCMC notes that pricing of the trunk segment as published by operators varies by reference to the distance but not by reference to the route. This suggests a national market, with the exception of the Peninsular Malaysia to East Malaysia route (see further below) and the prices in East Malaysia compared with Peninsular Malaysia. The MCMC notes its previous findings that the distance-related costs in East Malaysia are approximately 20% higher than in Peninsular Malaysia.<sup>70</sup>
- 4.23 Accordingly, the MCMC considers the inter-exchange transmission market as a national market. The MCMC will still take into account whether competition exists on particular transmission routes, if we receive sufficient evidence from licensees that indicate so.
- 4.24 When considering conduct under section 139, the MCMC will continue to take into account whether competition exists on a particular route which may dilute the anti-competitive effect of alleged anti-competitive conduct. That is, the ability of acquirers of inter-exchange transmission to switch to alternative suppliers of inter-exchange transmission on a particular route following an attempt by one particular supplier to engage in anti-competitive conduct will be taken into account by the MCMC when determining whether or not to intervene under section 139.
- 4.25 The MCMC notes that the ACCC exempts licensees from access obligations if certain routes are found to be competitively supplied. For example, inter-capital transmission routes between Brisbane, Sydney, Canberra,

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<sup>69</sup> ACCC, *Domestic Transmission Capacity Services - An ACCC Discussion Paper reviewing the declaration for the Domestic Transmission Capacity Service* (July 2013) at 3.2.

<sup>70</sup> SKMM, Public Inquiry Report, Review of Access Pricing, 14 December 2012  
Market definition analysis

Melbourne, Adelaide and Perth are “deregulated DTCS routes”, which are exempt from the DTCS declaration.<sup>71</sup>

#### *Inter-exchange transmission between Peninsular Malaysia and East Malaysia*

4.26 The MCMC has identified the potential for a separate geographic market on the route from Peninsular Malaysia to East Malaysia. There are particular characteristics on this route that may warrant such a finding. These characteristics include:

- (a) higher barriers to entry;
- (b) particular expertise required to deploy submarine cable capacity;
- (c) limited alternative routes; and
- (d) more limited competition on the route.

Therefore, there would appear to be limited substitutes for inter-exchange capacity on this route.

4.27 This issue was addressed by a mobile operator in its submission to the MCMC, where it noted that the inter East-West Malaysia traffic costs were high due to the high submarine costs being imposed by Telekom Malaysia. The said mobile operator has attributed the lack of new entrants in the market and poor expansion into East Malaysia to the high cost of transmission to submarine cables.<sup>72</sup>

4.28 The MCMC therefore specifically identifies the route from Peninsular Malaysia to East Malaysia as a separate market for inter-exchange capacity.

### **Functional dimension**

4.29 Inter-exchange transmission is only generally provided at a wholesale level. Acquirers at the wholesale level then integrate this transmission into an end-to-end product for end users. End users do not acquire inter-exchange transmission and hence this service route is only considered in the wholesale context.

### **Final view**

4.30 The MCMC considers there to be a wholesale national market for inter-exchange transmission. The MCMC considers that there is a separate geographic market for the route from Peninsular Malaysia to East Malaysia.

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<sup>71</sup> ACCC, *Domestic Transmission Capacity Services - An ACCC Discussion Paper reviewing the declaration for the Domestic Transmission Capacity Service* (July 2013) at 2.4.1.

<sup>72</sup> Response by a mobile operator to MCMC Questionnaire at 2.2(e).

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## 5 Tail transmission

### Brief overview of Malaysia

- 5.1 Tail transmission services are currently offered in Malaysia by various network operators.
- 5.2 For example, Telekom Malaysia offers both wholesale and retail products for tail transmission services. Telekom Malaysia describes its retail 'Digital Leased Line' product as a point-to-point connection that allows for:
  - (a) private networking solutions with speed of data transmission from 64 kbps up to 155 Mbps;
  - (b) managed 24 x 7 using a centralised Integrated Network Management System; and
  - (c) extensive nationwide network coverage.<sup>73</sup>
- 5.3 In its access reference document, Telekom Malaysia describes its wholesale local leased circuit as a facility and/or service for the carriage of communications by way of a private circuit between a point of interconnection and an end user, available only at one end of a private circuit, which comprises transmission (whether packet or circuit) at such transmission rates as may be agreed between Telekom Malaysia and the access seeker on a permanent or virtual basis.<sup>74</sup>
- 5.4 Providers of tail transmission or local leased circuits in Malaysia also include TIME, Maxis and Sacofa (in Sarawak).

### Product characteristics

- 5.5 Tail transmission is a technology neutral service involving the transmission between an end user at a fixed location and the nearest local exchange. It is usually supplied by means of fibre-optic cables, but may also be supplied using microwave and satellite technology.
- 5.6 In Australia, the ACCC has provided the following example of 'tail-end' transmission:

*"[T]ransmission within a single Exchange Service Area (ESA) between a customer location and a POI on the access seeker's network, or if Telstra provides the tail-end service, between a customer location or a POI and the Telstra exchange."*<sup>75</sup>

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<sup>73</sup> Telekom Malaysia, *Digital Leased Line Brochure* available online at: <<https://www.tm.com.my/Office/Business/Enterprise/DataServices/DigitalLeasedLine/Documents/Digital%20Leased%20Line%20-Wideband%20Brochure.pdf>>

<sup>74</sup> Telekom Malaysia Berhad's Access Reference Document at Part XI of Schedule A.

<sup>75</sup> ACCC, *Domestic Transmission capacity service discussion paper* (Jul 2013) at page 6.  
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- 5.7 Tail transmission is also commonly referred to as a local leased circuit (**LLC**) in other jurisdictions. For example, in Singapore, LLC has been defined as:

*"domestic private leased circuits with either point-to-point or point-to-multi-point configurations, providing dedicated/transparent telecom links to end users or licensees for carrying any voice/data/video traffic using the SDH technology. It includes LLCs used for connections to international IPLC gateways but excludes other domestic infrastructure or data services such as managed data services and backhaul for access to international capacities via submarine cables or satellites."*<sup>76</sup>

- 5.8 At the wholesale level, tail transmission may be used by operators to connect their own sites (e.g. mobile operators to connect their mobile base stations) and by operators to resupply to end users. As the ACCC has noted:

*"in practice there are two types of tail-end services offered in the market:*

- *between a wholesale customer point of presence (POP) and another wholesale customer POP (a POP-to-POP service), and*
- *between a wholesale customer POP and an end user location (a POP to end user service)."*<sup>77</sup>

- 5.9 Tail transmission (or local leased circuits) may also be acquired directly by end users (principally large corporate customers and government customers) from the network owner for their own data requirements.

- 5.10 There are three types of leased lines that may be used for tail transmissions:

- (a) analogue lines, which are commonly used for voice transmission and are mainly supplied at the retail level;
- (b) digital leased lines, whereby transmission of data is time division multiplexed so that transmission characteristics can be predicted with a high degree of accuracy; and
- (c) digital leased lines based on Ethernet technology.<sup>78</sup>

- 5.11 The MCMC has included tail transmission in the Access List at the wholesale level as part of Wholesale Local Leased Circuit Services.

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<sup>76</sup> IDA, *QoS standards for fixed network telecommunications service (Local Leased Circuit)* available online at: < [https://www.ida.gov.sg/~media/Files/PCDG/Licensees/StandardsQoS/QualityofService/QoS\\_webpage\\_-\\_leased\\_ckt.pdf](https://www.ida.gov.sg/~media/Files/PCDG/Licensees/StandardsQoS/QualityofService/QoS_webpage_-_leased_ckt.pdf)>

<sup>77</sup> ACCC, *Domestic Transmission capacity service discussion paper* (Jul 2013) at page 26.

<sup>78</sup> Ofcom, *Leased lines charge control: A new charge control framework for wholesale traditional interface and alternative interface products and services* (2 February 2009) at 2.4.

## Product dimension

- 5.12 From a demand perspective, tail end transmission has no close substitutes. Customers generally require transmission to a particular location. More highly managed services are not suitable for the applications for which tail transmission is used.
- 5.13 On the supply side, tail transmission exhibits the same characteristics as inter-exchange transmission (as described above). Barriers to entry are high and it is difficult to extensively duplicate tail end transmission to a wide range of locations.
- 5.14 The MCMC has also considered whether ULL services would be a demand side substitute for tail transmission if a hypothetical monopolist were to undertake a SSNIP in relation to the pricing of tail transmission. Ultimately, the MCMC considers that ULL is not substitutable for tail transmission as the symmetric transmission capabilities of ULL are highly dependent on the distance between the transmission points to a much greater extent than tail transmission.
- 5.15 This finding is also consistent with the IDA's decision in Singapore, where it has stated:

*"IDA does not agree that other technologies – such as xDSL, wireless local loop, wavelength division multiplexing, cable modem, free space optics, microwave links, Universal Mobile Telecommunications System and General Packet Radio Service – should be considered to be in the same market as LLCs. Again, IDA sees no reason to depart from its previous decision that these connectivity services are not demand side substitutes because they lack LLCs reliability and versatility."*<sup>79</sup>

- 5.16 Similarly, the MCMC has also considered whether tail transmission and broadband services are in the same market. This issue was recently considered by Ofcom in the United Kingdom, where it found that the two services were not sufficiently substitutable for the following reasons:
- (a) there are key differences in service features (e.g. bandwidth, contention of service, security, etc.) and end users of leased lines would have significant concerns about switching to broadband services;
  - (b) there is a lack of convergence between the prices of broadband services and leased lines, as well as a continued demand for leased lines despite the significant price premium for these services over broadband services; and

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<sup>79</sup> IDA, *Final decision on the request by SingTel for exemption from dominant licensee obligations with respect to the business and government customer segment and individual markets* (2 June 2009) at page 33.



- (c) there would be significant switching costs for some end users in moving from leased lines to broadband products.<sup>80</sup>
- 5.17 The Ofcom findings are also likely to apply to the Malaysian context. Therefore, the MCMC does not consider tail transmission and broadband services to be in the same market at this time.
- 5.18 There is also a temporal dimension to the market for tail transmission that must be considered, which relates to the potential effect of the HSBB rollout on the supply of tail transmission in Malaysia.
- 5.19 This issue was also recently considered in Australia where a NBN rollout is currently taking place. More specifically, the ACCC looked at whether the technical specifications (e.g. information rates and symmetric bandwidths) of NBN Co's proposed Medium Business Services and Enterprise Ethernet Services products could constitute substitutes for the DTCS service. However, as NBN Co has yet to release these services, the ACCC was unable to assess their impact on DTCS markets.<sup>81</sup>
- 5.20 The MCMC has considered the potential impacts of the HSBB rollout on the market for traditional tail transmission services. However, it is unclear at this time how the two transmission services will compare for the purposes of market definition. Therefore, the MCMC has chosen to exclude HSBB services from the market for tail transmission at this time.

## Geographic dimension

- 5.21 The MCMC has considered whether the geographic dimensions of the market should be linked to each individual transmission tail route between end users and the point of interconnect (**POI**) or local exchange.
- 5.22 However, the MCMC proposes to take a more holistic approach and is of the view that transmission tails are supplied in a national market.
- 5.23 Central to this view is the pricing strategies that are currently employed by most operators, which tend to be charged on a per kilometre basis. For example, we note that in Telekom Malaysia's access reference document its charges are per year per circuit which are broken down into segments of network (e.g. 0-5km, 5-10km, 10-20km, etc.). There is also a single set of charges for each of Peninsular Malaysia and East Malaysia, rather than on a route-by-route (or some other) basis.<sup>82</sup>
- 5.24 In Singapore, the IDA has also considered how competitive differences between 'Central Business District (CBD) and Non-CBD' areas may affect the geographic market definition for LLC services. Ultimately, it found that despite any competitive differences between the two regions, the market for LLC should be viewed as a national market largely because the

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<sup>80</sup> Ofcom, *Business connectivity market review – Review of retail leased lines, wholesale symmetric broadband origination and wholesale trunk segments*, (28 March 2013) at page 102.

<sup>81</sup> ACCC, *Domestic Transmission Capacity Services - An ACCC Discussion Paper reviewing the declaration for the Domestic Transmission Capacity Service* (July 2013) at 2.4.1.

<sup>82</sup> Telekom Malaysia Berhad's Access Reference Document at Part XI of Schedule A.  
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incumbent operator's market share precludes entry into the market equally across the country.<sup>83</sup>

- 5.25 However, the MCMC also notes that there may be specific exceptions to this approach for reasons of remoteness or ease of access. More specifically, exceptions to a national market may be found for transmission to operating cable landing stations and earth stations that are particularly remote and alternative access is difficult or impossible. This form of access is separately considered in Part E of this Market Definition Analysis.

## Functional dimension

- 5.26 Tail transmission is offered as a wholesale product to other licensees who then use the transmission capacity to design and deliver communications products.
- 5.27 Tail transmission is also supplied as a separate retail product, particularly to business or enterprise customers who wish to acquire managed data services. The ACCC has identified the relevant downstream markets for DTCS (equivalent to tail transmission in Malaysia) as:

*"the range of retail services (that can be supplied using transmission services) which are delivered over optical fibre including national long distance, international call, data and IP-related markets."*<sup>84</sup>

- 5.28 The MCMC notes that there is a clear supply chain in relation to tail transmission. When tail transmission is acquired at the wholesale level, it may be on-supplied in the form of a managed product at the retail level or it may be consumed by the acquiring licensee (i.e. the access seeker) for its own purposes. The ACCC also notes that transmission capacity is supplied directly to retail customers for a variety of purposes, which will often be on separate terms to the provision of wholesale transmission capacity.
- 5.29 The MCMC is of the view that there are distinct functional dimensions of the tail transmission market, namely retail and wholesale.

## Final view

- 5.30 The MCMC has determined that there are separate wholesale and retail markets for tail transmission and that both markets operate at a national level, unless the limited exceptions stated above are found to apply.
- 5.31 The MCMC does not consider that ULLs or HSBB services are product substitutes for tail transmission at this time.

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<sup>83</sup> IDA, Final decision on the request by SingTel for exemption from dominant licensee obligations with respect to the business and government customer segment and individual markets (2 June 2009) at page 33-34.

<sup>84</sup> ACCC, *An ACCC Final Report on reviewing the declaration of the domestic transmission capacity service* (May 2009).

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## 6 Domestic managed data services

### Brief overview of Malaysia

- 6.1 Domestic managed data services are currently offered by a number of providers in Malaysia.
- 6.2 For example, Telekom Malaysia provides an IP-VPN service which may be ordered as a 'premier', 'classic' or 'lite' service. Telekom Malaysia also offers a 'Metro-E' product, which it promotes as offering customers high speed and high scalability over a managed network.
- 6.3 Similarly, Maxis offers a Metro-Ethernet product which it claims has data speeds of approximately 6 Mbps to 1 Gbps. Fiberail claims that its own Metro Ethernet service offers speeds of between approximately 1 Mbps to 10 Gbps.
- 6.4 Jaring offers a 'Network Enhancer' product which allows customers to view, manage and optimise bandwidth usage to improve network efficiency. Jaring also offers a Virtual Private Network service that emphasises network security, which it appears to target at its corporate customers.
- 6.5 Fibrecomm offers an Ethernet Private Leased Circuit service, as well as a Domestic Private Leased Circuit service.

### Product characteristics

- 6.6 Local managed data services are highly managed data services provided using technologies such as frame relay, ATM, IP-VPN and Metro-Ethernet services. They may be provided domestically or internationally. International managed data services are described in section 7 below.
- 6.7 Tail transmission or LLCs are usually provided as inputs to the provision of local managed data services (whether by way of internal supply or acquired at wholesale by an access seeker). Domestic managed data services are then supplied to an end user at the retail level. Domestic managed data services are not generally resold at the wholesale level.

### Product dimension

- 6.8 On the demand side, domestic (Malaysia) managed data services offer a highly managed form of service that is not offered by LLCs. The IDA in Singapore has stated (albeit in the international managed data service context, but in a sufficiently general way to also apply to domestic managed data services):

*"Frame Relay and ATM provide connectivity by means of a permanent virtual circuit; IP-VPN provides logical connections among sites, either over the public Internet or private networks. Frame Relay typically*

*provides service at speeds below 2Mbps, which is significantly slower than most ATM services.*<sup>85</sup>

- 6.9 The IDA went on to conclude that customers can substitute between these services reasonably readily and there is evidence of customer switching between these services. The evidence of customer switching is limited in Malaysia, but the MCMC would expect that given that the customers of these services are primarily large corporates that are present in many markets, the demand characteristics of these customers would be similar in Malaysia and Singapore markets.
- 6.10 On the supply side, most of the providers of data managed services in Malaysia offer a suite of domestic managed data services which indicates a high degree of supply side substitution between these domestic data managed services.
- 6.11 The MCMC has also considered the demand and supply side substitutability between domestic managed data services and local leased circuits. For the same reasons expressed by the IDA,<sup>86</sup> the MCMC does not consider that there is sufficient substitutability and is of the view that domestic managed data services are in separate markets.
- 6.12 On the demand side, domestic managed data services offer a higher degree of data management than that offered by LLCs. On the supply side, providers of domestic managed data services are usually highly dependent on tail transmission (LLCs) providers as an essential input into the supply of local managed data services. Consequently, there is no real ability for a domestic managed data services provider to move into the supply of tail transmission (LLCs) due to high barriers to entry observed above in relation to the provision of tail transmission.

## **Geographic dimension**

- 6.13 The MCMC considers there to be a national market for domestic managed data services. On the demand side, while customers want connectivity into particular locations, they typically demand services into several different locations and expect the same levels of service into those multiple locations. Furthermore, the pricing for these services is generally national.

## **Functional dimension**

- 6.14 The information available on domestic managed data services is limited. However, usually there is no or only a small pricing differential between the wholesale and retail levels for the supply of domestic managed data services.
- 6.15 This is supported by the IDA in Singapore which observed that:

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<sup>85</sup> IDA, *Explanatory Memorandum on ICS Decision* at page 23-24

<sup>86</sup> See IDA, *Final Decision on the Request by Singapore Telecommunications Limited for exemption from dominant licensee obligations with respect to the business and government customer segment and individual markets* at page 54

*"while LMDS is generally provided on a retail basis, the service is also sold to wholesale customers. However, given that there is no difference in pricing or any other aspect of sales between wholesale and retail customers, IDA concludes that wholesale and retail LMDS constitutes a single market."<sup>87</sup>*

- 6.16 Therefore, although the MCMC acknowledges that domestic managed data services may be supplied on a wholesale basis, the MCMC ultimately supports the view that wholesale pricing tends to be comparable to the pricing for retail domestic managed data services and should form a single market.
- 6.17 The MCMC is of the view that there is a single retail market in the provision of domestic managed data services in Malaysia.

## **Final view**

- 6.18 The MCMC is of the view that there is a national market for the provision of local managed data services in Malaysia. The MCMC does not believe that tail transmission is a substitute for these services in Malaysia.

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## **7 International transmission and international managed data services**

### **Brief overview of Malaysia**

- 7.1 International data services are currently offered by several providers in Malaysia.
- 7.2 For example, Telekom Malaysia offers:
- (a) International Private Leased Circuits, which it describes as "internationally dedicated point-to-point leased line services between customers' premises around the world"; and
  - (b) Global Ethernet Virtual Private Line and International Ethernet Private Line services, which are managed data services that are largely targeted at large international companies that require cross-border connectivity solutions for high volumes of traffic over a secure network.
- 7.3 Similarly, Fibrecomm offers an International Private Leased Circuit service by means of Fibrecomm's terrestrial cross-border connections via Thailand and Singapore.

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<sup>87</sup> See IDA, *Final Decision on the Request by Singapore Telecommunications Limited for exemption from dominant licensee obligations with respect to the business and government customer segment and individual markets* at page 53

Market definition analysis

## Product characteristics

- 7.4 International transmission provides capacity on international backbone networks for voice and data traffic between Malaysia and international destinations. It is typically delivered by a half circuit which is connected to a half circuit provided by a foreign operator to form an international private leased circuit (**IPLCs**) between Malaysia and that foreign jurisdiction.
- 7.5 IPLCs are point-to-point private lines that allow organisations to communicate between offices where those offices are geographically dispersed across national borders. An IPLC may be used for internet access, business data exchange, video conferencing, as well as most other forms of communications services.
- 7.6 In Singapore, the IDA has identified a market for Terrestrial IPLCs which consists of:
- "services, provided over submarine cables, that offer customers the exclusive use of a point-to-point, dedicated transparent transmission path for voice, data or video between a location in Singapore and a location outside of Singapore."<sup>88</sup>*
- 7.7 A local example of international transmission services would be Telekom Malaysia's IPLC service which is briefly described above. Telekom Malaysia's IPLC service supports communications services such as data transmission, fax and video conferencing with digital circuits at different speeds ranging from 64 kbps up to 2 Gbps.<sup>89</sup>
- 7.8 Separately, there are providers of international managed data services, namely frame relay, IP-VPN, Ethernet-based and ATM services using the same technology described above in relation to domestic managed data services.

## Product dimension

- 7.9 On the demand side, there do not appear to be any realistic substitutes for international transmission. It would be too costly to invest in a rival international transmission line and it would not make sense to duplicate infrastructure on such a large scale (i.e. due to complex permitting requirements, costs versus potential revenues, etc.).
- 7.10 It is conceivable that an IPLC service could be provided by other means. For example, in the event of a SSNIP in relation to a terrestrial IPLC service, it may be possible for another provider to attempt to enter the international transmission market by means of a satellite-based service. However, customers would be unlikely to switch to a satellite-based service because there are generally significant price and performance differences between satellite-based and cable-based IPLC services. Further, satellite-

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<sup>88</sup> IDA, *Explanatory Memorandum on ICS Decision* at 53-60.

<sup>89</sup> Telekom Malaysia, *Digital Leased Line: IPLC* (accessed on 28 February 2014) available online at: < <https://www.tm.com.my/Office/Business/Enterprise/DataServices/DigitalLeasedLine/Pages/IPLC.aspx>>.

based IPLCs are typically used only to reach locations that cannot be accessed using terrestrial IPLCs, which demonstrates that each service targets separate markets and should not be considered as forming a single market for IPLCs.

- 7.11 It may also be possible for some large wholesale customers in Malaysia to seek international connectivity by hubbing through another location and then seeking connectivity to all other countries through that hub.
- 7.12 In Singapore, the IDA looked at the same issue of whether a customer in Singapore could access any destination by hubbing through Hong Kong or Tokyo, but concluded that while hubbing may be technically possible it was not an economically or technically acceptable substitute for terrestrial IPLCs. Routing traffic through a third country would only be acceptable where direct connection was available, such as on the route from Singapore to Vietnam.<sup>90</sup>
- 7.13 The MCMC agrees with this assessment and has applied a similar approach in relation to the Malaysian context.
- 7.14 Furthermore, for the same reasons expressed in relation to domestic managed data services, the MCMC does not consider that IPLCs and international managed data services are substitutes and hence are products offered in different markets.

## **Geographic dimension**

- 7.15 International transmission and international managed data services are generally delivered into a point of presence, usually in Kuala Lumpur.
- 7.16 The MCMC's view is that IPLCs should be considered to be supplied in a national geographic market. The pricing structures for IPLC services appear to be offered uniformly across the country with any price differences typically being the result of specific commercial negotiations and other factors (e.g. speed). For example, Telekom Malaysia states that the pricing structure of its High Speed Broadband (Transmission) Service is as follows:
  - (a) a one-time charge; and
  - (b) monthly recurring charges that are based on "speed and other parameters."<sup>91</sup>
- 7.17 Pricing may ultimately vary when the half circuit is secured from the foreign operator, but this does not affect the pricing of the Malaysian half circuit and there is generally no distinction between pricing depending on the Malaysian origin.

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<sup>90</sup> IDA, *Explanatory Memorandum to the Decision of the IDA on request by SingTel for exemption from dominant licensee obligations with respect to the "International Capacity Services" market* (12 April 2005) at 55-58.

<sup>91</sup> Telekom Malaysia, *Response to MCMC Questionnaire* at 1.3(a).  
Market definition analysis

- 7.18 Further, the MCMC also notes that Telekom Malaysia identifies the geographic area for its transmission services as “nationwide” for its packet-based and circuit-based transmission services.
- 7.19 The MCMC notes that the IDA in Singapore has also considered whether each Terrestrial IPLC route should be viewed as a separate market. It concluded that it was not necessary to treat each route as a separate market, except where it was necessary to assess an exemption request.<sup>92</sup> Ultimately, the IDA concluded that:
- “the geographic market in which SingTel offers Terrestrial IPLC services is national. It consists of all Terrestrial IPLCs purchased in Singapore (so-called “A-end” sales).”<sup>93</sup>*
- 7.20 Therefore, the MCMC considers the geographic area of the international transmission market on a national level. For the same reasons, international managed data services are viewed as being provided in a national market.

## Functional dimension

- 7.21 International transmission may be provided as both a wholesale service and retail service (e.g. IPLCs).
- 7.22 When a wholesale customer purchases an IPLC, it typically buys connectivity between its point of presence in Malaysia and its point of presence in another country. The wholesale customer also buys some form of tail transmission service in each country to allow it to provide an end-to-end service, which is then resold to businesses.
- 7.23 The MCMC is of the view that separate markets exist for retail and wholesale IPLC markets. When a business orders an IPLC service, it must also purchase tail transmission from the operator’s point of presence to the customer location. In contrast, a wholesale IPLC service is provisioned directly by means of a co-location facility (where possible). Otherwise, tail transmission must be purchased from the operator’s point of presence to the wholesale customer’s point of presence and onto the customer. In either case, the different routes of transmission (and associated costs) for retail and wholesale customers suggests that two separate markets exist for retail and wholesale international transmission markets.
- 7.24 The IDA came to a similar conclusion and identified that both retail and wholesale markets exist for international IPLCs, although the IDA also

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<sup>92</sup> IDA, *Explanatory Memorandum to the Decision of the IDA on request by SingTel for exemption from dominant licensee obligations with respect to the “International Capacity Services” market* (12 April 2005) at 55-58.

<sup>93</sup> IDA, *Final decision on the request by SingTel for exemption from dominant licensee obligations with respect to the business and government customer segment and individual markets* (2 June 2009) at 107.



concluded that both services are subject to similar competitive conditions, so should be assessed together.<sup>94</sup>

- 7.25 The same conclusion does not apply to international managed data services. International managed data services are generally only offered on an end-to-end basis and, while limited wholesale pricing information is available, the MCMC does not expect that there would be any (or no significant) price difference between international managed data services offered to businesses and wholesale customers. Hence, the MCMC is of the view that there is no functional dimension in the international managed data services market.

## Final view

- 7.26 The MCMC is of the view that there are national retail and wholesale markets for IPLC transmission in Malaysia.
- 7.27 The MCMC is of the view that there is a separate, single national market for international managed data services in Malaysia.

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## 8 Broadcasting transmission

### Brief overview of Malaysia

- 8.1 In Malaysia, terrestrial broadcasting is undertaken by the free to air (**FTA**) networks. The main FTA providers in Malaysia are:
- (a) TV1;
  - (b) TV2;
  - (c) TV 3;
  - (d) ntv7;
  - (e) 8TV;
  - (f) TV9; and
  - (g) TV AlHijrah.<sup>95</sup>
- 8.2 While these FTA networks are responsible for broadcast transmission, they are dependent on third party transmission between their play-out facilities and the transmission tower.
- 8.3 This transmission to the broadcasting tower is generally provided by Telekom Malaysia by means of its Broadcast Transmitter Service.<sup>96</sup>

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<sup>94</sup> IDA, *Final decision on the request by SingTel for exemption from dominant licensee obligations with respect to the business and government customer segment and individual markets* (2 June 2009) at 107.

<sup>95</sup> MCMC, *Communications & multimedia pocketbook of statistics* (Q4, 2013) at page 35.

<sup>96</sup> See: <https://www.tm.com.my/Office/Business/Enterprise/Broadcast/Pages/Transmitter.aspx>.

## Product characteristics

- 8.4 Broadcasting transmission is the end-to-end delivery of content from a broadcaster to an end user. Broadcasting is traditionally provided over an analogue system which is fed through an encoder to a transmitter which sends the signal to an antenna, mast or other related equipment as an electromagnetic wave with an assigned frequency range and is broadcast and picked up by other equipment at the fixed customer location.
- 8.5 Generally, broadcasting content is encoded into either an analogue or digital signal which is then transmitted from a single point to multiple points. There is currently a global move to switch over encoding from analogue to digital as the format affects the power required to broadcast, the spectrum that is needed (if spectrum is used), the equipment used and the capacity of carriage with digital signals outperforming analogue in these areas.<sup>97</sup>
- 8.6 The broadcasting sector in Malaysia is currently in a state of transition. Since the 2004 Dominance Study, significant technological and product innovation has taken place in the broadcasting sector, particularly with the increased availability of digital broadcasting services. A planned migration from analogue to digital broadcasting is currently scheduled to begin in 2015.
- 8.7 In Malaysia, broadcasting transmission to the tower is regulated under the Access List which identifies the relevant service as:
- "Transmission Service is a Facility and/or Service for the carriage of communications between any two technically feasible network transmission points (not being Customer transmission points) via network interfaces at such transmission rates as may be agreed between the Access Provider and the Access Seeker on a permanent or virtual basis....."*
- (e) The Transmission Service may be for the carriage of communications which comprise of content applications service.*<sup>98</sup>
- 8.8 The MCMC also notes that for analogue broadcast television, the process of transmission of a signal from the tower is effectively the same as the distribution of the broadcast – both are performed by the FTA broadcaster. Broadcasting markets are considered in Part D.
- 8.9 However, this position changes for digital television. For digital television, there is a person responsible for the digital transmission from the towers, who is separate from the broadcasters themselves. Hence, transmission from the towers in relation to digital television needs to be separately

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<sup>97</sup> OfTel, *Review of competition: broadcasting transmission services A consultation issued by the Director General of Telecommunications* (2003) at page 12.

<sup>98</sup> *Commission Determination on Access List, Determination No. 1 of 2005 (as amended in 2009).*

considered from the broadcasting distribution itself. The digital television transmission of FTA signals from the towers is considered in this section, whereas the broadcasting and distribution of digital television by broadcasters is considered in Part D.

## Digital television

- 8.10 The MCMC has decided that there will be a single Common Integrated Infrastructure Provider (**CIIP**) for all of the FTA broadcasters in Malaysia. After a lengthy tender process, on 8 January 2014 the MCMC announced that Puncak Semangat Sdn Bhd (**PSSB**) was the successful bidder to build, operate and manage the infrastructure for Digital Terrestrial Television Broadcast (**DTTB**) service in Malaysia.
- 8.11 PSSB is required to develop the DTTB infrastructure which includes a digital multimedia hub and a network of high, medium and low powered digital TV transmitters nationwide that will have the technical capability, as a start, of carrying up to 45 standard definition or 15 high definition digital television channels.
- 8.12 Initially, the migration to digital will be for the current government-owned and private stations namely TV1, TV2, TV 3, ntv7, 8TV, TV9, TV AlHijrah and Bernama TV. The final mix of channels shall be determined commercially between the CIIP and the broadcasters. The current radio channels can also be carried on the DTTB platform.

## Product dimension

### *Transmission to the tower*

- 8.13 Assessing the demand for broadcasting transmission requires consideration of the economics of the broadcasting industry. In order to broadcast a channel in a particular area, transmission costs will be fixed for the broadcaster. This means that they will not vary according to the number of viewers that watch the channel, nor will they be affected by the amount of revenues that the channel brings in.
- 8.14 These particular fixed-cost characteristics of the broadcasting industry may alter the way in which the SSNIP test will be applied. This is because if the price of transmission rises, demand for these services will not be met with a corresponding drop in the number of viewers. Therefore, a hypothetical increase in transmission costs of 5-10 % may not have the same impact on broadcasters as it would in other industries. Instead, where the channel in question is relatively profitable, then transmission prices would have to rise significantly before a channel is rendered unprofitable (and therefore ceases to operate). This has been considered by the MCMC when determining access to broadcasting transmission services to the tower.
- 8.15 On the demand side, broadcasters require access to transmission capacity to reach the relevant towers for broadcast. Further, there do not appear to be any viable alternatives to terrestrial transmission, unless broadcasting services were supplied over other mediums, such as online, cable or

satellite. However, given the importance of FTA broadcasting to the Malaysian public and the cost of building rival broadcasting infrastructure, these are not considered viable alternatives. Therefore, the MCMC is of the opinion that there are no effective substitutes for broadcasting transmission to towers at this time.

- 8.16 Therefore, a separate product market exists for broadcasting transmission to towers for FTA broadcasting purposes.

#### *Digital transmission*

- 8.17 The introduction of a single DTTB network means that all digital broadcasters of FTA channels, whether they are government-owned or privately-owned, are now required to share access to the same broadcasting transmission infrastructure. In effect, this appears to establish a national market for all digital FTA broadcasters in Malaysia.
- 8.18 Once it is built and operational, the DTTB will effectively form a natural monopoly as broadcasters will have no other option for broadcasting their digital content, unless they transition to offering their content by other means (e.g. online). For this reason, the MCMC has developed an access regime that governs how the DTTB multiplexer is shared among the access seekers.<sup>99</sup>
- 8.19 Due to the impending migration to digital broadcasting, the MCMC will not consider a market for analogue broadcasting transmission services. Maxis acknowledge that the increasing use of digital services has occurred in tandem with the withdrawal of analogue services, which supports the MCMC's decision not to consider analogue broadcasting services.<sup>100</sup>
- 8.20 Accordingly, the MCMC has separately consider a FTA digital broadcast transmission market.

#### **Geographic dimension**

- 8.21 Transmission to broadcast towers may be seen as a market to each tower. However, broadcasting in Malaysia occurs on a national basis and the MCMC understands that this service is priced on a national basis and is not dependent on the location of the tower. Hence, the MCMC is of the view that transmission to broadcast towers is a national market.
- 8.22 The introduction of a single common CIIP to cover broadcasts across Malaysia appears to confirm the existence of a national market for FTA digital transmission.

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<sup>99</sup> See: MCMC Determination on Access List (Determination No. 1 of 2005) at section 23 ('Digital Terrestrial Broadcasting Multiplexing Service').

<sup>100</sup> Maxis, *Response to MCMC questionnaire* at 3.1(c).

## Functional dimension

- 8.23 Broadcasting transmission services are not part of a traditional supply chain. This is because broadcasters acquire transmission as an end user and they are also licensed separately as the providers of content that is broadcast over that transmission service. Therefore, a traditional supply chain will not apply when assessing the relevant market for broadcasting transmission services. No functional dimension exists in this product market.

## Final view

- 8.24 The MCMC considers that there is a separate, national market for broadcasting transmission to towers for the purposes of transmission by FTA licensees.
- 8.25 The MCMC considers there to be a national market for digital transmission that includes all FTA digital broadcasters that use the DTTB infrastructure to broadcast their content.
- 8.26 The distribution of FTA and subscription television broadcasting is separately considered in Part D below.

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## 9 Other satellite services

- 9.1 The MCMC notes that a number of other satellite services are offered by Malaysian operators.
- 9.2 For example, Telekom Malaysia offers the following other satellite services:
- (a) Very Small Aperture Terminal (VSAT). This is a satellite-based service that is used to transmit and receive video, voice and data to remote locations or areas without terrestrial connectivity. VSAT is also designed to serve other broadcast and interactive multimedia applications.
  - (b) Digital Satellite News Gathering. This service facilitates the up-link of news by sending live telecasts from a particular location to a Satellite Earth Station. These services are typically used for instantaneous and live news or special events where more conventional methods, such as cable feeding, are absent or impossible to lay due to the short notice given by the broadcasters.
  - (c) International Satellite Turnaround. This is an international television service that delivers live or delayed programs from one region to another through the use of satellite systems in either analogue or digital form.

- (d) Satellite Master Antenna TV. This is a system that integrates TVRO and UHF/VHF antenna in bringing together Satellite TV and FTA TV programs.<sup>101</sup>

9.3 Based on the feedback provided by licensees during the public inquiry, the MCMC has formed a view that there is no separate market for these other satellite services. Further, there does not appear to be a unified position internationally from which guidance may be taken for application in the Malaysian context.

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<sup>101</sup> For example, see: <https://www.tm.com.my/Office/Business/Enterprise/Broadcast/Pages/Antenna.aspx>.  
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## Part C      Mobility services (Layers 1-2)

### 1      Introduction

- 1.1      The term 'mobility services' is broadly used to capture what is commonly referred to as mobile services, as well as other wireless products (e.g. WiMAX) that are considered to be potential substitutes.
- 1.2      The impacts of convergence in the communications market are addressed at the outset in Part A of this Market Definition Analysis. The MCMC is aware of the evolving nature of fixed and mobile services and the growth of convergence in these sectors. However, for the purposes of convenience and structure, the MCMC has not pre-empted whether the mobility services market is in a converged market with the fixed services discussed in Part B above. Instead, the interrelationship between fixed and mobility services is addressed in the assessment of particular markets.

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### 2      Mobile telephony

#### Brief overview of Malaysia

- 2.1      Mobile telephony is an increasingly important mode of communication in Malaysia. As of 2013, it is estimated that there were over 40 million mobile subscriptions in Malaysia with approximately 18 million of those being 3G subscriptions. This represents a 143.6% penetration rate.<sup>102</sup>
- 2.2      In 2013, the Malaysia mobile market continued to see substantially more prepaid subscribers than postpaid subscribers, in the ratio of almost 80:20. The total number of prepaid subscribers reached 35.3 million and there were a further 7.6 million postpaid subscribers over the same period.<sup>103</sup>
- 2.3      The mobile telephone penetration rate continues to vary quite dramatically across Malaysia. As of 2012, the states with the highest mobile telephone penetration rates were W.P. Kuala Lumpur (203.5%) and Selangor (154.4%), while the state with the lowest penetration rate was Sabah (87.6%). In addition, the percentage of mobile telephone users was significantly greater in urban areas (68.8%) than in rural areas (31.2%).<sup>104</sup>
- 2.4      Mobile telephony is provided by cellular providers such as Celcom, Maxis, DiGi and U-Mobile. There are also two main WiMAX providers, P1 and YTL.
- 2.5      Mobile Virtual Network Operators (**MNVOs**) are also present in the provision of mobile telephony services in Malaysia. Some of the major MVNOs include (among others) Tune Talk, Merchantrade, Altel, XOX Com and Redtone Mobile.
- 2.6      In general, mobile pricing by Malaysian mobile network operators (**MNOs**) and MVNOs tend to be comparable for their respective mobile telephony

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<sup>102</sup> MCMC, *Communications and Multimedia Pocket Book of Statistics Q4 2013*.

<sup>103</sup> MCMC, *Communications and Multimedia Pocket Book of Statistics Q4 2013*.

<sup>104</sup> MCMC, *Communications and Multimedia Pocket Book of Statistics Q4 2013* (2013) at page 19 – 20.

and data packages. The growing use of bundled mobile telephony and broadband products and the vigorous competition in the mobile space has benefitted consumers, which has translated into continued uptake and growth of mobile services across Malaysia.

- 2.7 The WiMAX providers tend to offer their products at slightly higher prices, but WiMAX pricing remains substantially lower than the price offerings for fixed-line products.

## Product characteristics

- 2.8 Mobile telephony services are typically offered as either prepaid or postpaid offerings. Prepaid customers purchase credit for a specified amount, which can then be used for a certain number of calls and other services (e.g. SMS). Postpaid customers enter into a longer term agreement with the mobile provider, in which a fee is paid on a regular basis (usually monthly) in exchange for service for the life of the agreement. Postpaid contracts often include additional services or discounts to encourage a user to commit to the provider for a longer period.
- 2.9 There has been an evolution in mobile technologies over time:
- (a) 2G or GSM - This was one of the original mobile technologies to be deployed in Malaysia. GSM was originally a 3.1 kHz voice service that included basic SMS functionality that was eventually upgraded with the release of General Packet Radio Service (**GPRS**) (discussed further below). GSM was originally designed on 900 MHz range, but is now also available in the 800 MHz, 1800 MHz and 1900 MHz ranges. GSM data download rates (with GPRS capability) can reach rates of approximately 60 kbps.
  - (b) 3G - The rollout of 3G networks introduced Universal Mobile Telecommunications System (**UMTS**) technology, which provided an upgrade to GSM. UMTS frequency spectrum is typically provided over bands in the 1900-2025 MHz and 2110-2200 MHz ranges with data transmission rates of approximately 15 Mbps. The ITU also refers to 3G technologies as 'IMT-2000'.
  - (c) 4G or LTE - LTE is not a replacement for UMTS 3G technology in the way that UMTS was a replacement for GSM, but is rather an update to the UMTS technology. While the distinction between third and fourth generation technologies is often viewed as obscure, the ITU now recognises that LTE technologies broadly equate with 4G.<sup>105</sup> However, the ITU has identified the target transmission rates for IMT-Advanced as 100 Mbps when used in a high mobility

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<sup>105</sup> The distinction between 3G and 4G mobile technologies is not cleanly defined. The ITU has stated that: "The term 4G remains undefined but it is being applied by operators to the forerunners of IMT-Advanced technologies — LTE, HSPA+ and WiMax and to other evolved 3G technologies, which provide a substantial level of improvement in performance and capabilities with respect to the initial third generation systems now deployed." ([http://www.itu.int/net/newsroom/wrc/2012/reports/imt\\_advanced.aspx](http://www.itu.int/net/newsroom/wrc/2012/reports/imt_advanced.aspx))



environment (e.g. driving in a car) and 1 Gbps in a stationary environment.<sup>106</sup>

- 2.10 The MCMC takes a technology neutral approach to market definition in the mobile sector and does not make any distinction between the technologies over which mobile services are provided.
- 2.11 Calls made over a mobile network may be “on-net” (i.e. calls between subscribers on the same network) or “off-net” (i.e. calls between subscribers across two different networks).
- 2.12 Mobile calls can be further divided into the following segments:
  - (a) mobile to fixed line;
  - (b) mobile to mobile; and
  - (c) mobile to international.

These distinctions become important when considering the pricing strategies that are adopted by mobile providers for a particular segment of the product market.
- 2.13 Upstream wholesale provision of mobile telephony services is discussed elsewhere in this Market Definition Analysis (e.g. mobile call origination and mobile call termination).

## Product dimension

### *Prepaid as substitutable for postpaid services*

- 2.14 On the supply side, prepaid and postpaid services are both capable of providing the same basic functionality (i.e. telephone calls, SMS, etc.).
- 2.15 In general, prepaid rates tend to be aimed at a particular subset of customers (i.e. low use customers and those who cannot afford a long term plan). On the other hand, postpaid services are typically offered with promotional discounts to encourage a long term contractual commitment (e.g. an allowance of free minutes or texts). For example, Maxis claims to offer postpaid services to residential, SME and corporate customers, but targets its prepaid services at the “general mass population of Malaysia.”<sup>107</sup>
- 2.16 However, there is clear substitutability between the services as it would be relatively easy for a service provider to enter either the prepaid or postpaid market in response to a SSNIP. Most of the mobile providers in Malaysia already offer both services, so a shift in focus towards one particular service could be affected quickly and with little additional costs.
- 2.17 The MCMC’s position is supported by the Telecommunications Regulatory Authority (**TRA**) in Bahrain, which issued a determination in which it found

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<sup>106</sup> ITU, *IMT-Advanced* (accessed on 14 March 2014) available online at: [http://www.itu.int/net/newsroom/wrc/2012/reports/imt\\_advanced.aspx](http://www.itu.int/net/newsroom/wrc/2012/reports/imt_advanced.aspx)

<sup>107</sup> Maxis, *Response to MCMC Questionnaire* at 1.8(c).  
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prepaid and postpaid mobile services in the same market. In its Determination, the TRA expressed the view that:

*"a mobile operator offering solely prepaid services could easily offer postpaid services in response to a SSNIP in the postpaid market."*<sup>108</sup>

- 2.18 Similarly, in its *T-Mobile/Orange merger decision*, the EC found that "the distinction between [prepaid and postpaid] is becoming blurred, because of the development of different types of offers."<sup>109</sup> The Commission notes the offering of 30 day and SIM-only packages as examples of the "blurring" between prepaid and postpaid services.<sup>110</sup>
- 2.19 On the demand side, while there are different marketing characteristics for prepaid and postpaid mobile services, the MCMC believes that there would be a high degree of substitution between prepaid and postpaid services in the event of a SSNIP in respect of either service. This is because both prepaid and postpaid services offer comparable functionality and service offerings to subscribers (but with different pricing structures), so subscribers are likely to view them as substitutable.
- 2.20 For these reasons, the MCMC views that prepaid and postpaid services are in a single mobile telephony market.

#### *Fixed-line telephony as a possible substitute for mobile voice telephony*

- 2.21 On the demand side, fixed and mobile telephony services offer the same basic functionality to end users. They both provide end users with the ability to make and receive calls. However, there are some important differences between the two technologies which leads the MCMC to believe that fixed and mobile telephony services should be viewed as forming separate markets.
- 2.22 While there is some overlap in functionalities between fixed and mobile telephony, mobile phones tend to offer a number of additional attributes. The most obvious is the ability to make a call or receive a call from any location that has mobile reception. Mobile telephony services also offer additional functionalities, such as the ability to send an SMS.
- 2.23 As discussed above, there are also significant differences in the pricing strategies that are employed by fixed and mobile providers. The ability to purchase prepaid credit typically does not exist for a fixed-line service, which is a distinguishing feature and motivates how agreements are structured for postpaid contracts.
- 2.24 Furthermore, the prices listed above in Figure 3 also illustrate that while "off-net" mobile calls are priced in approximately the same range as calls made over a fixed network, the pricing strategy for "on-net" mobile calls is

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<sup>108</sup> Telecommunications Regulatory Authority, *Significant market power designation for certain relevant retail markets – Determination (3 June 2008)* available online at: 73-76.

<sup>109</sup> *Case No COMP/M.5650 - T-Mobile/Orange* at 21.

<sup>110</sup> *Case No COMP/M.5650 - T-Mobile/Orange* at 21.

more aggressive than fixed-line calls. It appears that fixed-line providers do not engage in the aggressive pricing strategies that most mobile providers offer for on-net calls to attract subscribers, while some of this type of behaviour is only beginning to be exhibited when calls are included in broadband packages. This supports the proposition that fixed and mobile telephony should not be considered as substitutes within the same market.

- 2.25 In addition, the differences in regulatory and licensing regimes for fixed and mobile networks create different operating conditions for fixed and mobile operators. The higher regulatory compliance costs associated with the provision of fixed-line telephony will have cost implications on operators, which was a point that was made by Telekom Malaysia in its submission to the MCMC.<sup>111</sup>
- 2.26 The international position appears to be that mobile and fixed services should be viewed as separate markets. BEREC recently published a report on the impact of fixed-mobile substitution in market definition, in which it found that "the majority of National Regulatory Authorities have considered whether fixed and mobile services belong to the same market, and one NRA (RTR - Austria) has included fixed and mobile services in the same market."<sup>112</sup>
- 2.27 BEREC notes that the main reasons given to support separate fixed and mobile markets include:
- (a) the different characteristics between fixed and mobile offers (e.g. differences in price, bandwidth, mobility and usage limitations); and
  - (b) the different preferences and usage patterns between fixed and mobile services users (e.g. fixed broadband consumers use the service more intensively and demand higher bandwidth than mobile broadband consumers).<sup>113</sup>
- 2.28 On the supply side, although fixed and mobile providers share a core network, the end connections to end users is distinctly different between the two services. It would be costly and time consuming (e.g. building or arranging access to towers and masts, acquiring spectrum, etc.) for a fixed operator to enter the mobile telephony retail market in response to a SSNIP.
- 2.29 The Commission for Communications Regulation in Ireland concluded that fixed and mobile services should be differentiated on the supply side because:

*"the time, costs and risks involved in investing in comparable access products for use at a fixed location using mobile network inputs renders such supply*

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<sup>111</sup> Telekom Malaysia, *Response to MCMC Questionnaire* at 2.13(e).

<sup>112</sup> BEREC, *Report on the impact of fixed-mobile substitution (FMS) in market definition* (30 May 2012) BoR (12) 52 at 3.

<sup>113</sup> BEREC, *Report on the impact of fixed-mobile substitution (FMS) in market definition* (30 May 2012) BoR (12) 52 at 3.

*substitution not sufficiently immediate or effective to be considered as part of the [fixed voice access] relevant market.*<sup>114</sup>

- 2.30 Celcom has stated that they view their main competitors at the retail level as other MNOs and MVNOs.<sup>115</sup> A notable omission from Celcom's list of competitors is Telekom Malaysia (the largest provider of fixed-line telephony services in Malaysia), which suggests that Celcom believes there is a separate market for mobile telephony.
- 2.31 While a fixed operator could become an MVNO reasonably easily, the MCMC does not consider that an MNVO would place a significant constraint on the mobile market. Similarly, fixed re-sale by an MNO would not place a significant constraint on a fixed operator.
- 2.32 The MCMC considers that mobile and fixed telephony services do not form close enough substitutes to warrant their inclusion in a shared retail telephony market. Instead, the MCMC prefers the view that separate and distinct markets exist for mobile and fixed telephony services.

*OTT telephony services as possible substitutes for mobile telephony*

- 2.33 OTT telephony services, such as Skype, Viber, Whatsapp for messaging and Blackberry Messenger, have been gaining in popularity in recent years. The MCMC has considered whether these services are viable substitutes for traditional mobile telephony services.
- 2.34 On the demand side, OTT and mobile telephony services offer the same basic functionality to end users in that they both provide the ability to make and receive calls. In addition, they can both be accessed over the user's mobile handset. However, there are some important differences between the technologies which likely makes them part of separate markets.
- 2.35 OTT providers typically offer 'unmanaged' VoIP services that allow the end user to make calls by means of a data connection rather than over the voice channel of the mobile network. In this way users are able to avoid paying mobile telephony charges, with calls instead counting against their data cap which distinguishes OTT telephony from mobile telephony services.
- 2.36 Further, OTT telephony services rely on a reliable data connection in order to function. This means that if the user has a poor Wi-Fi or mobile connection or they enter into a crowded mobile cell, then it is likely to interfere with their telephony service. In that sense, the mobile telephony network is more reliable, although the MCMC acknowledges that congestion may also be an issue in the mobile telephony network.
- 2.37 It is also possible for an OTT telephony service to be intentionally degraded (or preferred) by the network operator, which may occur as part of general

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<sup>114</sup>Oxera, *Market definition in the fixed voice access market: Analytical framework and review of economic evidence* at 42.

<sup>115</sup> Celcom, *Response to MCMC Questionnaire* at 2.1(b).

network management or it may be targeted at a particular OTT service that competes with the network operator's own telephony service. This raises potential dominance issues that may deserve consideration at a later time.<sup>116</sup>

- 2.38 On the supply side, it is possible for mobile providers to introduce their own rival OTT service over the data network in response to a price increase, which suggests a degree of substitutability. However, it would be difficult and costly for an OTT provider to enter the mobile market as this would require substantial capital investment (e.g. sunk costs of infrastructure as a MNO, access to spectrum as a MNO, marketing and customer service as either a MNO or MVNO, etc.).
- 2.39 Based on feedback obtained from licensees during the informal consultation, the MCMC has defined mobile telephony, SMS and data services in separate retail markets. However, the MCMC accepts that at the wholesale functional level, messaging is required by MVNOs and resellers as part of a package of services including telephony and SMS. Hence, at the wholesale functional level, the MCMC considers that there is a single mobile telephony and messaging market.

#### *Bundling*

- 2.40 Mobile telephony services are commonly offered as part of a bundle, which may impact on how the market for telephony services is defined.
- 2.41 The MCMC has assessed bundled packages that include mobile telephony services to determine if the provider is dominant in the retail market where that bundle is offered. This involved consideration of whether the service provider is dominant in the wholesale or retail market that relates to the mobile service that is included in the bundle.

#### **Geographic dimension**

- 2.42 Mobile telephony services are typically provided on a national basis. National coverage and regulatory boundaries are consistent with national borders which also suggest that there is a national market for mobility services.<sup>117</sup>
- 2.43 Mobile pricing is also offered on a national basis, with no distinction in pricing between locations at which the mobile service is sold or a mobile call is made. Furthermore, the pricing structure for on-net calls within Malaysia is the same irrespective of the location of the end users.
- 2.44 It is also worth noting that a national mobile market has been supported in other overseas jurisdictions.<sup>118</sup>

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<sup>116</sup> Ecorys, *Future electronic communications market subject to ex-ante regulation: final report (18 September 2013)* page 151-153.

<sup>117</sup> *Case No COMP/M.5650 - T-Mobile/Orange* at 31.

<sup>118</sup> This issue arose in *Case No IV/M.1430 - Vodafone/Airtouch*, where the European Commission held that the market for mobile telecommunications services in EU member states was national. The Commission considered whether the "increasing availability of roaming facilities" resulted in the geographic dimension of the market

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## Functional dimension

- 2.45 Mobile telephony services are provided as both retail and wholesale services, which the MCMC considers to comprise separate functional dimensions to the mobile market.
- 2.46 The MNO and MVNO relationship is a common one in Malaysia. For example, Maxis claims that Celcom, DiGi, U Mobile and itself all have MVNO divisions and host a total of 29 MVNOs across their respective networks.<sup>119</sup>
- 2.47 There is a significant degree of vertical integration in the supply chain for the provision of mobile services. The different pricing structures for wholesale and retail customers suggest the existence of a wholesale access market, which was the position found by the EC in *T-Mobile/Orange*<sup>120</sup> and *Vodafone/Tele2 Italy/Tele2 Spain*.<sup>121</sup>

## Final view

- 2.48 The MCMC is of the view that both national retail and wholesale markets for mobile telephony services exist.
- 2.49 The MCMC does not view fixed-line telephony services (including VoIP) to be an effective substitute for mobile telephony services at this time.
- 2.50 The MCMC has defined mobile telephony, SMS and data services in separate retail markets. However, at the wholesale functional level, the MCMC considers that there is a single mobile telephony and messaging market.

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## 3 Mobile broadband and data

### Brief overview of Malaysia

- 3.1 Mobile broadband and data is provided by the MNOs, MVNOs and WiMAX licensees described in section 2 above. That section sets the scene for the Malaysian context when assessing markets relevant to the supply of mobile broadband and data. Most mobile pricing plans described in section 2 also include a data allowance.
- 3.2 Demand for mobile broadband and data has been substantially enhanced by smartphone and broadband penetration. In Malaysia, smartphone penetration is reported to have increased from 47% in 2012 to 63% in

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being “wider than national”, since a customer had the option of subscribing to an operator based in a foreign country and using its services in the customer’s home country through roaming. However, the Commission ultimately decided that the costs of “roaming permanently” on a foreign network would be significantly more expensive than purchasing services from a national network. Accordingly, the market for mobile telecommunications services was found to be national rather than supra-national or EU-wide.

<sup>119</sup> Maxis, *Response to MCMC Questionnaire* at 2.1(e).

<sup>120</sup> *Case No COMP/M.5650 - T-Mobile/Orange*.

<sup>121</sup> *Case No COMP/M. 4947 - Vodafone / Tele2 Italy / Tele2 Spain*.

2013, while tablet penetration increased almost threefold from 14% to 39% over the same period.<sup>122</sup>

## Product characteristics

- 3.3 Mobile broadband and data services can be provided over a number of different technologies, but in Malaysia this is principally provided over GPRS, high speed packet access (**HSPA**), LTE and WiMAX.
- 3.4 As discussed in the fixed broadband and data section, the MCMC has applied a minimum data transmission rate of 256 kbps for determining which services will be considered as broadband capable. This threshold is broadly in line with the international position.<sup>123</sup>
- 3.5 GPRS is a best-effort mobile service that is typically subject to variable throughput and latency depending on the number of end users that may be sharing mobile services concurrently at any given time within a particular area. GPRS is also a relatively low bit rate service which limits a user's browsing experience.
- 3.6 Contrast this with HSPA mobile services, which use packet-switching technologies and are able to offer users access to higher bit rates of transmission. These features of HSPA services mean that end users generally obtain a better user experience.
- 3.7 The technological differences, particularly in service speeds, between GPRS and HSPA raises the question of whether these two types of mobile services are substitutable for one another.
- 3.8 For the purposes of this Market Definition Analysis, the MCMC proposes to consider LTE technologies as being broadly equivalent to HSPA (more specifically, HSPA+) technologies. As such, LTE will not be discussed separately. This appears to be broadly in line with the position that has been taken by the ITU.<sup>124</sup>
- 3.9 WiMAX was originally conceived as a fixed wireless service and this was reflected in its early standardisation. However, the set of standards produced by the Institute of Electrical and Electronics Engineers (**IEEE**) and known as IEEE802.16 have evolved over time. Mobility was added to WiMAX functionality with the release of IEEE802.16e in 2005. The current version of WiMAX is known as "WiMAX release 2" and is standardized as IEEE802.16m. This version of the standard was designed to meet the ITU requirements for IMT-Advanced, the basis of the original definition of "4G" and a competing standard to LTE-A. The effect is that WiMAX services have a similar technology profile to 3G and LTE services. That is, WiMAX supports mobility.

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<sup>122</sup> The Star, *Smartphone penetration hits 63% in Malaysia* (12 September 2013) available online at: <<http://www.thestar.com.my/Tech/Tech-News/2013/09/12/Smartphone-and-tablet-penetration-hits-63-percent.aspx/>>

<sup>123</sup> For example, see: OECD, 'Indicators of Broadband Coverage' DSTI/ICCP/CISP(2009)3/FINAL (10 December 2009) at page 38.

<sup>124</sup> See: [http://www.itu.int/net/newsroom/wrc/2012/reports/imt\\_advanced.aspx](http://www.itu.int/net/newsroom/wrc/2012/reports/imt_advanced.aspx)

## Product dimension

### *General Radio Packet Service (GPRS) and High Speed Packet Access (HSPA)*

- 3.10 On the demand side, a mobile customer will be able to receive some form of mobile service via each of these technologies. However, even though a product or service may have the same end use, it may not be considered substitutable by customers for various reasons (e.g. due to its particular technical characteristics).<sup>125</sup>
- 3.11 As discussed above in the section on fixed broadband, mass market and residential consumers are typically more concerned with data transmission rates (i.e. service speeds) than they are with the quality of their broadband connection. The difference in speed between GPRS and HSPA is significant. GPRS may transmit data at speeds of up to 60 kbps, which does not meet the threshold for broadband of 256 kbps. On the other hand, HSPA may transmit data at speeds of up to 7.2 Mbps. In addition, HSPA+, which is currently being rolled out by some providers, has been found to reach speeds of up to 168 Mbps (although it tends to be closer to 21 Mbps in reality).<sup>126</sup>
- 3.12 However, there does not appear to be any difference in the pricing of data services provided over GPRS and HSPA. Furthermore, on the supply side, the MCMC is of the view that it would be relatively likely that a mobile operator providing GPRS-based data would upgrade to HSPA in the event of a SSNIP for HSPA-based data.
- 3.13 Accordingly, while the MCMC accepts that there is some difference in the quality and speed of GPRS and HSPA, the MCMC does not consider that this difference is sufficient to constitute separate markets.

### *WiMAX as a mobility service*

- 3.14 From a pricing perspective, the MCMC notes that WiMAX and mobile offerings are closely priced across the industry. This can be seen in Figure 6.

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<sup>125</sup> Office of Fair Trading, *Market Definition: Understanding Competition Law* (2004) at page 9.

<sup>126</sup> Clove Technology, *Guide to GSM, GPRS, EDGE, 3G, HSDPA, HSPA (Plus) and LTE* (accessed on 26 February 2014) at < <http://www.clove.co.uk/viewtechnicalinformation.aspx?content=3B2BD491-6465-4C70-ABDB-5A12A06C3D8D>>



**Figure 6: Broadband pricing per month for mobile and WiMAX retail services**

	Telekom Malaysia	Maxis	DiGi	Celcom	U Mobile	P1	YTL	TIME
<b>FTTH/Fibre/VDSL2</b>	RM 149-249 (bundle)	RM 148-248 (bucket)	-	-	-	RM 109-269		RM 119-399
<b>ADSL</b>	RM 60 - 188 <sup>127</sup>	RM 78-128	-	-	-	-	-	-
<b>WiMAX</b>	-	-	-	-	-	RM 39-149	RM 30-109	-
<b>Mobile</b>	-	RM 30-78	RM 25-139	RM 28-138	RM 15-128	-	-	-

(Source: Pricing information published by service providers)

3.15 These pricing figures reveal two important trends that help with the MCMC's consideration of the relevant markets for broadband in Malaysia:

- (a) First, fibre services are significantly more expensive than both WiMAX and mobile, which supports the definition of a separate fixed broadband market.
- (b) Second, the pricing for WiMAX and mobile services are relatively close. This seems to suggest that mobile and WiMAX providers view their respective products as comparable, which is reflected in competitive pricing between the two technologies.

3.16 This position is confirmed by P1, who have identified perceived competitors for their "wireless internet" service as being Telekom Malaysia, Celcom, DiGi, Maxis, U Mobile and YTL.<sup>128</sup> Although this list includes a fixed-line provider (Telekom Malaysia), the rest of the list are the prominent mobile and WiMAX providers in Malaysia. It is also notable that TIME is excluded from this list, which could suggest that P1 view their fixed-line competition as being other ADSL services, but not fibre-related services.

3.17 Similarly, we note that DiGi refers to P1 and YTL as competitors with their respective WiMAX products.<sup>129</sup>

3.18 On the supply side, it would be costly for a provider to rollout a mobile or WiMAX network in response to a SSNIP. However, there are a number of commonalities between mobile and WiMAX network architectures (e.g. towers, etc.) which would already be in place and would lower the capital costs and rollout timetable to facilitate a switch of technologies if necessary. This suggests that there may be some supply side substitutability between mobile and WiMAX services.

<sup>127</sup> Telekom Malaysia offers a Streamyx 4Mbps package for RM 268 per month. However, this service is only available in a limited number of 'selected areas' (see: <https://www.tm.com.my/Home/Broadband/Streamyx/Pages/StandardPackages-4Mbps.aspx>).

<sup>128</sup> P1, Response to MCMC Questionnaire at 2.1(a).

<sup>129</sup> DiGi, Response to MCMC Questionnaire at 1.12(c).

- 3.19 For these reasons, despite minor differences in pricing and functionalities, the MCMC treated mobile and WiMAX data services as substitutable products within a single market.

#### *Fixed and mobile broadband substitution*

- 3.20 On the demand side, at a basic level both mobile and fixed broadband offer customers access to the Internet. However, there are a number of reasons why fixed and mobile technologies are likely to form distinct markets:

- (a) Consumption patterns - A fundamental difference between mobile and fixed broadband is the way in which each is used by consumers. Fibre and other fixed broadband services are point-to-point services that must be consumed at a particular location, while mobile services allow users to browse the Internet while on the move. Related to this are the devices that are typically used for each technology (i.e. tablets, smart phones, etc. for mobile versus desktop, laptop, smart TV, etc. for fixed broadband).
- (b) Technical limitations - The latest fixed broadband technologies such as FTTH are capable of providing users with access to much higher download speeds and quality of service than mobile technologies. For example, Telekom Malaysia promotes its 'Unifi' product as being capable of reaching up to 100 Mbps,<sup>130</sup> which is a much higher data transmission rate than the 75 Mbps that is claimed by Maxis for its 4G LTE services.<sup>131</sup>
- (c) Capacity - As a point-to-point service, fixed broadband tends to offer a higher degree of reliability than mobile services which provide varying levels of service depending on the number of users on the network in a particular area and at a particular time.
- (d) Pricing - As illustrated in Figure 6 above, the pricing for fixed broadband tends to be higher than that of mobile or WiMAX services. This can be explained by the higher data limits in most fibre packages, as well as the higher speeds that are provided for fixed services.

- 3.21 For these reasons, the MCMC considers the markets for fixed broadband and mobile broadband (including WiMAX) to be separate and distinct.

#### *Mobile voice and data substitution*

- 3.22 The MCMC has also considered whether mobile telephony and mobile broadband and data are in the same market. On the demand side, consumers separately use voice and data for different applications. While there is some substitution at the margins where users use OTT services for voice, for reasons expressed above, the MCMC does not regard OTT

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<sup>130</sup> Telekom Malaysia, *Response to MCMC Questionnaire* at 1.2(a).

<sup>131</sup> Maxis, *Introducing Maxis 4G LTE* (access on 26 February 2014) available online at: <  
<http://new.maxis.com.my/en/personal/internet/network-and-coverage.html#show-detail>>

providers' voice applications as substitutable for mobile telephony services at this time.

- 3.23 Furthermore, bundled pricing packages usually provide for separate voice and data allowances and there is generally no inter-change of value between voice and data allowances (i.e. an overrun on the data allowance cannot be paid for by an underrun on the voice allowance).
- 3.24 On the supply side, the MCMC acknowledges that there is likely to be a reasonable degree of supply side substitution by MNOs between voice and data services if a SSNIP occurs in respect of either product. However, the MCMC does not consider supply side substitution as important in this case and the lack of demand side substitution more strongly suggests that separate mobile telephony and broadband/data markets exist.
- 3.25 Accordingly, the MCMC is of the view that there are separate mobile telephony and data markets.

### **Geographic dimension**

- 3.26 To a certain degree, mobile broadband availability is specific to the geographic footprint of mobile coverage that is associated to an operator's network. However, despite possible black spots in coverage and other network constraints, in practice mobile and WiMAX broadband providers appear to make their commercial decisions on a national scale. This is confirmed in submissions received from P1<sup>132</sup>, U Mobile<sup>133</sup> and Celcom.<sup>134</sup> Furthermore, all pricing appears to be done on a national basis and there is no distinction between where the data is downloaded or the data service is provided.
- 3.27 Accordingly, the MCMC's view is that the mobile broadband and data market is a national market. This position is further supported by international decisions in this area.<sup>135</sup>

### **Functional dimension**

- 3.28 The range of mobility broadband services (including WiMAX) discussed in this section are typically provided directly to end users at the retail level.
- 3.29 However, as discussed in the introduction to this Part C and when discussing mobile telephony, it is also important to note that there is a reasonably well established retail and wholesale supply chain in the mobile sector. This is evidenced by the existence of MVNOs in Malaysia, as well as MNOs that supply both wholesale (i.e. MVNO) and retail services.

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<sup>132</sup> P1, *Response to MCMC Questionnaire* at 1.3.

<sup>133</sup> U Mobile, *Response to MCMC Questionnaire* at 1.3.

<sup>134</sup> Celcom, *Response to MCMC Questionnaire* at 1.8(c).

<sup>135</sup> For example, in *Nederlandsche Banden-Industrie Michelin v. Commission* it was determined that the appropriate geographic market should be at the national level (rather than international level) where commercial decisions are made based on local factors (Case 322/81, *Nederlandsche Banden-Industrie Michelin v. Commission*, [1983] ECR 3461 at page 3478).

- 3.30 Therefore, the MCMC's view is that there are separate retail and wholesale markets for mobile broadband and data (including WiMAX).

### **Final view**

- 3.31 The MCMC consider there to be national retail and wholesale markets for mobile broadband and data services, which includes WiMAX.

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## **Part D      Application services (Layers 3+)**

### **1      Introduction**

- 1.1    The MCMC separately licences applications services in the form of ASP licences. When dealing with market definition however, the MCMC is concerned with economic substitution.
- 1.2    For convenience, we have dealt with fixed and mobility services in Part B and Part C above. However, there are a few remaining applications services that are licensed by MCMC and that are offered by licensees in Malaysia that need to be categorised into communications market. These are dealt with separately as 'applications services' markets in this Part D.

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### **2      Messaging services**

#### **Brief overview of Malaysia**

- 2.1    Messaging services are generally provided by the MNOs, MVNOs and WiMAX licensees described in section 2 of Part C above. That section sets the scene for the Malaysian context when assessing markets relevant to the supply of messaging services. Section 3 of Part C regarding mobile broadband and data also assists to set the scene. Most mobile pricing plans described in section 2 of Part C also include a messaging allowance.

#### **Product characteristics**

- 2.2    Traditional mobile messaging services, such as SMS, are provided using spare capacity in the mobile network reserved for voice signalling. In contrast, multimedia messaging services (**MMS**) are provided using the non-voice capacity set aside for mobile data communications.
- 2.3    The growth in mobile internet access has led to a corresponding explosion in uptake for messaging services in its various forms. Social messaging websites and applications ("apps") such as Facebook chat, Skype message, Whatsapp and Viber (to name only a few) are putting pressure on mobile operators as these data-based services allow users to avoid paying formerly-lucrative SMS charges.
- 2.4    Data-based messaging services typically use mobile data services to send and receive messages which may include emailing applications on smartphones and OTT messaging applications. However, these data-based messaging applications will only be available to consumers that use a suitably enabled device, such as a smartphone with the appropriate application installed.
- 2.5    With this growth in demand for OTT and other online message services, MCMC considers OTT to constitute a viable substitute for traditional text messaging services.

## Product dimension

### *SMS and OTT messaging services substitution*

- 2.6 From the perspective of the consumer, all messaging services provide the same basic functionality, which is some form of text messaging. However, there are a number of notable differences between traditional mobile SMS and other OTT messaging services which must be taken into account.
- 2.7 As discussed, SMS are delivered over the mobile phone network. Each text message is then sent typically for a fee or as part of a larger mobile package. Contrast this with OTT messaging services that use the mobile data network and allow the user to avoid paying per text.<sup>136</sup> These services rely more on advertising revenues rather than revenue per message, which further leads to fundamental differences in how OTT and mobile providers operate their respective businesses.
- 2.8 Similarly, a mobile text message may be provided to any person with a mobile telephone. As long as the unique number for that telephone is correctly dialled, the text message should be delivered to the receiving party. The same any-to-any principle does not apply for most data-based messaging services. Instead, these services typically only allow users to send messages to other users of that particular service (e.g. a WhatsApp user can only message another WhatsApp user), whereas a Celcom end user can send an SMS to a Maxis end user.
- 2.9 Lastly, there is a device divide between the various messaging services. For example, mobile SMS may only be sent via a mobile phone or smartphone, while most data-based services can be accessed from most devices as long as that device has an Internet connection. This fundamentally alters the manner in which each messaging service is used (e.g. fixed versus mobile messaging) and it limits the availability of OTT messaging services only to users of suitably capable devices.<sup>137</sup>
- 2.10 In Australia, the service description for the Mobile Terminating Access Service (**MTAS**) currently only applies to the termination of voice services and does not cover mobile messaging services, such as SMS. However, the ACCC recently sought submissions on whether or not to regulate termination of SMS and MMS services.
- 2.11 The ACCC noted that during its previous review of the MTAS service description, it opted against regulating access to SMS and MMS because the market for these services was still growing and "there had been no demonstrable market failure."<sup>138</sup> However, the ACCC is now considering whether the provision of SMS termination exhibits the same bottleneck features as terminating voice calls on a mobile network, as the SMS

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<sup>136</sup> ACCC, *Review of the declaration of the Domestic Mobile Terminating Access Service – Discussion paper* (May 2013) at page 13.

<sup>137</sup> ACCC, *Review of the declaration of the Domestic Mobile Terminating Access Service – Discussion paper* (May 2013) at page 25.

<sup>138</sup> ACCC, *Review of the declaration of the Domestic Mobile Terminating Access Service – Discussion paper* (May 2013) at page 24.

termination cannot be delivered without access to the mobile network of the receiver.<sup>139</sup>

- 2.12 On the supply side, the MCMC notes that it may be possible for mobile providers to introduce their own rival online messaging service that would work over the data network in response to a price increase, which suggests a degree of substitutability. However, it would effectively cannibalise the mobile providers existing SMS revenues and would take some time to attract customers given that so many social messaging options are already available. Similarly, it would be too costly and time-consuming for an OTT player to enter the mobile telephony market, thereby making it also an ineffective substitute.
- 2.13 The MCMC received persuasive evidence that was provided to demonstrate some correlation between prices in popularity of OTT messaging services and the broad declines in SMS volumes and revenues that are being experienced by most Malaysian mobile providers. The MCMC also notes continued growth in smartphone penetration rates in Malaysia. Therefore, the MCMC consider OTT based messaging and SMS mobile messaging substitutable and have included these services in the same market.

#### *Mobile telephony and broadband/data services substitution*

- 2.14 The MCMC has also considered whether SMS messaging falls within the same market as mobile telephony services or mobile broadband/data services. It is the MCMC's view that there is a separate market for SMS messaging.
- 2.15 While there is likely to be a degree of supply side substitution, the MCMC believes that there is limited demand side substitution. End users acquire an SMS allowance as part of their mobile package, but the value of this allowance is not generally interchangeable with any other part of their mobile package.
- 2.16 Furthermore, the MCMC considers that end users use messaging services for the particular purpose of communicating by way of text message and do not see it as a substitute for a voice call or for access to mobile broadband (and OTT providers as a consequence) . Hence, the MCMC believes that there is limited substitution between SMS messaging and mobile voice or mobile broadband/data services.

### **Geographic dimension**

- 2.17 Most OTT and other messaging services may be viewed as international services, largely because they can be accessed and used from anywhere that the user has an Internet connection.
- 2.18 Similarly, mobile messaging is not necessarily restricted by national borders. For example, a domestic user in Malaysia may text a friend

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<sup>139</sup> ACCC, *Review of the declaration of the Domestic Mobile Terminating Access Service – Discussion paper* (May 2013) at page 24.  
Market definition analysis

overseas and is free to continue texting even if they leave the country (i.e. via roaming services).

- 2.19 However, the MCMC ultimately views the geographic market for text messaging as a national market. This is because for the majority of the time users will be based in Malaysia and would not “roam permanently” by choice.<sup>140</sup> Furthermore, Malaysian mobile companies generally target their marketing and promotions at Malaysian residents or those using a local SIM (e.g. travellers).
- 2.20 Therefore, the MCMC applies a national market for SMS messaging services.

## **Functional dimension**

- 2.21 The market for messaging services requires consideration of both the retail and wholesale levels of the supply chain.
- 2.22 At the retail level, MNOs and MVNOs contract directly with subscribers to provide access to both mobile and data-based messaging services. Subscribers will often be charged a regular access fee (e.g. monthly subscription) for access to mobile and data networks. A further charge will also typically be charged per SMS or MMS that is sent by a subscriber over the mobile network (although in many cases a promotional offer may be given to subscribers, which could include free or discounted text messages). These usage charges will apply to traditional text messages only, which effectively makes data-based messaging appear to be ‘free’ to the subscriber.
- 2.23 At the wholesale level, MVNOs and resellers generally acquire telephony and messaging services as a bundle and hence the MCMC considers there is a combined wholesale mobile telephony and messaging market.

## **Final view**

- 2.24 The MCMC views that there are both national retail markets for mobile SMS messaging which included both SMS and OTT messaging.
- 2.25 SMS termination is separately considered in Part E below.

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<sup>140</sup> This issue arose in *Case No IV/M.1430 – Vodafone/Airtouch*, where the European Commission held that the market for mobile telecommunications services in EU member states was national. The Commission considered whether the “increasing availability of roaming facilities” resulted in the geographic dimension of the market being “wider than national”, since a customer had the option of subscribing to an operator based in a foreign country and using its services in the customer’s home country through roaming. However, the Commission ultimately decided that the costs of “roaming permanently” on a foreign network would be significantly more expensive than purchasing services from a national network. Accordingly, the market for mobile telecommunications services was found to be national rather than supra-national or EU-wide.



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## 3 Directory services

### Brief overview of Malaysia

- 3.1 Directory services are offered by several operators in Malaysia. For example, Telekom Malaysia offers a Directory Enquiries service, which may be accessed by dialling '103' and providing the specific name and location of the enquiry to help the Customer Service Assistant to locate the enquired number. Charges for this directory service include a flat rate fee (RM0.30), as well as any additional fees that apply depending on the duration of the call and the network from which the call is made (e.g. Maxis, Celcom, etc.).
- 3.2 In March 2014, Maxis launched a new online directory service, FINDIT, in partnership with FINDIT Malaysia (the largest digital directory service in Malaysia). FINDIT may be used by subscribers on any mobile network. However, Maxis customers can use the directory service for free without data charges applying. FINDIT claims to offer consumers access to over 175,000 business listings in over 2,500 categories and it includes a number of additional services, such as a built-in location-based feature that helps customers find the nearest products and services to their location.
- 3.3 TM Info-Media Sdn Bhd (a subsidiary of Telekom Malaysia) also publishes Yellow Pages and E-Yellow Pages directory services.

### Product characteristics

- 3.4 Directory services are defined by Ofcom as the provision of services that "allow an individual to find a particular telephone number by reference to information about the user of that number (for example, their name)".<sup>141</sup>
- 3.5 Three possible segments of directory services may be identified:
  - (a) voice directory services (e.g. call centres), where a user calls a particular telephone number to speak to an operator about their search requirements in the expectation of receiving the telephone number they are looking for;
  - (b) online directory services (e.g. Google), where users submit search requirements via a website in the expectation of receiving the telephone number they are looking for; and
  - (c) paper directories (e.g. a phonebook) of telephone numbers together with other data services such as electronic directories on a flash drive.<sup>142</sup>

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<sup>141</sup> Ofcom, *Telephone directory information obligations and regulations: Consultation on a proposal to remove and/or amend universal service obligations and general conditions relating to the provision of telephone directory information* (10 March 2008) at 2.2.

<sup>142</sup> Ofcom, *Telephone directory information obligations and regulations: Consultation on a proposal to remove and/or amend universal service obligations and general conditions relating to the provision of telephone directory information* (10 March 2008) at 2.2.

- 3.6 The level of interaction within and between each of these product segments has been used to define the appropriate market for directory services.

### **Product dimension**

- 3.7 On the demand side, each product segment satisfies the same basic requirements for its customers in that they all provide users with the ability to search for information in response to a query from the user.
- 3.8 Other than the ability to pay an additional fee for a premium directory service, each of these product segments also tends to be roughly the same price (i.e. free or for a minor fee). Therefore, it is likely that an increase in price of one directory service would lead customers to either switch to:
- (a) another directory service within the same product segment (e.g. from Google to Yahoo), which is more likely if a customer prefers to receive information over a particular medium (i.e. voice, online or hard copy); or,
  - (b) to another form of directory service entirely (e.g. from voice to online or hard copy).
- 3.9 This suggests that there is a relatively high degree of substitutability between directory services. However, it is probable that customers favour a particular type of directory service (i.e. voice, online or hard copy) and would be more likely to use another provider within the same product segment rather than switch to a directory service that is provided over another medium in the event of a SSNIP.
- 3.10 On the supply side, it seems less likely that a directory service provider would be willing to change mediums in response to a price increase by a rival service in another product segment. However, the MCMC also notes that there is more likely to be substitution from hard copy directory service providers to call centre and on-line provision of directory services, rather than the other way around where there is more limited substitution.
- 3.11 The level of supply side substitution varies between each product segment depending on the ease with which that product segment may be offered. In other words, there is likely to be little to no substitution for hard copy services, limited substitution for call-in services and a high degree of substitution for internet-based directories simply due to the large number of online options that are available.
- 3.12 The only service that may be distinguished as being part of a separate "premium" market for directory services are services that offer value adds to their basic product. For example, some providers may offer more direct and personalised directory services in exchange for a fee.

### **Geographic dimension**

- 3.13 The geographic features of the relevant market may differ to some degree between product segments, but in general the MCMC considers directory

services to be subject to a national market. This will be the case for voice and online services which are not fixed to a particular location and may be provided at any location within Malaysia.

- 3.14 A national market may be less applicable for paper directories because they tend to be region-specific. However, it is still relatively easy to offer paper directories in another region on short notice (e.g. in response to a SSNIP by a competitor).

## **Functional dimension**

- 3.15 Directory services are generally only provided at the retail level directly to customers. The MCMC is not aware of the provision of directory information at the wholesale level.

## **Final view**

- 3.16 The MCMC is of the view that there are national markets for the provision of directory services that apply across the three main product segments (i.e. voice, online and paper directories).

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# **4 Content services**

## **Brief overview of Malaysia**

- 4.1 An overview of the FTA broadcasters and subscription television broadcasters is set out in section 5 below.
- 4.2 In terms of content in Malaysia, the most popular content that attracts viewers has tended to be premium offerings such as live sporting events (e.g. English Premier League (**EPL**), Malaysia FA Football, NBA, etc.), international blockbuster movies and music and entertainment programmes. There also continues to be significant demand for local (e.g. Masterchef Malaysia) and regional (e.g. Korean drama) content.<sup>143</sup>
- 4.3 The bulk of local content has traditionally been broadcast over FTA channels. However, the MCMC notes the growing portfolio of local content that is now being aired over pay-TV channels. For example, Astro states in its Annual Report 2013 that its broadcast of 'Adam & Hawa', a local TV drama produced by Astro, drove an increase in HD uptake by 120,000 during the telecast of the series and recorded over 1.2 million viewers on television.<sup>144</sup>
- 4.4 The Minister of Information, Communications and Culture of Malaysia has identified the following events as 'Sports Events of National Significance' which FTA providers must be given an opportunity to broadcast on reasonably agreed negotiated terms:

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<sup>143</sup> Astro Malaysia Holdings Berhad, *Annual Report 2013* at page 72-81.

<sup>144</sup> Astro Malaysia Holdings Berhad, *Annual Report 2013* at page 73.

- (a) Olympics;
  - (b) Commonwealth Games;
  - (c) Asian Games;
  - (d) SEA Games;
  - (e) SUKMA Games;
  - (f) various badminton events (e.g. the BWF Super Series held in Malaysia); and
  - (g) various football events (e.g. the semi-final and final of the Malaysian Super League, ASEAN Football Championship matches involving the Malaysian national team, semi-final and final of the FIFA World Cup, etc.).
- 4.5 In Malaysia, licensed content providers typically deliver a package of multiple linear television channels. For FTA providers these channels will typically be for a range of general content, but for pay-TV providers such as Astro each of these channels typically conforms to a particular genre or subject matter (e.g. news or sport). This content may be provided by means of linear television, playback, catch-up or as an on-demand service.
- 4.6 Other sources of content available in Malaysia, such as most short form user-generated content (e.g. YouTube), are typically left to online or alternative content delivery models.

## **Product characteristics**

- 4.7 The content services market is characterised by complex chains of production and supply, with trade taking place at a variety of levels. The definition of markets at different levels in these chains may differ markedly, and the potential for anti-competitive effects due to leveraging across the chain of production should be recognised. Therefore, it is important to consider the interplay between the various levels of the supply chain when attempting to define a content services market.
- 4.8 However, first it is important to understand the key concepts in this area and the nature of the content supply chains and how they function.

## **Overview of content supply chains**

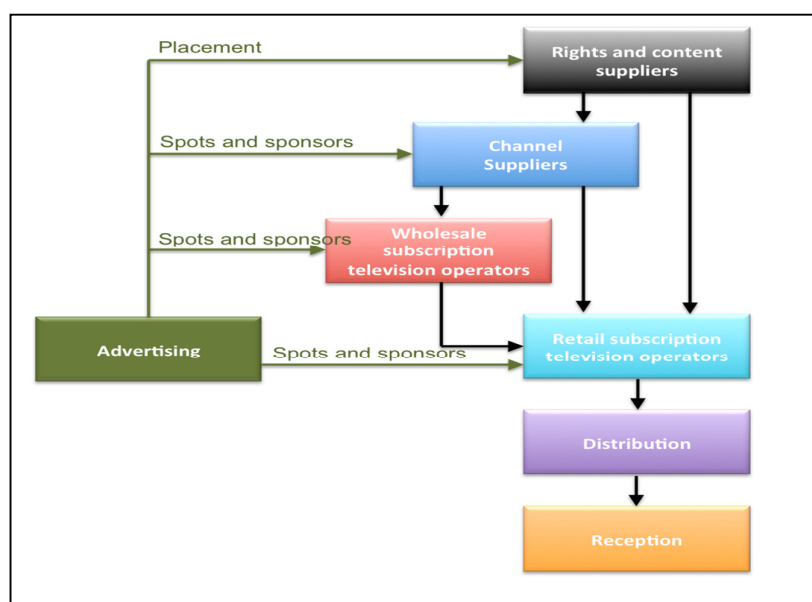
- 4.9 At a high level, the most prevalent content supply models are:
- (a) Subscription television service. A service which delivers television programs to customers who pay a periodical fee, such as a monthly subscription fee.
  - (b) Pay per view service. A service where a fee is associated with a single television program.

- (c) Linear television service. A service where the service provider selects the start time of television programs and provides each program in a continuous real time manner. This is the form in which FTA providers provide their service.
- (d) On demand service. A service where the viewer can select the start time of a television program.
- (e) Subscription video on demand service. A service where the subscriber can choose to select as many television programs as they wish to view in a contract period.

*Subscription television service supply/production chain*

- 4.10 Subscription television services are services which deliver television programs to customers who pay a periodical fee, such as a monthly subscription fee.
- 4.11 The supply chain for subscription television services was set out by the ACCC in a report from 2003.<sup>145</sup> The diagram in Figure 7 below describes a more up to date form of that supply chain.

**Figure 7: Supply chain for subscription television services**



- 4.12 The supply chain consists of six parts:

- (a) The first part of the supply chain contains the supplier of rights and content. These include the producers of programs, the holders of rights to sporting events and movies and may include corporations

<sup>145</sup> ACCC, 'Emerging market structures in the communications sector' Report to Senator Alston, Minister for Communications, Information Technology and the Arts, 30 June 2003.  
Market definition analysis

which have other roles in the supply chain such as the businesses which supply sound recording rights.

- (b) The second element of the supply chain contains the channel suppliers. When subscription television is provided it is in the form of channels. This contrasts with supply on a program-by-program basis, which would be a pay per view service. Channel suppliers aggregate programs from the rights and content suppliers. A service provider may operate at the wholesale and retail levels and, as a consequence, it is both a channel supplier and a channel acquirer.
- (c) The third and fourth parts of the supply chain are the subscription television operators. A subscription television operator is a business that provides subscription television services. These businesses can operate at the wholesale level, the retail level or both.
- (d) The fifth element of the supply chain is the distribution mechanism. This is the transmission technology used by retail subscription television operators to deliver services to subscribers. The transmission system has historically been satellite and, increasingly, the transmission system is the internet.
- (e) The sixth and final part of the supply chain is the reception of the subscription television service. This allows the television programs to be displayed on a suitable device such as a television, computer, tablet or mobile telephone. If the display device is a television, the reception equipment is likely to be a set top box. If the device is a computer, tablet or mobile telephone, the reception capability is likely to be implemented in applications software running those devices.

- 4.13 Advertising occurs at various levels of the supply chain, as shown in Figure 7. The advertising could be product placement, traditional advertising “slots” or sponsorship of a program or program segment.

*Pay-per view service supply/production chain*

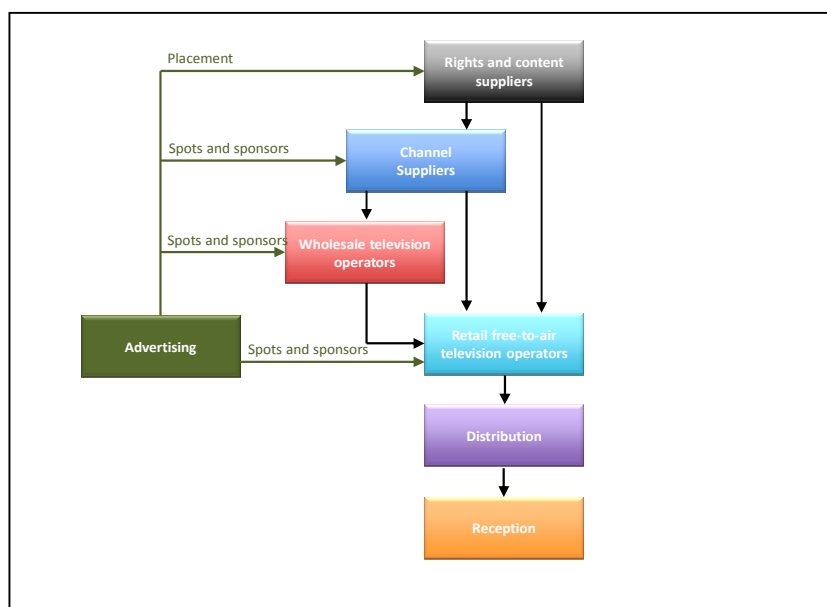
- 4.14 For pay per view services, the supply/production chain is essentially the same as for the subscription television service, except that channel providers are absent and the wholesale subscription television operator may be an aggregator of retail pay per view rights.

*Linear television service supply/production chain*

- 4.15 For linear television services, the service provider selects the start time of television programs and provides each program in a continuous real time manner. This is the form in which FTA providers typically provide their services.
- 4.16 The supply/production chain for linear television broadly entails the same steps as the subscription television service (i.e. content creation and the

supply of rights and content, management of individual television broadcast channels, and the distribution of a channel or group of channels to viewing households). However, there are some differences in the way subscription and FTA broadcasters carry out each of these steps. Figure 8 sets the linear television supply/production chain for FTA television.

**Figure 8: Supply chain for FTA television services**



4.17 In particular, the sources of value added along the linear supply/production chain may vary considerably. For example, two of the key differences include:

- (a) original content can take a range of forms (e.g. live sporting events and blockbuster movies to smaller local programming) which can lead to a wide variation in content production and supply costs; and
- (b) distribution may be a simple technical transmission service (e.g. UHF/VHF terrestrial) or it can involve the packaging, retailing and marketing of a group of channels in encrypted form with subscriber management and billing services.

4.18 Another difference between subscription and FTA television providers is in revenue generation. While subscription TV providers collect advertising money, as discussed above, they also rely on regular (e.g. monthly) subscription fees. On the other hand, FTA television providers tend to rely almost exclusively on advertising revenues.

#### *On demand service supply/production chain*

4.19 There are a number of ways in which video on demand services can be delivered. These include:

- (a) near video on demand, which is a service where the same television program is offered on a number of different channels with a small time offset (15 or 30 minutes) for the start of the program;
- (b) personal video recorder video on demand, which is a service where television programs are delivered to the storage device in a personal video recorder and are made available once the recording is complete. These services cannot be viewed as they are being delivered to the set top box as they are not delivered in real time; and
- (c) streamed video on demand, which is a service where television programs are delivered to reception equipment using the internet and are available to be watched as they are being delivered to that reception equipment.

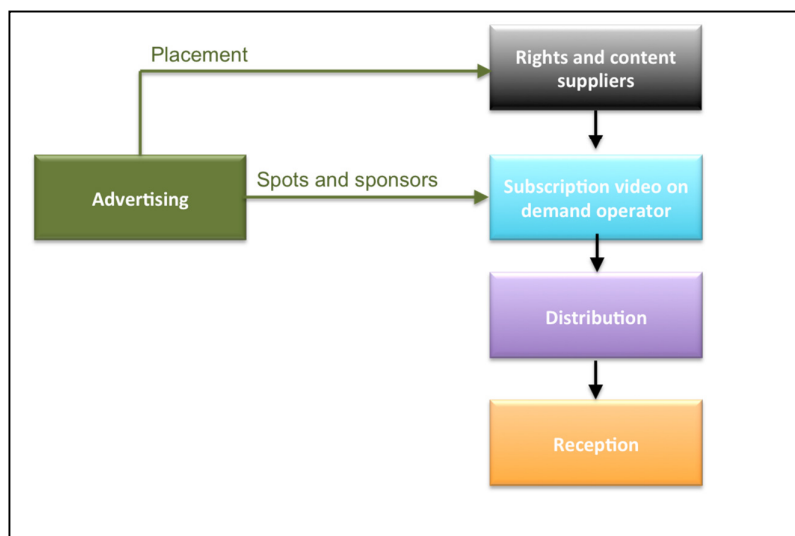
4.20 The supply chain for video on demand is depicted in Figure 9 below.

*Subscription on demand service supply/production chain*

4.21 In the supply chain for subscription video on demand services, there is no channel aggregation as all of the programs that are in the video library are available to the customer.

4.22 As a consequence, the simplified supply chain is shown in Figure 9 below.

**Figure 9: Supply chain for subscription video on demand services**



*Additional elements of the supply chain*

4.23 From a technology perspective, there are some additional elements to the way that subscription television is delivered that are helpful to add to the supply chain. These mainly relate to the way that customers are billed for

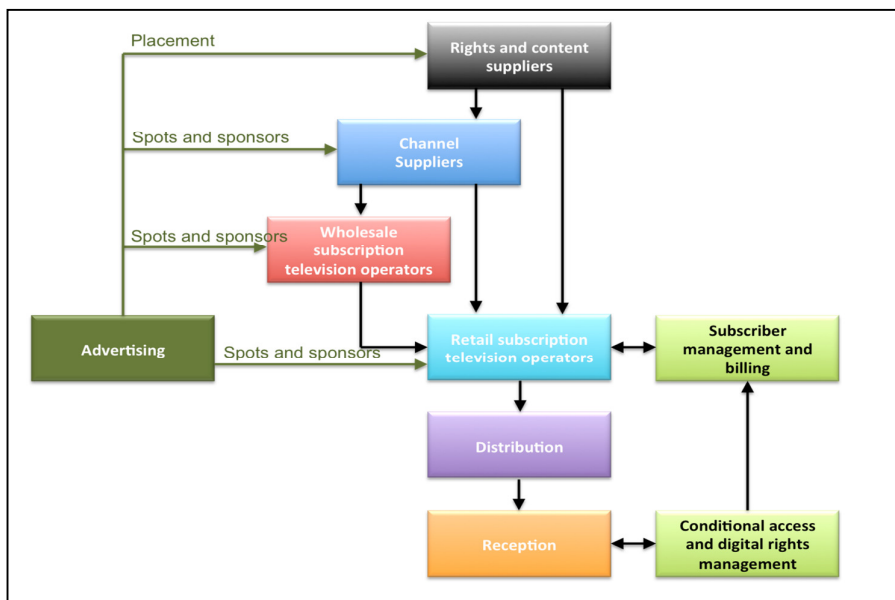


the services that they consume. These elements are also used in the delivery of pay per view services.

- 4.24 The first additional element is a billing system. These are sometimes called "subscriber management systems" or "business support systems". The billing system needs to be able to identify the customer and the channels or programs to which they are entitled. The entitlement is usually related to the payments that are made.
- 4.25 The second additional element is a system that restricts what a customer can watch depending on their entitlements. This can be a system called "conditional access" or a series of systems called "digital rights management".
- 4.26 A conditional access system provides a consumer with access to television channel or programs subject to conditions having been met. Typically, the access is conditional on payment. However, conditional access can also be used to restrict viewing to specific geographical areas. Conditional access is implemented by "scrambling" a digital video signal so that it cannot be decoded unless it is descrambled. The information as to the television services to which the customer is entitled is held on a smart card that sits in a smart card slot in the set top box. Provided that the customer is entitled to watch a program or a channel, the conditional access system permits it to be displayed.
- 4.27 Digital rights management is normally associated with a single television program and constrains the use of that program. For example, if a consumer starts to watch a movie recorded on a personal video recorder, they may only be entitled to continue watching the movie over a 24-hour period. A personal video recorder is a reception device that allows programs to be recorded on a hard disk in the device. This entitlement would be managed using the digital rights management information associated with the program and enforced by the digital rights management system in the personal video recorder.
- 4.28 Digital rights management is also used for subscription video on demand services. In this case, the digital rights management may use a combination of checking for entitlements and "geo-blocking". Geo-blocking adds a geographical restriction to entitlements.
- 4.29 Digital rights management information is usually sent with the digital content. The software in the reception device determines the user rights associated with the content and only allows the content to be used in accordance with those user rights. That software can be in a set top box, a television, computer, tablet or mobile telephone.

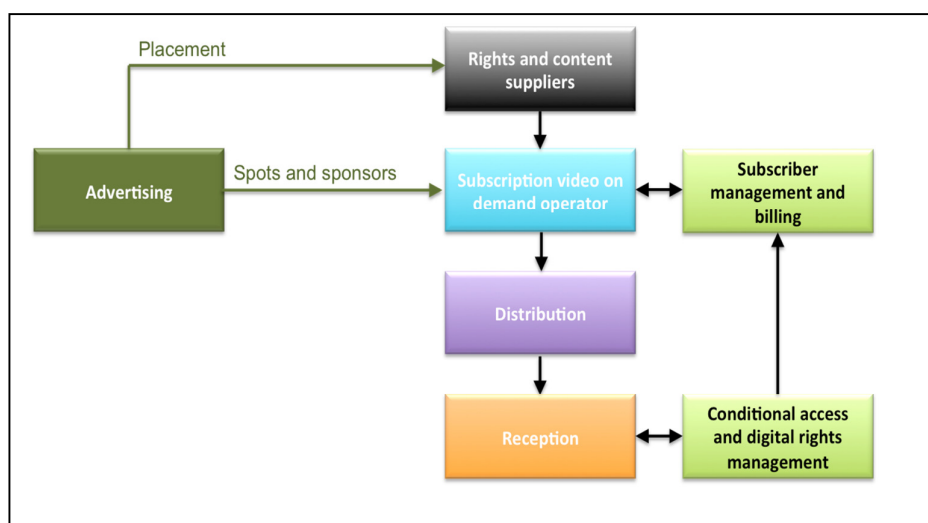
- 4.30 This functionality is added to the diagram in Figure 7 and set out below in Figure 10.

**Figure 10: Overlay on supply chain for subscription television services**



- 4.31 This functionality may also be added for the subscription video on demand services depicted in Figure 9. Figure 11 below illustrates this added functionality.

**Figure 11: Overlay of supply chain for subscription video on demand service**



## Relevant markets

- 4.32 As noted above, the supply and production chain in respect of content is long and complex. It is important to note that while the MCMC regulates important aspects of this supply and production chain process, not all elements of the supply and production chain process are subject to regulation by the MCMC.
- 4.33 The purpose of this study is to identify relevant “communications market” for the purposes of the CMA. “Communications market” include economic markets for an applications service (which includes content applications service) and goods or services used in conjunction with an applications service. This is a very broad definition and would mean that all goods and services through the content production and supply chain identified above are likely to be caught by the definition.
- 4.34 However, the MCMC also notes that under section 137, the MCMC’s power to determine dominance is limited to licensees.
- 4.35 Therefore, the MCMC focused on those activities of *licensees* which are involved in the content production and supply chain to determine in which economic markets those activities occur.
- 4.36 The relevant activities that the MCMC has identified are:
- (a) content acquisition, as discussed further below;
  - (b) distribution of broadcast signals from play-out centre to transmission tower – this service is discussed in section 8 of Part B above; and
  - (c) the broadcasting of content itself, which is discussed in section 5 below.
- 4.37 However, the MCMC notes that dominance in one market can affect competition in other markets, particularly when services in each of those markets are bundled. Accordingly, the MCMC warns that by limiting the discussion of relevant activities to the three listed above, this does not limit the interest or jurisdiction of the MCMC and the MCMC continues to monitor the entire content production and supply chain when considering the impact of particular conduct by licensees.

## Content acquisition market

### *Product characteristics*

- 4.38 Before turning to the question of content acquisition markets, it is important to identify the type of content that the MCMC is focussing on.
- 4.39 The MCMC considered long form and linear content that is provided over FTA, subscription television and IPTV platforms. If long form content is distributed over a non-linear viewing platform (e.g. video on-demand

services), this content will also be considered when identifying relevant content services markets.

- 4.40 While other sources of content, such as user-generated content, continue to gain in popularity, the MCMC does not believe that these forms of content constitute close substitutes for FTA, subscription television or IPTV services at this time. This interpretation is consistent with approaches currently taken in other jurisdictions.<sup>146</sup>
- 4.41 To be clear, the MCMC considered content services that are provided over IPTV as being included within this market. Although these services use an internet-based mode of delivery, they often require a subscription and offer similar long form content as FTA and subscription television providers.
- 4.42 Therefore, the following discussion on the acquisition and distribution of content will only focus on long form content (e.g. sport, movies, etc.) that is acquired and distributed by licensed retail content applications providers in Malaysia.

#### *Product dimension*

- 4.43 When defining the scope of the market for the acquisition of content, it is necessary to identify potential rivals who are in competition for the right to offer the best content to their viewers. The MCMC views the following content acquirers as potentially being in competition with one another to acquire content:
  - (a) FTA television providers;
  - (b) subscription television providers; and
  - (c) IPTV providers.
- 4.44 In theory, each of these content providers will compete against one another to acquire the rights to show particular content. They will compete with one another in negotiations with content producers, such as sports bodies (e.g. English Premier League), movie studios or television production houses.
- 4.45 However, in reality what tends to occur is the provider with the greatest financial resources is able to regularly outbid all other providers and lockout access to premium content. In effect, this serves to narrow the number of demand side substitutes in the market as effective competition is limited to a few large players.
- 4.46 In Malaysia, Astro has substantially higher buying power than the individual FTA operators. Astro's total revenue for financial year ended 31 January 2013 was reported at RM 4,264,967,000,<sup>147</sup> which is significantly above what other FTA providers reported over the same time period. For example,

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<sup>146</sup> For example, in its assessment of the proposed Foxtel and Austar merger in 2012, ACCC found that, although mobile and "other audiovisual content delivery services" were likely to play an increasing role in the content services market in the future, at this time they did not constitute a sufficient substitute to subscription television services.

<sup>147</sup> Measat Broadcast Networks Systems (Astro), Annual Report 2013  
Market definition analysis

Media Prima reported annual revenue in the same year 2013 of RM 1,722,943,000 (with only RM 727,769,000 coming from its TV networks business).<sup>148</sup>

- 4.47 The MCMC notes that the number of digital FTA channels will be increasing from the existing 8 channels up to 30 channels in 2015. However, this is unlikely to have a significant impact on the field of rivalry between Astro and the FTA providers. While advertisement revenues may increase slightly with the prospect of increased viewership, the total revenue is expected to remain relatively constant for the foreseeable future. In fact, advertisement revenues would be divided amongst a larger number of channels, so there is the potential for FTA revenues on a per channel basis to decline over time.
- 4.48 The area in which these financial resources are most distinct is in relation to the acquisition of so-called "premium content". The MCMC notes that content providers are seeking to differentiate their offerings by providing premium content, such as live sporting events (e.g. English Premier League) and blockbuster movies, often on an exclusive basis.
- 4.49 The ability of a particular provider to lock out access to certain premium content has been an area of growing concern in other jurisdictions. For example, in 2010, Ofcom in the United Kingdom imposed ex-ante wholesale obligations on BSkyB for access to particular live sporting events, in particular the English Premier League. While the UK's Competition Appeal Tribunal later removed Ofcom's wholesale must offer regulation in 2012,<sup>149</sup> the regulator began a new investigation in 2013 to assess complaints from British Telecom (**BT**) that BSkyB was withholding wholesale supply of its channels to BT on an unreasonable and discriminatory basis.<sup>150</sup>
- 4.50 Similarly, ex-ante measures were also introduced in Singapore in relation to access to certain premium content. The Media Development Authority (**MDA**) of Singapore imposed cross-carriage measures to regulate cases where content exclusivity was viewed as limiting competition in the pay-TV market.<sup>151</sup>
- 4.51 In Australia the ACCC notes the importance of operators having access to "compelling" content to effectively compete for viewers. In its competition assessment of the proposed merger between Foxtel and Austar, the ACCC noted that:

*"Market participants identified an inability to access compelling content as the most significant barrier to*

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<sup>148</sup> Media Prima Berhad, Annual Report 2013.

<sup>149</sup> *British Sky Broadcasting Limited v Office of Communications* [2012] CAT 20.

<sup>150</sup> The Guardian, *BSkyB investigated over BT claim it is withholding Sky Sports package* (20 June 2013) available online at: < <http://www.theguardian.com/media/2013/jun/19/bskyb-bt-sky-sports-youview-premier-league>>

<sup>151</sup> See: MDA, *Code of Practice for Market Conduct in the Provision of Media Services* (2010).  
Market definition analysis

*entry in the market for the supply of subscription television.”<sup>152</sup>*

- 4.52 This supports the notion that premium or compelling content has separate characteristics to other ordinary forms of content, which tends to attract a greater number of viewers. Premium content will typically include live coverage of a popular sporting event or a new release blockbuster movie. The ability of a content provider to leverage its financial resources to acquire the exclusive rights to either of these forms of premium content will often directly translate into increased viewership or subscriber numbers.
- 4.53 Therefore, in line with the general position taken in other jurisdictions, the MCMC identified a distinct market for the acquisition of premium content. Such a market would include the acquisition of certain popular live sporting events (e.g. English Premier League) and blockbuster movies.

#### *Geographic dimension*

- 4.54 The MCMC’s view is that content acquisition operates on a national basis. This is because content rights are acquired for national broadcasting and content tends to be provided in the same manner across Malaysia (e.g. in the same language, using the same distribution platforms, etc.).
- 4.55 The MCMC notes that the ACCC also found that a national market applied for the acquisition of “audio-visual” content by FTA and subscription television providers.<sup>153</sup>

#### *Temporal dimension*

- 4.56 It is worth noting that the number of firms in the content acquisition market may increase in the future. A growing trend towards OTT content delivery models can be observed internationally.
- 4.57 OTT providers have traditionally been smaller operations which would likely struggle to outbid FTA and subscription television providers. However, a few larger OTT content providers (e.g. Netflix) have taken hold in other overseas markets. Therefore, there is a possibility that these larger OTT operators, who could have the financial resources to compete for content with FTA and subscription providers in Malaysia, may eventually seek entry into the local market. This was a point that was raised by Astro in its submission.<sup>154</sup>
- 4.58 However, other than the largest international OTT providers such as Netflix or Roku, the MCMC does not view OTT providers as a serious substitute at this time. The MCMC will continue to monitor the provision of OTT services in Malaysia and may amend its position if a leading global OTT provider seeks entry and that entry has the potential to significantly impact the Malaysian communications market.

<sup>152</sup> ACCC, *Public competition assessment – Foxtel proposed acquisition of Austar United Communications Limited* (14 June 2012) at 49.

<sup>153</sup> ACCC, *Public competition assessment – Foxtel proposed acquisition of Austar United Communications Limited* (14 June 2012) at 38.

<sup>154</sup> Measat Broadcast Networks Systems (Astro), *Dominance Questionnaire Response* at 2.2(b).  
Market definition analysis

## Final view

- 4.59 The MCMC is of the view that there are separate markets for the acquisition of premium content and ordinary content. The market for premium content would include the acquisition of certain popular live sporting events (e.g. English Premier League) and blockbuster movies, while the market for ordinary content would include any other content that is not generally considered to be “premium” content (other than short form and user-generated content).
- 4.60 For the purposes of this assessment, the MCMC considers only long form, linear content (with the exception of non-linear subscription offerings) as being within scope. Short form and user-generated content that is distributed online will not be considered by the MCMC at this time.

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## 5 Broadcasting services

### Brief overview of Malaysia

- 5.1 In this section the MCMC will consider the markets for platforms over which content services are broadcast. As mentioned in Part C above, the MCMC has separately considered the relevant markets associated with transmission to towers and, in the case of digital television, transmission from towers. Content acquisition markets are also separately considered in section 4 above.
- 5.2 In Malaysia, the three main broadcasters are:
- (a) the commercial FTA television service providers, namely Media Prima Group;
  - (b) the Government-owned Radio Televisyen Malaysia (**RTM**); and
  - (c) the satellite pay-TV provider, Astro Malaysia Holdings.
- 5.3 With the advent of the new digital broadcasting platform discussed earlier, the MCMC notes that FTA broadcasters plan to launch more local TV channels that come with high definition services, interactivity and lite pay services such as VOD, pay per time, pay per view, personal recording as well as the ability to switch to broadband services on demand.<sup>155</sup>
- 5.4 The main FTA channels in Malaysia are:
- (a) TV1;
  - (b) TV2;
  - (c) TV 3;

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<sup>155</sup> MCMC, *IPR 2012 Shaping a Connected Future* (2012) at page 114.  
Market definition analysis

- (d) ntv7;
- (e) 8TV;
- (f) TV9; and
- (g) TV AlHijrah.<sup>156</sup>

- 5.5 Astro is currently the only direct-to-home satellite TV provider that transmits digital satellite television and radio in Malaysia. Astro also offers IPTV services, such as its Astro B.yond Service (in partnership with TIME) and Astro On-the-Go service (in partnership with Maxis).<sup>157</sup>
- 5.6 Telekom Malaysia also offers its own IPTV service, Hypp TV, which it bundles as part of its UniFi triple play service offering. The Hypp TV service comprises VOD services, pay per view options and free live TV channels.
- 5.7 As of the end of 2013, the total number of pay-TV subscriptions in Malaysia was estimated at approximately 3,865,000, which equates to a penetration rate of 55.7%.<sup>158</sup> There were also approximately 658,000 IPTV subscriptions across Malaysia over the same period.<sup>159</sup>
- 5.8 Since the 2004 Dominance Study, the communications sector in Malaysia has experienced (and continues to experience) significant technological and product innovation. In the broadcasting sector, this has included the movement from linear to on-demand supply, the emergence of new cable operators, the increase in intermodal competition (e.g. IPTV versus traditional media platforms), and a planned migration from analogue to digital broadcasting that is scheduled to begin in 2015.
- 5.9 The extent to which these changes have affected demand and supply side substitutability for the purposes of defining relevant communications market will be an important consideration when defining broadcasting services markets in Malaysia.

## Product characteristics

- 5.10 Identifying a market for broadcasting services in Malaysia requires consideration of the extent to which FTA, subscription television and other audiovisual content providers (e.g. OTT providers) are able to effectively compete for viewers.
- 5.11 This issue was considered at length by the ACCC in Australia during its assessment of a proposed merger between Foxtel (a subscription cable provider) and Austar (a satellite television provider) when it stated:

*"the ACCC considered that other sources of supply of audiovisual content to end consumers including FTA television, mobile TV and audiovisual content*

<sup>156</sup> MCMC, *Communications and Media Pocket Book of Statistics* (Q4 2013) at page 35.

<sup>157</sup> MCMC, *IPR 2012 Shaping a Connected Future* (2012) at page 117.

<sup>158</sup> MCMC, *Communications and Media Pocket Book of Statistics* (Q4 2013) at page 35.

<sup>159</sup> MCMC, *Communications and Media Pocket Book of Statistics* (Q4 2013) at page 36.



*delivered on a transactional basis, including over the internet, were not sufficiently close substitutes to be considered in the same market as subscription television services...*<sup>160</sup>

- 5.12 The ACCC ultimately identified the relevant market as being a “national market for the supply of subscription television services”. The reasoning behind its decision was as follows:

*“If there was a market with multiple subscription television service providers, the competition between those providers would be significantly closer and more vigorous than between the subscription television providers and FTA television broadcasters.”*<sup>161</sup>

- 5.13 Similarly, the Commission in *BskyB/Kirch Pay-TV* took the same approach when it stated:

*“[t]he fact that subscribers are prepared to pay considerable sums for pay-TV indicates that the latter is a distinguishable product with specific extra utility.”*<sup>162</sup>

## **Product dimension**

- 5.14 On the demand side, the MCMC does not consider that FTA television and subscription television are in the same market. This is because the MCMC believes that a SSNIP in the subscription TV market would be unlikely to lead to demand moving across to FTA television services.
- 5.15 The MCMC’s position is supported by the churn and content pricing data that Astro supplied to the MCMC which shows an actual SSNIP has occurred in the subscription television market. Between 2012 and 2014, Astro was able to maintain a relatively stable subscriber base. However, within this same period, the company also increased the price of its basic package plus sport by 10%.<sup>163</sup>
- 5.16 In effect, what this data reveals is a real life SSNIP. Astro carried out a ‘small but significant and non-transitory increase in price’ of approximately 10% without experiencing a comparable loss of subscribers. The high degree of pricing independence on the part of Astro in relation to other participants in the broadcasting market suggests a lack of true substitutes in the market.
- 5.17 It should be noted that Astro did identify a number of FTA television providers (as well as other pay-TV providers, content piracy, online/OTT

<sup>160</sup> ACCC, *Public competition assessment of Foxtel and Austar merger* (14 June 2012) at 37.

<sup>161</sup> ACCC, *Public competition assessment of Foxtel and Austar merger* (14 June 2012) at 34.

<sup>162</sup> European Commission, *Market Definition in the Media Sector – Economic Issues* (November 2002) at 3.5.10.

<sup>163</sup> Measat Broadcast Networks Systems (Astro), *Dominance Questionnaire Response* at 1.5(c).  
Market definition analysis

and mobile TV) as competitors in its submission.<sup>164</sup> This is supported by the notion that one firm identifying another firm as a rival is an exhibit of competitive behaviour within the market.<sup>165</sup>

- 5.18 However, the MCMC does not agree with Astro's position. The MCMC believes it is reasonably clear from anecdotal evidence as well as the data that on the demand side, there is very little substitution between FTA and subscription television in Malaysia. The MCMC is of the same view as the ACCC that if there was a market with multiple subscription television service providers, the competition between those providers would be significantly closer and more vigorous than between the subscription television providers and FTA television broadcasters.
- 5.19 On the supply side, FTA and subscription television providers should not be considered supply side substitutes. The infrastructure used to supply FTA broadcasts and subscription television is very different. FTA television is broadcast over terrestrial systems in Malaysia, while most subscription television is broadcast via satellite. If a SSNIP occurred in relation to subscription television services, it would be extremely difficult both technically and financially for a FTA provider to move into subscription television.
- 5.20 Accordingly, based on the evidence of lack of substitution between subscription television and FTA television broadcasters on the demand and supply side in Malaysia, the MCMC's view is that subscription and FTA television broadcasting services are fundamentally different products that should be situated in separate and distinct markets.

### **Geographic dimension**

- 5.21 The MCMC considers that the broadcasting services markets operate on a national basis. This is because content is broadcast in the same manner across Malaysia (e.g. in the same language, using the same distribution platforms, etc.), which justifies the delineation of a national market for broadcasting services.

### **Functional dimension**

- 5.22 Broadcasting transmission services are not subject to a traditional supply chain. This is because broadcasters acquire transmission as an end user and they are also licensed separately as the providers of content that is broadcast over that transmission service. Therefore, a traditional supply chain will not apply when assessing the relevant market for broadcasting transmission services.
- 5.23 A far more complex upstream supply chain applies from the production of content through to its acquisition. However, the MCMC considered these issues in section 4 above.

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<sup>164</sup> Measat Broadcast Networks Systems (Astro), *Dominance Questionnaire Response* at 2.1(a).

<sup>165</sup> *Re Fortescue Metals Group* (2010) 242 FLR 136 at 1020.

## **Final view**

- 5.24 The MCMC views the national markets for the supply of broadcasting services as being fundamentally separate for FTA and subscription television providers.

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## **6 Other applications services**

- 6.1 The MCMC is aware that markets for applications services, including content applications services, may be highly dynamic and are often not confined to national borders.

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## Part E Interconnection services

### 1 Introduction

- 1.1 Interconnection services broadly refer to a facility or service (including the physical connection between separate networks) that is provided by one network operator to another network operator in order to facilitate the carriage of communications between end users who are connected to different networks.
- 1.2 The effective provision of interconnection services is critical to the functioning of a communications network. To ensure cooperation between network operators, it is often necessary for regulatory intervention to govern effective interconnection between separate networks because there is a lack of commercial incentive for larger operators to interconnect with smaller operators.
- 1.3 The following sections outline the relevant markets for interconnection services that are deemed necessary for the effective functioning of the Malaysian communications sector by the MCMC.

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## 2 Termination (fixed and mobile)

### Brief overview of Malaysia

- 2.1 In Malaysia, there are several fixed and mobile networks in respect of which terminating access is required to facilitate any-to-any connectivity.
- 2.2 Fixed call termination is facilitated by the Fixed Network Termination Service which is on the Access List and is described as follows:

*"Fixed Network Termination Service is an Interconnection Service provided by means of a Fixed Network for the carriage of Call Communications from a POI to a 'B' party. The Fixed Network Termination Service comprises transmission and switching (whether packet or circuit) for Fixed Network-to-Fixed Network, Mobile Network-to-Fixed Network and incoming international-to-Fixed Network calls and messages which require Any-to-Any Connectivity."*<sup>166</sup>

- 2.3 Mobile call termination is facilitated by the Mobile Network Termination Service which is on the Access List and is described as follows:

*"Mobile Network Termination Service is an Interconnection Service for the carriage of Call Communications from a POI to a 'B' party. The Mobile*

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<sup>166</sup> MCMC Determination on Access List, Determination No.1 of 2005 (as amended by Determination No. 1 of 2009).

*Network Termination Service supports Mobile Network-to-Mobile Network, Fixed Network-to-Mobile Network and incoming international-to-Mobile Network calls and messages which require Any-to-Any Connectivity.*<sup>167</sup>

- 2.4 Fixed termination rates and mobile termination rates are regulated in Malaysia and are set out in the MCMC's Access Pricing Determination.<sup>168</sup>

## **Product characteristics**

- 2.5 When a telephone call is made between end users on two different networks, it will involve two essential elements:
- (a) call origination; and
  - (b) call termination.
- 2.6 Call origination refers to the carriage of a call from the end user who makes (or "originates") the call to a point of interconnection with the network on which the called party is connected. Call termination refers to the carriage of the call from the point of interconnection to the end user who receives the telephone call.
- 2.7 According to the interconnect model that applies in Malaysia, the network operator that originates the call is generally required to purchase terminating access from the network operator that terminates the call. The originating network operator then recovers these costs from its customers in the price it charges them for making the call. The terminating network operator does not charge its customers for receiving the call.
- 2.8 The focus of this section will be on call termination. Call origination is discussed in the next section. However, it is important to note the interaction between these interconnection services because they are closely related to one another.
- 2.9 Call termination supports the following call types:
- (a) fixed network to fixed network calls;
  - (b) mobile network to mobile network calls;
  - (c) fixed to mobile network calls;
  - (d) mobile to fixed network calls; and
  - (e) incoming international calls to fixed or mobile networks.
- 2.10 In functional terms, termination applies in much the same way for both fixed and mobile calls. As such, the following discussion will consider the

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<sup>167</sup> MCMC Determination on Access List, Determination No.1 of 2005 as amended by (Determination No. 1 of 2009).

<sup>168</sup> MCMC Determination on the Mandatory Standard on Access Pricing, Determination No. 1 of 2012.

market for call termination more broadly, but the conclusions will apply equally to fixed and mobile call termination.

## Product dimension

- 2.11 On the demand side, the purchaser is the operator requiring a call originating on its network to be terminated on the network of another operator. This is because a fixed or mobile end user will not purchase a separate termination service, but will instead expect their operator to provide full end-to-end call services. This calling system requires the originating operator to arrange for termination services from other operators so that if customers wish to call a subscriber on another network they know that the call will be connected.
- 2.12 When a call is made to a specific subscriber and that person is on another network, there is an expectation that the call will reach the intended subscriber. Calling someone other than the desired subscriber will not be an acceptable demand substitute.
- 2.13 Therefore, the originating network operator has no option other than to terminate its call on the terminating operator's network. While some operators might offer transit services, ultimately these transit operators also need to negotiate with the terminating network operator to terminate calls which transit over the transit operator's network.
- 2.14 The ACCC in Australia has 'declared' a Fixed Terminating Access Service (**FTAS**) and a Mobile Termination Access Service (**MTAS**). In a recent review of its MTAS declaration, the ACCC stated it reasons for continuing to apply a wholesale mobile termination market in relation to each operator's network:
- (a) MNOs continue to have exclusive control over access to end users on their networks, which means that only a MNO can terminate a voice call on its own network;
  - (b) effective substitutes currently do not exist for wholesale voice termination services or the voice services which require voice termination (i.e. mobile-to-mobile and fixed-to-mobile voice services), which means that service providers must acquire a wholesale voice termination service from MNOs in order to allow their customers to call end users on other mobile networks;
  - (c) currently VoIP services should not be considered as effective substitutes for voice calls made over fixed and mobile networks; and
  - (d) termination services are typically sold separately to other telecommunications services, which suggests that there is a separate wholesale market for voice termination.<sup>169</sup>

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<sup>169</sup> ACCC, *Domestic Mobile Terminating Access Service Declaration Inquiry – Report on the ACCC's Draft Decision* (13 December 2013) at pages 13-15.  
Market definition analysis

- 2.15 These points were made in relation to mobile network termination, but they also apply to fixed network termination.
- 2.16 The EC views each termination to a particular end user as a separate market:

*"[E]ach terminating network is a separate relevant market and the operator of that network has Significant Market Power... Strictly speaking, it follows that NRAs should do a separate market analysis decision for each network and NRAs should impose specifically designed remedies for each relevant market. From a practical point of view this might be superfluous if such separate exercises were to result in a duplication of documents that only differ in the names of the operators."<sup>170</sup>*

- 2.17 The MCMC proposes to follow a similar approach to those applied in Australia and in Europe to find that separate termination markets exists for:
- (a) each fixed network; and
  - (b) each mobile network.
- 2.18 On the supply side, there is no substitute for a specific end user's number because that number is unique. As such, the MCMC is of the view that there are no supply side substitutes for fixed and mobile termination.

## **Geographic dimension**

- 2.19 Call termination effectively creates a natural monopoly for each and every operator for termination of calls on that operator's network. This means that the geographic dimensions of any relevant termination market are likely to align with the boundaries of each operator's fixed and/or mobile network.
- 2.20 While the prices for fixed Network Termination Services and Mobile Network Termination Services vary by reference to the distance and the infrastructure over which the service is provided, they do not vary geographically.

## **Functional dimension**

- 2.21 The MCMC notes that termination occurs at the wholesale level where network operators are required to arrange for interconnection of end user calls between their networks. This position is supported in Australia and the EC, which both apply wholesale markets for call termination.

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<sup>170</sup> Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) page 100.  
Market definition analysis

## Final view

- 2.22 The MCMC considers each termination over an operator's network as a separate relevant market. Termination markets has been defined separately at the wholesale level for:
- (a) each fixed network; and
  - (b) each mobile network.

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## 3 Origination (fixed and mobile)

### Brief overview of Malaysia

- 3.1 In Malaysia, most call origination is provided directly to end users as part of their retail package of calling services. These retail services are described in Part A and Part B above for fixed and mobility services respectively.
- 3.2 Some limited services may require wholesale originating services to be provided, namely calls to freephone 1800, toll free 1300 number services and other similar services. 1800 and 1300 services are a popular way for business and government customers to provide end users in Malaysia with access to their call centres and other customer services.
- 3.3 Fixed call origination to these services is facilitated by the Fixed Network Origination Service which is on the Access List and is described as follows:

*"Fixed Network Origination Service is an Interconnection Service provided by means of a Fixed Network for the carriage of Call Communications from a 'A' party to a POI. The Fixed Network Origination Service comprises transmission and switching (whether packet or circuit) for Fixed Network-to-Fixed Network, Fixed Network-to-Mobile Network and Fixed Network-to-international outgoing calls insofar as they relate to freephone 1800 number services, toll free 1300 number services and other similar services which require Any-to-Any Connectivity."*<sup>171</sup>

- 3.4 Mobile call origination to these services is facilitated by the Mobile Network Origination Service which is on the Access List and is described as follows:

*"Mobile Network Origination Service is an Interconnection Service for the carriage of Call Communications from a 'A' party to a POI. The Mobile Network Origination Service supports Mobile Network-to-Mobile Network, Mobile Network-to-Fixed Network and Mobile Network-to-international outgoing calls*

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<sup>171</sup> MCMC Determination on Access List, Determination No.1 of 2005 (as amended by Determination No. 1 of 2009).



*insofar as they relate to freephone 1800 number services, toll free 1300 number services and other similar services which require Any-to-Any Connectivity.”<sup>172</sup>*

- 3.5 Fixed origination rates and mobile origination rates are regulated in Malaysia and are set out in the MCMC’s Access Pricing Determination.<sup>173</sup> Different rates apply to the Fixed Network Origination Service for calls with the prefix 0154 which originate on networks based on IP.

## **Product characteristics**

- 3.6 The network operator who supplies a 1800 or 1300 service to a business or government customer will need to originate calls onto those numbers from all networks. The first mentioned network operator will be required to pay an originating network charge and recover these costs directly from its business and government customers through the prices that they pay for the 1800 or 1300 services.
- 3.7 As mentioned above, the fixed and mobile call origination applies to calls to free phone 1800 calls and toll free 1300 calls.
- 3.8 It is important to note that once a consumer chooses a service provider they are effectively locked-in to that provider’s network. This means that 1800 or 1300 services will only be accessible if the originating network operator permits originating access or is required to provide originating access to the 1800 or 1300 provider.

## **Product dimension**

- 3.9 On the demand side, a “free” call to a 1800 number is paid for by the called party and not the calling party. Similarly, a call to a 1300 number is also paid for by the called party, except a local charge will often still apply to the calling party.
- 3.10 For every call that is made to a 1800 and 1300 number, the called party will be required to pay the originating charges to the network provider that serves the calling party.
- 3.11 The MCMC accepts that there may be some substitutes for originating calls from time to time. For example, an end user may have the choice of calling a 1800 or 1300 service from a fixed line at their workplace, a mobile telephone or a fixed line at their home. However, the ability of a rival network operator to act as a substitute is constrained by the fact that once a consumer selects a particular network, no other network operator may originate calls on its network for that particular consumer from that particular service.

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<sup>172</sup> MCMC Determination on Access List, Determination No.1 of 2005 (as amended by Determination No. 1 of 2009).

<sup>173</sup> MCMC Determination on the Mandatory Standard on Access Pricing, Determination No. 1 of 2012.

- 3.12 In Australia, the ACCC recently advocated the continued declaration of PSTN Originating Access services. Some of the reasons given by the ACCC for this include:
- (a) to promote any-to-any connectivity; and
  - (b) to prevent larger network operators from withdrawing access to the service or offering it on unreasonable terms.<sup>174</sup>
- 3.13 These justifications for the regulation of fixed and mobile origination also apply in the Malaysian context. As such, the MCMC has defined a separate market for fixed and mobile call origination because sufficient substitutes do not appear to exist at this time.
- 3.14 Similarly, on the supply side, there will not be a viable substitute for fixed and mobile network origination because this would effectively require a calling party to switch telephone connections. This is infeasible given that the calling party will not be subject to any rises in price and will therefore have no incentive to switch connections.

### **Geographic dimension**

- 3.15 Call origination effectively creates a natural monopoly for the operator of the network from which the call was made. This means that the geographic dimensions of any relevant origination market are likely to align with the boundaries of each operator's network.

### **Functional dimension**

- 3.16 The MCMC notes that origination typically occurs at the wholesale level where network operators are required to arrange for interconnection of end user calls between their networks. This position is supported in Australia and the EC, which both apply wholesale markets for call origination.

### **Final view**

- 3.17 The MCMC considers each origination over each fixed and mobile network in Malaysia as a separate wholesale market.

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## **4 SMS termination**

### **Brief overview of Malaysia**

- 4.1 SMS termination is supported by the Mobile Network Termination Service described in section 2 above, which also applies to "messages".

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<sup>174</sup> ACCC, *Fixed services review – Discussion paper on the declaration inquiry* (July 2013) at 4.3.  
Market definition analysis

## **Product characteristics**

- 4.2 When an end user on one network sends an SMS to an end user that is connected to another network, the terminating network operator is required to provide a termination service to the originating network operator in order to facilitate any-to-any connectivity of that service.
- 4.3 The originating network operator may then charge its end user for sending the SMS. The terminating network operator will not charge its customer for receiving the SMS, but will charge the originating network operator a SMS termination fee.

## **Product dimension**

- 4.4 On the demand side, end users have a number of different options for sending and receiving SMS. These services include many of the available OTT services that are now widely available, such as WhatsApp and Blackberry Messenger. The MCMC has considered its views on the substitutability of these services for SMS services in Part C above. The MCMC does not consider these services to be substitutes at this time.
- 4.5 However, for SMS termination, the MCMC notes that there are no demand side substitutes. If an end user sends an SMS then there is only one operator that can terminate that SMS, namely the terminating network operator. Accordingly, each network operator has a monopoly over the supply of SMS termination on its network in the same way that it has for calls that terminate on its network.
- 4.6 On the supply side, the same basic infrastructure that is used to supply call termination is used to supply SMS termination. Accordingly, the MCMC considers there to be a high degree of supply side substitution by the terminating operator between calls and SMS.
- 4.7 Therefore, the MCMC takes the view that the markets defined for call termination (i.e. a market applicable to each network) also applies to SMS termination.

## **Geographic dimension**

- 4.8 SMS termination effectively creates a natural monopoly for the operator of the network to whom the SMS is made. This means that the geographic dimensions of any relevant termination market are likely to align with the boundaries of each operator's network.

## **Functional dimension**

- 4.9 SMS termination typically occurs at the wholesale level where network operators are required to arrange for interconnection of end user SMS between their networks.

## Final view

- 4.10 The MCMC considers the wholesale termination markets applicable to calls as the same market for the termination of SMS.

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## 5 Inter-connect link

### Brief overview of Malaysia

- 5.1 There are multiple networks in Malaysia that need to be physically inter-connected in some way for end users to be able to communicate between the different networks. The inter-connect link is a key service that facilitates such a connection between two networks.

- 5.2 The Interconnect Link Service is on the Access List and is described as follows:

*"An Interconnect Link Service is a Facility and/or Service which enables the physical connection between the network of an Access Provider and the network of an Access Seeker for the purpose of providing an Interconnection Service..."<sup>175</sup>*

- 5.3 The maximum prices that may be charged for Inter-connect Link Services are currently set out in section 8(e) of the Mandatory Standard on Access Pricing.<sup>176</sup> Network operators are free to commercially negotiate pricing for each inter-connect link Service that is provided, as long as they do not exceed the maximum regulated prices. These negotiations will typically be conducted in relation to each individual point of interconnection.

### Product characteristics

- 5.4 Inter-connect links facilitate a connection between two networks at a particular point, such as at an exchange. They will typically be subject to the specific characteristics (e.g. geographic location) of the particular interconnection point.

- 5.5 The most common types of interconnection links are:

- (a) in-span interconnection, which occurs when the point of interconnection is located in an optical fibre within a cable duct or cable chamber that is located between the respective operators' premises, at which the various network elements that make up the interconnect circuit are located; and

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<sup>175</sup> MCMC Determination on Access List, Determination No.1 of 2005 (as amended by Determination No. 1 of 2009).

<sup>176</sup> Commission Determination on the Mandatory Standard on Access Pricing – Determination No. 1 of 2012, section 8(e).

- (b) in-building interconnection, which occurs at an optical interface between two network elements within one operators premises.<sup>177</sup>

- 5.6 The ability for network operators to physically interconnect their respective networks is essential to ensure end-to-end connectivity for end users. Without an effective interconnection access regime in place, it would otherwise be possible for an incumbent operator to leverage its dominant position to prevent interconnection with smaller competitors.

## Product dimension

- 5.7 On the demand side, the MCMC has considered the extent to which access may be achieved to effect interconnection in the event that a particular inter-connect link is rendered inaccessible.
- 5.8 For the most part, the only substitute that will typically be available to an operator seeking interconnection at another operator's exchange would be through a similar facility with comparable access to that network, such as through a transit operator. While transit is a possible approach, the MCMC notes that transit will not be economically viable particularly for the transit of traffic of a large operator. Accordingly, in reality, such a substitute is not likely to be available in many circumstances.
- 5.9 For this reason inter-connect links will typically not have any viable substitutes and may be considered as a form of natural monopoly.
- 5.10 On the supply side, it may be possible for a third party to provide the inter-connect link in circumstances where there is a SSNIP. However, that third party would still need access to the exchange which was being denied to the operator seeking direct interconnection. It is unclear why this form of service would be denied to one operator and not another. The more likely scenario is that the inter-connect link service is denied to both operators and hence supply side substitution is likely to be limited.
- 5.11 Accordingly, the MCMC is of the view that the product dimension is likely to be limited to direct interconnect link services only.

## Geographic dimension

- 5.12 Inter-connect links are specific to a particular point of presence on the network. As such, an inter-connect link may be viewed as having an individual market with boundaries that align with the particular point of presence (e.g. exchange) on the network where the interconnection point is located.
- 5.13 However, interconnection may occur at one or many points in Malaysia and it is likely that operators will consider establishing interconnect links on a national basis.

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<sup>177</sup> Ofcom, *DWDM interconnect between UK licensed operators – Interoperability and commissioning recommendation* (ND1128:2001/07) available online at: <  
[http://www.niccstandards.org.uk/files/current/nd1128\\_2001\\_07.pdf?type=pdf](http://www.niccstandards.org.uk/files/current/nd1128_2001_07.pdf?type=pdf)>  
Market definition analysis

- 5.14 Therefore, the MCMC is of the view that the geographic dimension of the inter-connect link market is national.

### **Functional dimension**

- 5.15 Inter-connect links are provided from one network operator to another so should be considered as situated at the wholesale level of the supply chain.

### **Final view**

- 5.16 The MCMC's view is that there is a national market for inter-connect link services that operates at the wholesale level of the supply chain.

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## **6 Transmission to submarine cable landing stations and earth stations**

### **Brief overview of Malaysia**

- 6.1 The MCMC notes that there are limited statistics available for earth stations and cable landing stations. The MCMC is referring here to major points of origination or termination connected to satellite systems or cable systems, generally for international but also for domestic transmission purposes.
- 6.2 Connection to cable landing stations and earth stations is essential for any operator with capacity on those systems. In this section, we consider whether there is a market for transmission to these locations.

### **Product characteristics**

- 6.3 Transmission to a submarine cable landing station or earth station may be provided as a backhaul transmission service, which typically entails the provision of an end-to-end connection by the network operator to an access seeker between an agreed network transmission point and the operator's submarine cable landing station or earth station (as applicable). Transmission will often then involve use of the operator's cross-connect equipment for the purpose of accessing:
- (a) cable capacity on the submarine cable system, which may be owned by the access seeker, subject to an indefeasible right of use granted to the access seeker or leased by the access seeker; or
  - (b) space segment capacity at the earth station which is leased by the access seeker.
- 6.4 Submarine cable landing stations and earth stations are generally viewed as bottlenecks in the network supply chain. As such, access regulation is often required to ensure access seekers are given access to those facilities so that they can get access to capacity on those systems.

- 6.5 Submarine cable landing stations and earth stations are often located in remote or inaccessible areas, which can make accessing these facilities particularly difficult, thereby reducing the number of substitutes available to these sites.

### **Product dimension**

- 6.6 On the demand side, in most cases due to the remoteness and difficulty of accessing these stations, transmission options that may otherwise be available to other similar facilities (e.g. an urban exchange or co-location facilities) will typically not apply for a submarine cable landing station or earth station.
- 6.7 Therefore, unless a separate transmission is constructed to provide access to a particular submarine cable landing station or earth station (which would be costly and impracticable), these transmission facilities will generally be viewed by the MCMC as without true substitutes and as natural monopolies.

### **Geographic dimension**

- 6.8 Submarine cable landing stations and earth stations are location-specific, which means that transmission to a particular point of presence where the station is located will typically be considered the geographic dimension of the individual market for that station.
- 6.9 A submarine cable system may only land at one particular location on Peninsular Malaysia or East Malaysia. Alternatively, if a submarine cable system lands in multiple locations, it is unlikely to be substitutable to connect to capacity at multiple locations.
- 6.10 Accordingly, the MCMC is of the view that the geographic dimension of the market is limited to transmission to the actual location of each earth station and submarine cable landing station.

### **Functional dimension**

- 6.11 Transmission to submarine cable landing stations and earth stations is typically only provided at the wholesale level, so the MCMC only considered the relevant market for transmission services for submarine cable landing stations and earth stations at the wholesale level.

### **Final view**

- 6.12 The MCMC considers each transmission service to a particular point of presence where a submarine cable landing station or earth station is located as the individual wholesale market for that location.

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## 7 Wholesale Internet interconnection

### Brief overview of Malaysia

- 7.1 In Malaysia, the Malaysia Internet Exchange (**MyIX**) provides a central space for domestic interconnection between all major service providers. MyIX claims that “at present all major Malaysia Internet Service Providers and Content Providers have established connections with MyIX.”<sup>178</sup>
- 7.2 MyIX offers the following services to its members:
- (a) Multilateral Peering Arrangements for interconnection of all MyIX members;
  - (b) Network Monitoring Systems which monitor and report the utilisation of member traffic;
  - (c) MyIX Looking Glass services, which allow members to view routing information remotely;
  - (d) IPv6 migration services; and
  - (e) a Network Operations Centre for member support services.<sup>179</sup>

### Product characteristics

- 7.3 IP-interconnection generally takes two forms:
- (a) peering agreements, which are commonly facilitated by Internet Exchange Points (**IXPs**); and
  - (b) transit agreements.
- 7.4 IXPs are commonly formed to facilitate peering. An IXP is a central place where multiple Internet service providers voluntarily agree to interconnect their respective networks. By participating in an IXP, Internet service providers are typically able to exchange traffic without having to buy transit from an upstream provider.<sup>180</sup> This appears to be the most common form of internet interconnection in Malaysia.
- 7.5 Transit can also be effected through a bilateral agreement where an Internet service provider extends full connectivity to the Internet for upstream and downstream transmission of traffic on behalf of another service provider or end user, including an obligation to carry traffic to third parties. Transit costs are typically incorporated into an end user’s bill and paid forward by the service provider to the upstream provider.<sup>181</sup>

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<sup>178</sup> See: MyIX, *Frequently Asked Questions* (accessed on 10 March 2014) available online at: < <http://myix.my/faq-page#t1n144>>

<sup>179</sup> See: MyIX, *Our Services* (accessed on 10 March 2014) available online at: <http://myix.my/our-services>

<sup>180</sup> BEREC, *An assessment of IP-interconnection in the context of net neutrality – draft report for public consultation* (29 May 2012) at page 23.

<sup>181</sup> BEREC, *An assessment of IP-interconnection in the context of net neutrality – draft report for public consultation* (29 May 2012) at page 18.



- 7.6 Peering is a bilateral agreement between Internet service providers to carry traffic for each other and for their respective customers. Peering does not include the obligation to carry traffic to third parties.<sup>182</sup>
- 7.7 The ACCC has also identified three of the more common peering models as follows:
- (a) 'sender keep all' (**SKA**) where providers agree to accept all Internet traffic addressed to their network without any charge;
  - (b) bilateral settlement where two networks share the cost of interconnection, negotiate a settlement rate and make payments based on the net volume of traffic. The settlement rate may be different depending on which network carries the most exchanged traffic, which is similar to existing international interconnection arrangements for voice and other data telephony; and
  - (c) multilateral settlement where Internet service providers pay their own interconnection costs to a central Internet exchange point and exchange traffic on either SKA or a bilateral basis.<sup>183</sup>

## Product dimension

- 7.8 The exchange of traffic between networks is fundamental for ensuring communication between users of different networks. On the demand side, because a single network operator is not able to connect to the worldwide Internet on its own, each operator relies on a series of interconnection agreements and IP traffic exchanges to line up traffic routes to reach an intended destination.
- 7.9 Entry barriers to this market tend to be relatively low. Although there is evidence of economies of scale and that the ability to reach traffic exchange or peering agreements may be helped by scale, this alone cannot be construed as preventing competition. Therefore, unlike the case of call origination and termination discussed above, the MCMC notes that it may be possible for providers to find alternative or substitute routes if network interconnection is prevented on a particular operator's network.
- 7.10 Further, IXPs, such as MyIX in Malaysia, also play a critical role in providing more efficient and cost-effective interconnection. The MCMC notes that currently all major network operators in Malaysia are members of MyIX.
- 7.11 In Europe, wholesale Internet interconnection is not currently viewed as a separate market in itself. However, the explanatory memorandum of the EC Recommendation on Relevant Products and Service Markets identifies that,

<sup>182</sup> BEREC, *An assessment of IP-interconnection in the context of net neutrality – draft report for public consultation* (29 May 2012) at page 19.

<sup>183</sup> ACCC, *ACCC's submission to the Productivity Commission's position paper on international telecommunications regulation* available online at: [http://www.pc.gov.au/data/assets/pdf\\_file/0020/55505/subdr020.pdf](http://www.pc.gov.au/data/assets/pdf_file/0020/55505/subdr020.pdf)

in some instances, obligations may be required to ensure the effectiveness of competition within particular markets.<sup>184</sup>

- 7.12 In the United Kingdom, General Condition 1 of the General Authorisation Regime requires all communications providers that offer public electronic communications networks to negotiate interconnection upon request from another communications provider.<sup>185</sup>
- 7.13 In defining the boundaries of a possible access market for IP-interconnection in Malaysia, the MCMC will consider the extent to which a network operator may be able to leverage the size of its network to dictate interconnection costs. However, the MCMC notes the moderating influence that MyIX has had on facilitating IP-interconnection between Internet service providers of varying sizes and preventing the artificial inflation of costs by the larger network operators.

## **Geographic dimension**

- 7.14 For the most part, wholesale Internet interconnection occurs domestically between Malaysian network operators. More specifically, Internet exchange occurs at the MyIX points of interconnection.
- 7.15 However, the MCMC also notes that some Malaysian operators may have both national and international networks, which allows for the provision and management of links that are capable of reaching all destinations in the global Internet. The extent of global reach has been considered by the MCMC when attempting to define the potential market for wholesale access to IP-interconnection.

## **Functional dimension**

- 7.16 The MCMC notes that two possible functional markets exist for the provision of broadband and data:
- (a) a market for the provision of retail and wholesale Internet services appears to exist (as discussed earlier in the Market Definition Analysis); and
  - (b) an access market for the provision of interconnection between Internet service providers, which is the focus of this section.
- 7.17 The inability of an operator to access another operator's network will hinder its ability to provide end users with effective retail broadband and data services. While it may still be possible to arrange alternative traffic routes over other networks, this will raise the cost of transmission which is likely to be passed on to consumers.

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<sup>184</sup> EC, *Explanatory note to the European Commission Recommendation on relevant Products and Service Markets* (2007) page 37.

<sup>185</sup> Ofcom, *Consolidated version of general conditions as at 26 December 2013 – Schedule to the notification under section 48(1) of the Communications Act 2003* at 1.1.

## **Final view**

- 7.18 The view of the MCMC is that there is a separate market for wholesale Internet interconnection exists and is not an associated service in relation to other markets (e.g. wholesale broadband and data markets).

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## **Part F Access to facilities and upstream network elements (Layer 0)**

### **1 Introduction**

- 1.1 Facilities access services and other upstream network elements (**UNEs**) provide access to the fundamental infrastructure and wholesale services that support the provision of midstream and downstream retail communications services. The access services and network elements discussed in this Part F reside at what is typically referred to as 'Layer 0', or the physical infrastructure layer of the OSI model.
- 1.2 Network infrastructure by its nature is very costly to build and often difficult or impractical to replicate. Similarly, most investments in telecommunications infrastructure are 'sunk' costs, which means that they can only be used for the particular purpose for which they were originally built. As such, economies of scale can be very important for a network owner to recoup its investments, which elevates barriers to entry for infrastructure-related communications market.
- 1.3 When considering the demand side and supply side substitution possibilities, it is important to note that the definition of communications market in the CMA relates to "access to facilities" not the facilities themselves. Accordingly, when considering substitution possibilities, the MCMC is considering the substitutability of access to that facility. For example, when considering exchanges, the MCMC will assess whether there are other options for obtaining access to those exchanges, not other options for building the exchange itself.
- 1.4 Access to the following facilities and UNEs is addressed in this Part F:
  - (a) access to lead-in ducts and manholes;
  - (b) access to inter-exchange ducts (as separate from lead-in ducts);
  - (c) access to towers;
  - (d) access to exchange buildings and co-location;
  - (e) access to submarine cable landing stations;
  - (f) access to earth stations;
  - (g) access to unbundling of local loop (**ULL**), sub-loops and line sharing;
  - (h) access to dark fibre;
  - (i) access to main distribution frames (**MDF**);
  - (j) access to in-building wiring (and associated facilities); and
  - (k) access to common in-building mobile systems.

- 1.5 The MCMC has considered the product dimension in respect of access to each of these facilities. In each case, the same functional and geographic dimensions apply as follows:
- (a) Functional dimension. Facilities access services are typically offered on a wholesale-only basis. There is no on-supply of facilities access to retail customers. This assumption is made when discussing the functional dimension of each 'layer 0' service, unless stated otherwise.
  - (b) Geographic dimension. On the supply side, each of the facilities described above form part of a network, which in most cases is a national network. This coincides with licensees' views which typically regard supply of access to network facilities as being provided at the national level. However, there are some exceptions described below, particularly in relation to access to towers, earth stations and submarine cable landing stations. While the MCMC acknowledges that on the demand side the licensee seeking access will want access to a particular location, the MCMC prefers to view access to facilities from the perspective of the network to which access is to be provided. Hence, the MCMC views the market from the supply side as being a national market.
- 1.6 Accordingly, the functional and geographic dimensions of the markets are not repeated below except where the MCMC has decided to move away from the approach described above.
- 1.7 The MCMC also acknowledges that the finding of markets and dominance in relation to access to facilities is somewhat influenced by access regulation. The MCMC will closely consider the impact of access regulation when considering dominance at a later time.

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## **2 Access to lead-in ducts and manholes**

### **Product characteristics**

- 2.1 Access to a particular network or end user location usually involves access through a lead-in duct or point of access.
- 2.2 A manhole is a hole, usually with a cover, through which a person may enter an underground utility vault used to house an access point for making cross-connections or performing maintenance on underground electronic communications cables.<sup>186</sup>

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<sup>186</sup> Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) page 317.  
Market definition analysis

- 2.3 The MCMC notes that in Singapore, lead-in ducts and manholes are regulated as Essential Support Facilities.<sup>187</sup>

## **Product dimension**

- 2.4 On the demand side, there are only a limited number of options that a licensee has to obtain access to a network location or an end user location.
- 2.5 For access to a network location, access to that location is usually only possible through a lead-in duct and manhole. Furthermore, due to the importance of connectivity to that network location, other demand side substitution possibilities such as aerial cabling will typically not be possible or relevant. Accordingly, a SSNIP in relation to the price of access to lead-in ducts and manholes is unlikely to result in an access seeker using alternative means of access to that particular network location.
- 2.6 For access to an end user location, other substitution possibilities such as access using aerial cabling to get into a particular location may be more common depending on the circumstances.
- 2.7 In addition, self-supply of access to lead-in manholes and ducts may also be a possibility for access to an end user location. However, the MCMC notes that this would not be a likely option due to the high barrier to entry and the likelihood that any self-built lead-in duct and manhole would need to be connected to inter-exchange or mainline ducting which, if owned by the access provider, might be refused by the access provider of the inter-exchange or mainline ducting.
- 2.8 On the supply side, these facilities are generally natural monopolies. The owner of the network location will always control access to that network location usually through the lead-in duct and manhole. Hence, there are usually no real supply side substitution possibilities in the case of supply of access to network locations.
- 2.9 For access to end user locations, as mentioned above it is possible that an owner of poles could offer access in the event of a SSNIP for access to its aerial facilities for the purposes of connecting to an end user location. Access to sewer facilities may also be an option for access to end user locations.

## **Final view**

- 2.10 The MCMC's view is that there is a national market for the wholesale supply of lead-in duct and manhole infrastructure which does not include aerial or sewer access to end user locations where available.

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<sup>187</sup> IDA, Code of Practice for Competition in the Provision of Telecommunication Services 2012, section 5.4, Appendix 2, Schedule of Interconnection Related Services and Mandated Wholesale Services

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### 3 Access to inter-exchange and mainline ducts

#### Product characteristics

- 3.1 Inter-exchange or mainline ducts are ducts used to connect larger exchanges and the main duct which run down streets and past homes (but not into homes, which are the lead-in ducts). Inter-exchange and mainline ducts are similar to lead-in ducts, except that they provide a conduit for cables that extend between two (or more) exchanges.
- 3.2 In Australia, the ACCC refers to “duct access services” more broadly, which includes access to an operator’s “network of ducts, tunnels, manholes and pits for the purpose of installing and operating access seeker cables and equipment.”<sup>188</sup>
- 3.3 Further, the ACCC also provides more specific examples of the types of services that could be included within the broader “duct access services”, including:
  - (a) ducts in which ‘External Interconnect Cables’ (**EICs**) are provided and ducts holding transmission cables between exchanges within a city; and
  - (b) lead-in conduits which hold the cable connecting the consumer premises to the local exchange or cabinet.<sup>189</sup> In the Malaysian context, the MCMC will consider these ducts as lead-in ducts as discussed in section 2 above.

#### Product dimension

- 3.4 On the demand side, there are generally no or limited substitution possibilities for access to inter-exchange and mainline ducts. In particular, an operator requiring access to inter-exchange ducting will not regard access to aerial facilities as a viable alternative option.
- 3.5 Access to aerial facilities (e.g. power poles) are more likely to be regarded as demand side substitutes for mainline ducts for rolling out networks past houses down the street. Similarly on the supply side, power and sewer owners may offer access to poles and ducts if a SSNIP occurred in relation to ducts used for telecommunications purposes.
- 3.6 However, the lack of substitutes for inter-exchange and mainline ducts does not mean that there is no competition in the provision of access to such facilities. For example, inter-exchange ducting was deregulated in Singapore a number of years ago because of the number of different ducting systems available from a range of power and road authorities in Singapore.

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<sup>188</sup> ACCC, *Fixed Services Review Discussion Paper on the Declaration Inquiry* (2013) at page 81.

<sup>189</sup> ACCC, *Fixed Services Review Discussion Paper on the Declaration Inquiry* (2013) at page 81.  
Market definition analysis

- 3.7 The MCMC has considered whether competition exists in the market for inter-exchange and mainline ducts when considering dominance in this market.

## **Final view**

- 3.8 The MCMC's views that there is a national market for the wholesale supply of inter-exchange and mainline ducts which includes access to aerial or sewer systems.

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## **4 Access to towers**

### **Product characteristics**

- 4.1 Tower access is principally required for the rollout of wireless technologies, whether by means of mobile, WiMAX or broadcasting transmission.
- 4.2 Tower access is principally required for wireless network rollout. It is important to consider the two main features relevant to the provision of the wireless services that are typically delivered by mobile network operators:
- (a) first is coverage of the service, where the coverage area of a base station determines the extent of service availability; and
  - (b) second is capacity of the service, where the number of concurrent users served is limited by the capacity of the base station.
- 4.3 The effect of these two components is that cell sizes tend to be significantly smaller in areas where there is a high density of users. The capacity of the base station limits the number of concurrent users. In regional areas, where the user density is low, cell sizes are larger and the range of the base station limits coverage.
- 4.4 As a practical matter, mobile network operators design their networks with a wide range of cell sizes. In Kuala Lumpur, there are very small cells serving a junction or a floor of a shopping mall (i.e. picocells) through to small cells (i.e. nanocells) and larger cells which cover a stretch of freeway (i.e. macrocells).

### **Product dimension**

- 4.5 On the demand side, a mobile operator requiring tower access can obtain access to a third party tower or build its own tower. In some locations, the mobile operator can acquire access to a rooftop or other mast-like facility (e.g. an antenna on a bridge or telecommunications tower).
- 4.6 However, towers are usually the preferred method of rolling out infrastructure, particularly in non-urbanised areas and along highways and busy thoroughfares. Accordingly, access seekers are faced with many of the same issues that pertain to other network facilities when seeking access to



third party towers, namely that they are difficult and costly to replicate in a particular area which often leads to each tower site forming a natural monopoly.

- 4.7 On the supply side, the MCMC considers it impractical and unlikely that in the event of a SSNIP in the price of tower access, a provider of alternative infrastructure such as rooftops would enter the tower market. Rooftops are usually controlled by building owners that are seeking incidental revenue and are not generally controlled by a focussed company seeking to promote access to space and other forms of access such as tower access.
- 4.8 As discussed above, self-supply also remains an option, except in areas where self-supply is difficult or regulated in such a way that it becomes impossible to do so.
- 4.9 Accordingly, the MCMC's view is that the product dimension is tower access, including rooftops and mastheads where available.

## **Geographic dimension**

- 4.10 The ability to either obtain access to towers or to rollout and self-build towers is not uniform across Malaysia. There is a key difference in the way towers are owned and operated in Malaysia in comparison to other network infrastructure, which is that they are often owned by state-controlled entities. This has implications on the geographic dimension in the market for towers.
- 4.11 In several states, towers are owned and operated predominantly by state-based entities. In some cases state-based ownership within a particular state was found to be as much as 95%.<sup>190</sup>
- 4.12 The MCMC also understands that some states restrict the building of towers to the state-owned companies. The MCMC acknowledges that there may be environmental reasons for centralising tower access through one particular company. However, the point remains that the field of rivalry is limited by these restrictive regulations and hence the geographic dimension of the market may be limited to the boundaries of these states where regulation is different to other locations in Malaysia.
- 4.13 Several communication providers have claimed that the state-based ownership model for the provision of tower services in several states has led to higher costs for gaining access to those towers.<sup>191</sup> It should be acknowledged that the merits of these complaints are largely unsubstantiated at this point, particularly since one state-based tower operator that responded to the MCMC's questionnaire also claimed to be a price leader in its provision of tower services.<sup>192</sup> However, if true, the ability to exercise price independence in a particular region or state would

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<sup>190</sup> Sacofa, *Response to MCMC Questionnaire* at 2.1(b).

<sup>191</sup> For example, see questionnaire responses from Telecom Malaysia.

<sup>192</sup> Sacofa, *Response to MCMC Questionnaire* at 2.1(d).

support the idea of regional (e.g. city-based or state-based) markets rather than a national market for towers.

- 4.14 The MCMC also notes that in some limited circumstances a case may be made that an individual market exists for a particular tower where it is impractical or infeasible to establish a second tower in the area. For example, the KLCC towers in Kuala Lumpur may or may not be considered as having an individual geographic market due to its level of coverage and the impracticalities of building a rival tower nearby.
- 4.15 However, for the most part, the MCMC considered the geographic market for towers to align with state-based boundaries depending on the particular circumstances of the tower.

## **Final view**

- 4.16 The MCMC's view is that there is a state-based geographic market for access to towers, mastheads and rooftop space.

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## **5 Access to co-location at exchange buildings**

### **Product characteristics**

- 5.1 Exchange buildings are a function of the PSTN network, where interconnection takes place to establish telephone calls between subscribers.
- 5.2 Access to co-location space and facilities at exchange buildings will generally be required in two circumstances:
- when interconnection with a particular network is required; and
  - when access to the network elements (e.g. ULL and line sharing services, as discussed further below) of the owner of the exchange building is required.
- 5.3 The ACCC has identified a number of elements that are typically offered as part of an 'equipment building access service' (which is roughly equivalent to exchange building access and co-location) in Australia:
- (a) the provision of access to floor space and equipment racks or rack space;
  - (b) the provision of access to cable trays and the internal interconnection cables contained in them, so that internal interconnection may be performed to connect access seeker equipment (e.g. DSLAMs) to the network operator's fixed line equipment (e.g. the MDF) within the exchange; and

- (c) the inclusion of power, security and air-conditioning.<sup>193</sup>

## **Product dimension**

- 5.4 On the demand side, there is usually no alternative to obtaining access to the co-location facilities provided by the access provider.
- 5.5 For interconnection purposes, access at that exchange building is required in some form. There are other forms of interconnection that may be possible as discussed in Part D above in relation to the market for the interconnect link service (e.g. in-span interconnection). However, economically, the most efficient form of interconnection will usually involve the provision of access to exchanges, including co-location facilities as described above.
- 5.6 However, for access to network elements, due to the distance limitations associated with xDSL services, access to a particular node or exchange building is essential to connect directly with the copper network so as to be able to provide those xDSL services.
- 5.7 On the supply side, access to exchanges form a natural monopoly and there are no real supply side substitutes. Transit providers may be able to provide an alternative means of interconnecting with another network, although this form of interconnection is unlikely to be efficient in many circumstances. Direct forms of interconnection are preferred from an efficiency perspective.
- 5.8 Accordingly, the MCMC currently considers that there is a market for access to co-location at exchange buildings.

## **Final view**

- 5.9 The MCMC's view is that there is a national market for the wholesale supply of co-location services at exchange buildings.

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# **6 Access to submarine cable landing stations and earth stations**

## **Product characteristics**

- 6.1 Earth stations are buildings which transmit radio frequency signals to, or receive such signals from, a geostationary space station in specified frequency bands.<sup>194</sup>
- 6.2 In a report written for the ACCC in Australia, a landing station was defined as:

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<sup>193</sup> ACCC, *Fixed Services Review Discussion Paper on the Declaration Inquiry* (2013) at page 81.

<sup>194</sup> ITU, *Determination of the coordinate area of an earth station operating within a geostationary space station and using the same frequency band as a system in a terrestrial service* (Recommendation ITU-R IS.847-1).  
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*"A form of telecommunications building located in the vicinity of the shoreline for the purpose of housing specialist undersea cable telecommunications transmission equipment. In this instance the Landing Station is defined to include beach access facilities that protect the undersea optical fibre cable as it comes ashore."*<sup>195</sup>

- 6.3 In relation to submarine cable landing, the landing will either be direct (in the case of a point-to-point cable system) or via a branch from a main cable using a submarine branching unit. In either case, the location of the landing station will be fixed to the point of connection with the main or branch cable system.

## **Product dimension**

- 6.4 Access to earth stations and submarine cable landing stations exhibit the same demand side characteristics as access to exchange buildings, although access issues may in fact be heightened at earth stations and submarine cable landing stations due to their remoteness.
- 6.5 At times, owners of these facilities may only offer access at a point-of-presence located in an urban location rather than at the cable landing station or earth station itself. However, the MCMC does not regard this as an economically efficient demand side substitute.
- 6.6 On the supply side, access to submarine cable landing stations and earth stations exhibit natural monopoly characteristics. The cost of a new entrant installing a rival or substitute station is impractical and infeasible and, in the case of access to a submarine cable landing station, is usually not permitted by the consortium agreement which governs the landing of the cable (i.e. the consortium will have appointed a specific landing party).
- 6.7 As such, both landing stations and earth stations will typically be viewed as without true substitutes and as natural monopolies. Again, transit options are possible, however the MCMC does not regard these as economic substitutes in this case.

## **Geographic dimension**

- 6.8 The MCMC has considered whether there is a national market for access to cable landing stations and earth stations. Unlike other network infrastructure, cable landing stations and earth stations exhibit characteristics of bottleneck facilities due to their particular location and accessibility to particular cable systems or satellites.
- 6.9 The MCMC is of the view that access to alternative geographic locations (whether they are points of presence in urbanised areas or other cable landing stations or earth stations) are not substitutable for access to a particular cable landing station or earth station. This is because access to a

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<sup>195</sup> Gibson Quai – AAS Consulting, *ACCC Transmission network cost model description of operation* (2007) at ix.  
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submarine cable or satellite is usually most efficiently obtained at that particular landing station or earth station.

- 6.10 Accordingly, the MCMC is of the view that access to each and every submarine cable landing station and satellite earth station is a natural monopoly and each represent individual markets.

## Final view

- 6.11 The MCMC's view is that the wholesale supply of access to each and every submarine cable landing station and satellite earth station is a natural monopoly and each represent individual markets.

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## 7 Access to full access (unbundling of local loop), sub-loop, line sharing and bitstream services

### Product characteristics

- 7.1 ULL, sub-loops and line sharing generally refers to the network of lines that run from an end user's premises to the local exchange.<sup>196</sup> The local loop may be in the form of copper pairs or optical fibre.
- 7.2 In Malaysia, the Line Sharing Service, the Bitstream Service, the Full Access Service and the Sub-loop Service are on the MCMC's Access List.
- 7.3 In Australia, an unconditioned local loop service (which is equivalent to ULL) provides full access to cables (e.g. twisted copper pairs) between:
- (a) the boundary of a communications grid (e.g. the PSTN) at or near the end user property; and
  - (b) a potential point of interconnection that is related to a "customer access module" or any other device that provides a dial-tone and dial current to end user equipment. The ACCC defines a 'customer access module' as a "device that provides ring tone, ring current and battery feed to customers' equipment."<sup>197</sup>
- 7.4 In Europe, unbundled access to the local loop is regulated under Regulation No 2887/2000.
- 7.5 The Sub-loop service, Unbundling of Local Loop and Line Sharing Service provide access to the copper cables so that an Access Seeker may connect Digital Subscriber Line Access Multiplexers (**DSLAMs**) to those loops to provide an xDSL service to end users connected to those cables.

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<sup>196</sup> EC, 'Directive 2002/12/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities, *Official Journal of the European Communities* (7 March 2002) at Annex II.

<sup>197</sup> ACCC, *Fixed Services Review Discussion Paper on the Declaration Inquiry* (2013) at page 55-56.

- 7.6 Purchasers of an ULL service must provision their own equipment to the fixed cable lines, which allows each access seeker to construct and tailor their services to meet customer needs to differentiate themselves from competitors. For example, an access seeker may wish to provide a mix of voice and broadband services, high speed broadband only, etc.
- 7.7 ULL also allows the access seeker to utilise both high and low frequency bands available over the fixed line which can be used to provide broadband services and voice telephony services.
- 7.8 In many ways, a line sharing service is similar to a ULL service. Line sharing services also provide access to fixed communications cables and are provided on an unconditional basis between:
- (a) the boundary of a telecommunications grid at or near the customer's premises; and
  - (b) a potential point of interconnection that is related to a "customer access module."<sup>198</sup>
- 7.9 Line sharing services typically require an access seeker to provide their own equipment in order to deliver services over the relevant communications cables.
- 7.10 However, unlike ULL services, line sharing services only utilise the high frequency bands (i.e. 20,000+ Hertz) of the communications wire it is being delivered over. In this way, these services cannot be used to provide traditional voice services, which require carriage over the lower frequency band of the cable.
- 7.11 Therefore, because line sharing services only use the higher frequency bands, the line is typically shared with another retail service provider who delivers voice services to the end user on the same line. This effectively allows two different access seekers to provide two different services to the same end user, over the same communications cable.
- 7.12 Bitstream services provide access to those lines at Layer 2 of the OSI model. This service still provides access seekers with the ability to provide an xDSL service to their end users, but by acquiring a Layer 2 rather than a Layer 1 service.

## **Product dimension**

- 7.13 On the demand side, the MCMC considered all of the sub-loop services, line sharing services, bitstream services and the local loop service in a single product market. This is because all of these local access services provide access to the last mile. It is likely that if there is a SSNIP in relation to one of these services then an access seeker may attempt to acquire one of the alternative local access services on offer.

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<sup>198</sup> ACCC, *Fixed Services Review Discussion Paper on the Declaration Inquiry* (2013) at page 56.  
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- 7.14 The MCMC does not consider that wholesale resale of DSL services or the resale of local telephony services are substitutable for access to these local access services. As discussed in Part A above, resale of these services does not provide access seekers with the functionality and control that is required to effectively compete with the owner of this local access infrastructure. Access to these resale services may be a step on the ladder of investment, but this does not mean that they will comprise a viable, economic substitute.
- 7.15 Furthermore, the MCMC does not consider that access to ducts (including lead-in ducts) is a substitute for access to this local access infrastructure. Access to ducts would require an access seeker to self-provide the copper or fibre infrastructure in the “last mile”. The MCMC considers this to be highly unlikely given the very high barriers to entry in the last mile.
- 7.16 On the supply side, the local loop or “last mile” exhibits strong monopolistic characteristics as mentioned above. Accordingly, the MCMC considers it to be highly unlikely that any person would move into the supply of local access infrastructure if there was a SSNIP in relation to any or all of the services listed above.

## **Final view**

- 7.17 The MCMC’s view is that there is a single national market for the wholesale provision of local access services, namely ULL, bitstream services, sub-loop services and line sharing services.
- 7.18 The MCMC does not consider access to resale services, such as wholesale DSL or wholesale telephony services, to be a substitute for access to these local access services.

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## **8 Access to dark fibre**

### **Product characteristics**

- 8.1 Dark fibre is fibre optic cabling that is not being used to transmit information and constitutes a passive network element. Fibre optic cables transmit data via a series of light pulses and therefore an unused cable is referred to as ‘dark’ or ‘unlit’.<sup>199</sup>
- 8.2 Operators will typically purchase dark fibre capacity at a wholesale level and then install their own equipment to ‘light’ the fibre and utilise the fibre to design and provide communications services.

### **Product dimension**

- 8.3 In identifying a market for dark fibre in Malaysia, the MCMC has considered the extent to which other passive infrastructure networks are able to

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<sup>199</sup> PTS, *Dark Fibre – market and state of competition* (June 2008) at pages 42-43.  
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effectively compete with dark fibre. The potential demand side product substitutability of pre-existing copper networks or radio links has been taken into account by the MCMC when making an assessment of the appropriate market for access to dark fibre.

- 8.4 This is the approach currently applied in Sweden by the Swedish Post and Telecom Authority (**PTS**). In particular, the PTS states that the following alternatives to dark fibre should be considered when assessing possible substitutes for the purpose of a market definition analysis:
- (a) rollout of a rival optical fibre network;
  - (b) use of other passive physical (fixed) infrastructure, such as copper or power line networks;
  - (c) use of other passive physical (wireless) infrastructure, such as radio links or mobile networks; and
  - (d) use of other electronic communications services active infrastructure, such as wavelengths and leased lines.<sup>200</sup>
- 8.5 If a SSNIP test were applied in relation to dark fibre, the MCMC considers it likely that other older technologies would be found not to be substitutable for dark fibre as the transmission capacity of dark fibre far outstrips the capacity of legacy copper and radio link technologies.
- 8.6 A similar finding is made by the PTS in its assessment of the alternatives listed above. The PTS concludes that there are currently no effective substitutes for the wholesale dark fibre services, and that “the product market is therefore limited to encompassing dark fibre.”<sup>201</sup>
- 8.7 The MCMC’s view is that other passive infrastructure is not a substitute for access to dark fibre.
- 8.8 The MCMC has also considered whether inter-exchange transmission services and tail transmission would act as a substitute for access to dark fibre. The MCMC accepts that dark fibre and transmission services are often considered as alternatives by parties seeking access to this infrastructure.
- 8.9 However, the MCMC considers that in most cases, a SSNIP in relation to inter-exchange transmission or tail transmission (depending on the segment of the network to which access is sought) would not lead to substitution to a dark fibre service. This is because the pricing of inter-exchange transmission and tail transmission is usually significantly higher than the pricing of dark fibre services.
- 8.10 The pricing of transmission services usually only approaches the price of dark fibre services when the acquiring party has a serious build-buy choice and the network infrastructure owner reduces the price of transmission to avoid the acquiring party from building its own infrastructure. This scenario

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<sup>200</sup> PTS, *Dark Fibre – market and state of competition* (June 2008) at pages 44.

<sup>201</sup> PTS, *Dark Fibre – market and state of competition* (June 2008) at pages 48.  
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is the exception rather than the rule and in the MCMC's view only occurs at the boundaries of the market.

- 8.11 Accordingly, it is the MCMC's view that access to transmission services, such as inter-exchange transmission and tail transmission services, is not substitutable for access to dark fibre and that wholesale dark fibre is in a separate product market.

## **Final view**

- 8.12 It is the MCMC's view that there is a national market for the provision of wholesale access to dark fibre services.
- 8.13 The MCMC's view is that access to transmission services or other passive infrastructure is not substitutes for access to dark fibre services at this time.

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## **9 Access to MDFs and in-building wiring**

### **Product characteristics**

- 9.1 An MDF is the frame on which incoming main cables and local distribution cables within an end user building or premises are terminated and cross-connected.<sup>202</sup> In-building wiring refers to the internal wiring that is installed within an end user premises.

### **Product dimension**

- 9.2 Access to MDFs and in-building wiring are often referred to as the "last mile" in that these facilities are effectively the final leg of a telecommunications network at which communications connectivity is delivered to end users. The "last mile" is generally considered as a natural monopoly and thus involves high and non-transitory entry barriers.<sup>203</sup>
- 9.3 On the demand side, the MCMC considers that there are limited substitutes for access to MDFs and in-building wiring. Other forms of building access by way of microwave or other wireless services are unlikely to be a substitute for fixed services, for the reasons expressed elsewhere in this paper.
- 9.4 On the supply side, the MCMC acknowledges that other suppliers may enter the market in response to a SSNIP. However, these suppliers would be likely to provide the same facilities as offered by the existing suppliers of in-building wiring and MDFs, if there was space available. If space is not available in the building, which is often the case, then there are likely to be very limited supply side substitutes.

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<sup>202</sup> Section 1.2, *IDA Code of practice for info-communication facilities in-building 2012*.

<sup>203</sup> Ecorys, *Future electronic communications market subject to ex-ante regulation: final report* (18 September 2013) page 78.

## Final view

- 9.5 It is the MCMC's view that wholesale access to MDFs and in-building wiring constitutes a separate national market.

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## 10 Access to common in-building mobile systems

### Product characteristics

- 10.1 The continued growth of indoor mobile data consumption is forcing mobile operators to find solutions to improve indoor mobile coverage and the reliability of in-building mobile services.
- 10.2 Ofcom recently identified two basic approaches to improve in-building mobile coverage:<sup>204</sup>
- (a) "outside-in" solutions, where the user receives a mobile signal from a network outside of the building, which typically entails some form of upgrade or enhancement to the existing outdoor cellular network; and
  - (b) "inside-in" solutions, where dedicated in-building solutions are provided so that the user receives a mobile signal from an access point within the building which is dedicated to serving that particular building.
- 10.3 This section is focused on the latter solution (i.e. "inside-in" solutions) as these typically involve some form of sharing between mobile operators of common in-building systems and other cellular infrastructure.

### Product dimension

- 10.4 On the demand side, as discussed above, a mobile operator may seek to improve indoor mobile coverage by undertaking an "outside-in" or an "inside-in" solution. However, while both of these solutions may improve the reliability of indoor mobile services, the MCMC notes that "outside-in" solutions will typically be limited in the penetration that they can achieve into buildings and the level of service that they are able to provide across multiple floors.<sup>205</sup> This form of coverage can be unreliable and that there is a high level of attractiveness to both mobile operators and users for in-building coverage. The MCMC does not view such external mobile solutions as a viable substitute to access to common in-building mobile systems.
- 10.5 On the supply side, where space is available in the building, it may be possible for other suppliers to build a competing in-building mobile solution in response to a SSNIP. However, the MCMC notes that the supply of any rival common in-building mobile services would likely be duplicating the

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<sup>204</sup> Ofcom, *Options for improving in-building mobile coverage – final report* (18 April 2013) at 35-36.

<sup>205</sup> Ofcom, *Options for improving in-building mobile coverage – final report* (18 April 2013) at 36.

same facilities that are already offered by the existing suppliers. Further, in some cases space may not be readily available in the building, which would also serve to limit supply side substitutes. Accordingly supply-side substitution is likely to be limited both economically and physically.

### **Final view**

- 10.6 It is the MCMC's view that wholesale access to common in-building mobile systems constitutes a separate national market.

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## **11 Summary of markets for access to network facilities and UNEs**

### **Final view**

- 11.1 The MCMC is of the view that there are separate and distinct markets for wholesale access to the following facilities and UNEs:
- (a) access to lead-in ducts and manholes;
  - (b) access to inter-exchange ducts (as separate from lead-in ducts);
  - (c) access to towers;
  - (d) access to exchange building access and co-location;
  - (e) access to submarine cable landing stations and earth stations;
  - (f) access to local access services, including ULL, sub-loops, line sharing and bitstream services;
  - (g) access to dark fibre;
  - (h) access to MDFs and associated in-building wiring (and other in-building facilities); and
  - (i) access to common in-building mobile systems.
- 11.2 Each of the above markets is an individual market except:
- (a) access to towers to be a state-based geographic market;
  - (b) national market for lead-in ducts and manholes;
  - (c) national market for access to inter-exchange and mainline ducts;
  - (d) national market for access to local access services; and
  - (e) national market for access to dark fibre.