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Study of mobile telecommunications markets in New Zealand

Issues Paper

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CONTENTS

CHAPTER 1 – INTRODUCTION AND CONTEXT FOR OUR STUDY OF MOBILE MARKETS IN NEW ZEALAND	5
PURPOSE OF THIS ISSUES PAPER.....	5
PURPOSE AND OUTCOMES OF THIS STUDY	5
STRUCTURE OF THIS ISSUES PAPER.....	6
LEGAL FRAMEWORK FOR OUR STUDY	6
CURRENT PROGRESS AND TIMELINE FOR THE COMPLETION OF THIS STUDY.....	7
SUBMISSIONS	7
CHAPTER 2 – MOBILE NETWORKS AND MOBILE SERVICES	9
PURPOSE OF THIS CHAPTER	9
MOBILE NETWORKS	9
MOBILE SERVICES	10
PROVIDERS OF MOBILE SERVICES	12
MOBILE REGULATORY SETTINGS.....	13
CHAPTER 3 – FRAMEWORK FOR THE STUDY.....	16
PURPOSE OF THIS CHAPTER	16
EVOLUTION AND CURRENT STATE OF THE SUPPLY OF MOBILE SERVICES	16
ENTRY AND EXPANSION CONDITIONS AND REGULATORY SETTINGS.....	16
CONSUMER BEHAVIOUR AND ENGAGEMENT IN RELATION TO MOBILE SERVICES	17
POSSIBLE FUTURE DEVELOPMENTS AND THEIR POTENTIAL IMPACTS ON COMPETITION.....	17
CHAPTER 4 – THE DEVELOPMENT OF MOBILE SERVICES AND COMPETITION IN NEW ZEALAND ...	18
PURPOSE OF THIS CHAPTER	18
MARKET STRUCTURE.....	18
MARKET SHARES	19
BUNDLING OF MOBILE SERVICES	23
PRICING	25
USAGE TRENDS.....	28
INVESTMENT	30
QUALITY OF MOBILE SERVICES	32
CHAPTER 5 – ENTRY AND EXPANSION CONDITIONS AND REGULATORY SETTINGS.....	34
PURPOSE OF THIS CHAPTER	34
MVNO BASED ENTRY.....	34
MNO BASED ENTRY	38
CHAPTER 6 – CONSUMER ENGAGEMENT AND SATISFACTION WITH MOBILE SERVICES.....	45
PURPOSE OF THIS CHAPTER	45
THE ABILITY OF CONSUMERS TO TAKE ADVANTAGE OF COMPETING RETAIL OFFERS	45
CUSTOMER SATISFACTION	52
CHAPTER 7 – POSSIBLE FUTURE DEVELOPMENTS AND THEIR IMPACTS ON COMPETITION AND MARKET OUTCOMES.....	55
PURPOSE OF THIS CHAPTER	55
EMERGING TRENDS.....	55
DEVELOPMENT OF 5G NETWORKS	55
INFRASTRUCTURE SHARING.....	59
NETWORK SLICING	62
SPECTRUM ISSUES.....	63
E-SIMS	65
CHAPTER 8 – CONSOLIDATED QUESTIONS.....	68

Glossary of Terms

2G	2 nd Generation mobile communications technology
3G	3 rd Generation mobile communications technology
3GPP	3 rd Generation Partnership Project – international body that governs cellular standards
4G	4 th Generation mobile communications technology
5G	5 th Generation mobile communications technology
ACCC	Australian Competition and Consumer Commission
ACMA	Australian Communications and Media Authority
ARPU	Average revenue per month per user/subscriber
BEIS	Department for Business, Energy and Industrial Strategy – government department in the United Kingdom
BEREC	Body of European Regulators for Electronic Communications
CDMA	Code-Division Multiple Access – a 2G mobile phone standard developed in the United States
CDR	Consumer Data Right
DoJ	Department of Justice – federal executive department of the United States government
Ethernet	Local area network technology
FTTH	Fibre-to-the-home – use of optical fibre from a central point directly to individual buildings
FWA	Fixed wireless access – type of wireless broadband data communication which is performed between two fixed locations
GB	Gigabyte. 1 gigabyte = 1024 megabytes
GHz	Gigahertz. 1 gigahertz = 1000 megahertz
GSM	Global System for Mobile communications
GSMA	Trade body that represents the interests of mobile network operators worldwide
IoT	Internet-of-Things – the network of physical and virtual objects accessed through the internet
ITU	International Telecommunications Union – United Nations agency for information and communications technologies
LoRa	Long Range
LTE	Long Term Evolution – a name given to the fourth generation of mobile technology that can provide high-speed mobile broadband
MB	Megabyte – a multiple of the unit byte for measuring the quantity of digital information
MBIE	Ministry of Business Innovation and Employment
Mbps	Megabits per second – used to measure data transfer speeds
MBSF	Mobile Black Spot Fund – government fund to provide greater mobile coverage on state highways and in tourism locations where no coverage currently exists
MHz	Megahertz

MNO	Mobile Network Operator – an operator that owns or controls all the elements necessary to deliver services to consumers, including radio spectrum and the wireless network infrastructure
MTAS	Mobile Termination Access Services – a regulated service that provides for the termination on a cellular mobile telephone network of voice calls and SMS messages, including price and non-price terms
MTR	Mobile Termination Rates – the wholesale prices for the MTAS
MVNO	Mobile Virtual Network Operator – an operator that provides mobile services but does not generally have its own radio spectrum or much of the infrastructure required to provide mobile services. It therefore relies on buying services from an operator with a full mobile network. The amount of control it has over the services it offers will vary according to the nature of its agreement
Naked broadband	A fixed line broadband service provided without a traditional analogue voice service also being provided over the same line
NCS	National Consumer Survey – consumer survey undertaken by MBIE.
NRA	National Regulatory Authorities
NZIER	NZ Institute of Economic Research
OECD	Organisation for Economic Co-operation and Development
Ofcom	Office of Communications – the regulatory and competition authority for broadcasting, telecommunications and postal industries in the United Kingdom
OTT	Over-the-top – refers to content and applications provided from a third party and delivered to an end user device, leaving the retailer responsible only for transporting IP packets
RAN	Radio access network
RBI (RBI1 and RBI2)	Rural Broadband Initiative – an initiative in two stages where the government partners with private sector telecommunications operators to upgrade or extend telecommunications networks in rural areas
RCG	Rural Connectivity Group – a joint venture between 2degrees, Spark and Vodafone who have a contract with the government under RBI2 and the MBSF
RSM	Radio Spectrum Management – business unit of MBIE responsible for managing radio spectrum
SIM	Subscriber Identity Module card – commonly known as a SIM card that contains a microchip that stores data that identifies the user, for use in GSM and compatible 3G mobile phones
SMS	Short Message Service – commonly known as a text messaging, is a service for sending short messages between mobile devices
STD	Standard Terms Determination
UMTS	Universal Mobile Telecommunications System – the 3G successor to the 2G GSM standard, which allows voice telephony, mobile internet access, fixed wireless internet access, video calls and mobile TV
UFB	Ultra-Fast Broadband – the name given to the Government’s initiative to roll out a fibre-to-the-premise access network to give households and businesses access to very high-speed broadband
W-CDMA	Wideband Code Division Multiple Access – third generation mobile phone standard
WiFi	Wireless Fidelity Standard – a series of standards for a popular technology that allows electronic devices to exchange data wirelessly (using radio waves), including allowing mobile devices to connect to high speed internet connections.

Chapter 1 – Introduction and context for our study of mobile markets in New Zealand

Purpose of this issues paper

1. This issues paper is part of our study into mobile markets in New Zealand.¹
2. This paper presents our initial observations and analysis of the performance of mobile markets and emerging developments, and considers their potential impact on competition and market outcomes.
3. We have taken into account the submissions received on our terms of reference² for the study, and other information that we have referenced throughout this paper.

Purpose and outcomes of this study

4. We are undertaking a study of mobile markets in New Zealand (study), to gain a better understanding of how mobile markets are currently performing and developing, and to consider how the mobile landscape may evolve in the future.³
5. This study will help us build an evidence base so that we can track relevant trends and identify whether there are any current or potential barriers to competition delivering benefits for consumers of mobile services in New Zealand.
6. As a result of this study, we expect to be better placed to ensure that any future market interventions, if required, are appropriate and proportionate. We anticipate that we will be able to:
 - 6.1 identify areas in the mobile markets that might require more/less focus on an ongoing basis;
 - 6.2 inform policy makers, industry and consumers of the performance of the mobile markets on an ongoing basis through regular monitoring and reporting of market performance and development;
 - 6.3 consider whether any regulatory measures (including deregulation) may be appropriate⁴;
 - 6.4 if necessary, recommend legislative changes;
 - 6.5 recommend appropriate industry self-regulation; and

¹ Throughout this issues paper, we refer to the market in which mobile services are supplied. We do not consider that a formal definition of the dimensions of the relevant market (as might be undertaken for the purposes of Part 2 or Part 3 of the Commerce Act) is required for this study.

² Full submissions can be found at <http://www.comcom.govt.nz/regulated-industries/telecommunications/monitoring-reports-and-studies/mobile-market-study/>

³ Commerce Commission “Scope for our study of mobile telecommunications markets in New Zealand” (27 March 2018), paragraph 2.

⁴ This is not limited to regulation within our mandate. Where appropriate, we may advise other agencies of our views.

- 6.6 consider whether any investigations into potential breaches of the Fair Trading Act 1986, Part 2 of the Commerce Act 1986 or Credit Contracts and Consumer Finance Act 2003 may be required.

Structure of this issues paper

7. The structure of this issues paper is summarised below:
- 7.1 Chapter 2 provides background on mobile networks and mobile services;
 - 7.2 Chapter 3 sets out the framework that we intend to use to undertake this study;
 - 7.3 Chapter 4 describes the evolution of mobile networks and mobile services in New Zealand, and how competition in the supply of those services has developed to date;
 - 7.4 Chapter 5 considers entry and expansion conditions and current regulatory settings in relation to the supply of mobile services;
 - 7.5 Chapter 6 examines consumer behaviour and engagement in relation to mobile services and regulatory settings;
 - 7.6 Chapter 7 explores possible future developments and their potential impacts on competition; and
 - 7.7 Chapter 8 contains a consolidated list of the questions raised throughout this paper.

Legal framework for our study

8. We are conducting this study under section 9A of the Telecommunications Act 2001 (Telecommunications Act). Section 9A sets out that we:
- a) must monitor competition in telecommunications markets and the performance and development of telecommunications markets; and
 - b) may conduct inquiries, reviews, and studies (including international benchmarking) into any matter relating to the telecommunications industry for the long-term benefit of end-users of telecommunications services within New Zealand; and
 - c) must make available reports, summaries, and information about the things referred to in paragraphs (a) and (b) above.
9. One of the ways we use section 9A studies is to gather information about, and develop our understanding of, telecommunications markets.

Current progress and timeline for the completion of this study

Progress to date

10. On 6 October 2017, we announced that we were undertaking a study of mobile markets in New Zealand, and we invited interested parties to submit on our proposed terms of reference for the study.
11. We received submissions from 2degrees, Blue Reach, Chorus, InternetNZ, New Street Research, Spark, Trustpower, Vocus, Vodafone and WISPA New Zealand. These submissions are available on our website.
12. Following the submissions on the terms of reference, we published our scope paper on 27 March 2018, and indicated that we would publish an issues paper and seek submissions.
13. This issues paper provides a high level summary following the initial information gathering and issue analysis phase of this study.

Next steps

14. Following the publication of this issues paper, we intend to request specific information from parties in order to inform our analysis and findings in this study.
15. After considering the submissions on this issues paper, we may need to seek further information from parties to help us progress the study.
16. We anticipate providing an update on the study before the end of the year, and will consider holding a conference in early 2019 if we think it would be useful.

Submissions

17. We are interested in your views and evidence in response to the questions and issues raised throughout this paper. The questions are also consolidated in Chapter 8 for ease of reference.
18. We also encourage submissions on any other issues that parties consider should be taken into account during this study, having regard to the purpose and outcomes set out in paragraphs 4 to 6 above.
19. Please send your submission to us by 5pm on 12 October 2018, and address your submission to Andrew Harrison, c/o regulation.branch@comcom.govt.nz.
20. We anticipate that there will be important information of relevance to the mobile market study that is commercially sensitive. If you wish to provide commercially sensitive information in your submission, we request that you provide multiple versions of your submission.

21. When including commercially sensitive information in your submission, we offer the following guidance:
 - 21.1 Please provide a clearly labelled “confidential version” and “public version”. This is because we intend to publish all public versions on our website.
 - 21.2 The responsibility for ensuring that confidential information is not included in a public version of a submission rests entirely with the party making the submission.
 - 21.3 If the Commerce Commission considers that disclosure of information that has been provided in the confidential version may be necessary for the public interest; we will consult with the party that provided the information before any such disclosure is made.

Chapter 2 – Mobile networks and mobile services

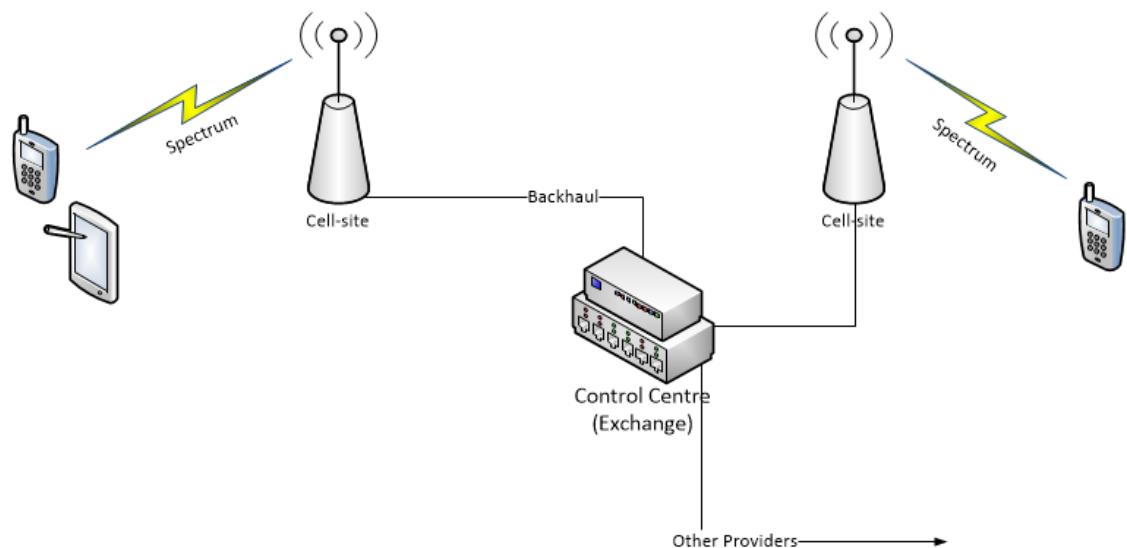
Purpose of this chapter

22. This chapter introduces and briefly describes the services within the scope of our study. We discuss the components of a mobile telecommunications network and the services that are supplied over it. We distinguish between mobile services (which do not depend on the location of the consumer's device) and fixed wireless services (which do). We also summarise the different types of providers of mobile services as well as the current regulatory framework.

Mobile networks

23. A mobile network (or a cellular network) is a communications network where the last link is wireless. Figure 1 illustrates the key elements of a mobile network.

Figure 1: Mobile network



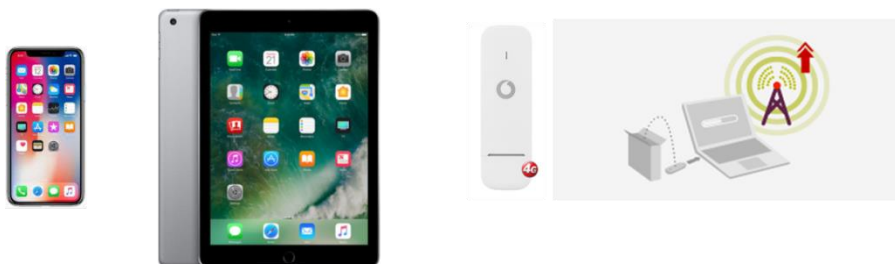
24. In a mobile network, the overall area covered by the network is divided up into smaller areas called cells. Each cell is served by a fixed transmitter/receiver called a base station, which is located at a cell site. User devices such as cell phones or wireless routers use the base stations to communicate over the cellular network.
25. Mobile services and mobile network architectures have undergone significant evolution since mobile networks were first deployed. Depending on the specific region of the world, different sets of standards were adopted for each network generation. In Europe and most of the world, the Global System for Mobile (GSM) standard was used for the second generation (2G) of mobile systems. This later evolved to the Universal Mobile Telecommunications System (UMTS) for the third Generation (3G) and Long Term Evolution (LTE) for 4G. In the USA, the CDMAOne standard became the dominant 2G system which later evolved to CDMA2000 for 3G and LTE for 4G.

26. New Zealand Mobile Network Operators (MNOs) currently use the GSM, UMTS and LTE systems for their 2G, 3G and 4G networks respectively. Most mobile services in New Zealand use 3G or 4G networks, with 2G either already decommissioned or being progressively phased out.
27. Spectrum is a critical input to the deployment of a mobile network, and refers to the radio frequencies allocated to the mobile industry and other sectors for communication over the air.
28. MNOs use a variety of spectrum bands to provide mobile services. Lower spectrum frequencies provide wider coverage and have better penetration (meaning they are better able to pass through objects such as walls) than higher spectrum frequencies. MNOs will use higher spectrum frequencies if they have exhausted the lower ones and need more capacity. This has meant that MNOs typically use lower spectrum frequencies to serve rural locations, where coverage rather than capacity is a concern. Conversely, in urban areas where capacity (rather than coverage) is a concern, MNOs typically use higher frequency spectrum.
29. Backhaul (transport) is a generic term used to describe a point to point service where aggregated traffic is carried between network nodes. In a mobile network, the MNO uses backhaul to connect its cell sites to other aggregation nodes such as mobile switching centres. Backhaul contributes to the service performance that an MNO's customers receive as it impacts on the capacity of the network and the latency of mobile services provided. The MNO may deploy its own backhaul infrastructure, or may purchase backhaul from third parties. The backhaul requirements of a mobile network are typically based on fibre to ensure service performance levels, but wireless backhaul (digital microwave) may be used in locations where fibre build out is prohibitively expensive, traffic is low, and spectrum interference is not an issue.
30. Mobile networks interconnect with one another so that subscribers on one network are able to communicate with subscribers on other networks.

Mobile services

31. Mobile services are location independent communications services (voice, messaging, and data) delivered over a cellular mobile network to devices such as mobile handsets, or data devices such as tablets with in-built mobile connectivity, or 'dongle' devices using cellular modems (Figure 2).

Figure 2: Mobile devices



32. Mobile networks were initially designed to carry voice and messaging services. More recently, the emergence of 3G and, in particular, 4G mobile network technologies has made the delivery of mobile data services at least as important as voice and messaging, particularly for mobile broadband connectivity and over-the-top (OTT) services.
33. These services are mobile in the sense that they can be used while moving around and are not tied to a specific fixed location of the consumer's device. As a consumer moves from the coverage area of one cell site to that of a neighbouring cell site, the signal to their mobile device is handed over between cell sites.
34. This is in contrast to voice and broadband services that are delivered to a fixed location, including fixed line services (delivered over copper, coaxial cable or fibre based networks) and 'fixed wireless' services (delivered over a wireless network).
35. From a consumer's perspective, a fixed wireless modem looks and performs similarly to a fixed line modem. In both cases, consumers' devices are connected either through local WiFi or an Ethernet cable. The only difference is that behind the fixed wireless modem, the network connection is via a wireless network rather than a copper or fibre cable.
36. In our 2016 Schedule 3 review of Schedule 1 services,⁵ we noted that fixed wireless services provide similar functionality and features as a fixed line broadband service at similar prices. We also found that mobile broadband services were considerably more expensive on a price per GB basis than fixed wireless and fixed line broadband services, and that the average amount of data usage was considerably higher for fixed broadband services than for mobile broadband. This remains the case. For example, Spark offers copper, entry-level fibre, and fixed wireless broadband services for the same retail price (\$84.99 per month for 120GB, or \$0.71 per GB). By comparison, Spark offers mobile broadband for \$69.99 for 6GB (\$11.67 per GB).
37. This suggests that fixed wireless services are currently competing with other fixed line services, whereas mobile broadband is more likely to have a complementary relationship.
38. Although we do not include fixed wireless services when assessing the current state of competition in the mobile markets, we recognise that there are likely to be some economies of scope on the supply side which may affect decisions around entry and expansion by MNOs. We also note that fixed wireless services are likely to be an important feature of 5G deployments.

⁵ Commerce Commission "Review of Designated and Specified Services under Schedule 1 of the Telecommunications Act 2001" (5 July 2016), paragraph A24. The review considered 14 services, including mobile co-location and number portability, both relevant to mobile services. The process for reviewing Schedule 1 services is discussed further at paragraph 54 below.

39. Mobile networks also provide connectivity to Internet of Things (IoT) devices. IoT describes the network of physical and virtual objects accessed through the internet.⁶
40. Mobile services have typically been offered to consumers through two types of retail plans. Prepay plans are where consumers pay for services in advance, and on account plans are where consumers pay at the end of each month of service.
41. On account plans may be in the following forms:
 - 41.1 Fixed term contracts, where the consumer signs up for a contract period of, for example, 12 or 24 months. These plans have typically been offered with a handset discount, and the consumer may face an early termination charge in order to break the contract; and
 - 41.2 Open term, where the consumer pays for the service on a month by month basis, and is not locked into a fixed term contract.
42. Recently mobile service providers have moved to offer open term plans paired with monthly interest free payments for handsets. Interest free payments spread the purchase price of a handset across a 12, 24 or 36 month period with the option to pay off the remaining amount in full at any point. Spark, Vodafone and 2degrees current handset promotional offers all appear to relate to open term plans with interest free payments.⁷
43. The on account market can be further split into residential and business segments.
44. Mobile plans are typically made up of a set 'bundle' of texts, calls, and data. The majority of plans have data caps; however there have been moves recently towards uncapped data plans.⁸

Providers of mobile services

45. There are two types of service providers competing in the supply of mobile services to consumers:
 - 45.1 MNOs own key mobile network infrastructure (spectrum, cell towers) and supply mobile services to retail consumers. MNOs may launch sub-brands to target specific segments of the market; and
 - 45.2 Mobile virtual network operators (MVNOs) are operators that provide mobile services to consumers but generally do not own licensed radio spectrum or much of the infrastructure required to provide mobile services. Instead, MVNOs rely on buying wholesale services from an MNO. The amount of control an MVNO has over the services it offers will vary according to the nature of its agreement with its host MNO.

⁶ IoT devices can be connected via a mobile network or a specialised IoT network.

⁷ As advertised online as of August 2018.

⁸ These uncapped data plans are not truly unlimited as they are subject to fair-use terms and MNOs currently throttle customers' speeds after a certain amount of data has been consumed.

46. MVNOs who subcontract all technical operational services to the MNO and focus on marketing and customer relations are known as ‘light’ MVNOs (where the MVNO resells the services of the MNO). ‘Full’ MVNOs, on the other hand, will manage their own IT systems, billing systems and may even own some spectrum.

Mobile regulatory settings

47. There are two types of regulated telecommunications services in Schedule 1 of the Telecommunications Act:
- 47.1 specified services, where the Commission can determine non-price terms; and
- 47.2 designated services, where the Commission can determine price terms and non-price terms.
48. We set the terms of access for the regulated services through a standard terms determination (STD).
49. Table 1 below outlines the mobile services currently included in Schedule 1 of the Telecommunications Act.

Table 1: Specified and designated mobile services in Schedule 1⁹

Service	Type	Introduced	Next Schedule 3 review due	Currently subject to an STD
National roaming	Specified	19 December 2001	20 September 2018 (preliminary view released)	No
Mobile Termination Access Service (MTAS)	Designated	23 September 2010	23 September 2020	Yes
Mobile co-location	Specified	19 December 2001	30 June 2021	Yes ¹⁰
Local and mobile number portability	Designated	19 December 2001	30 June 2021	Yes

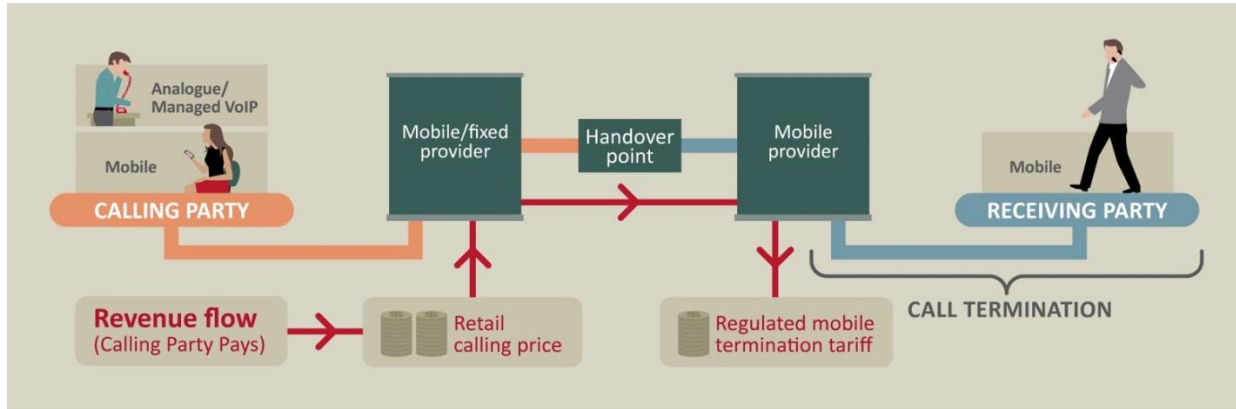
50. National roaming allows customers of one mobile network to use another network when they are outside their own service provider’s coverage area.

⁹ These services, and the reasons why they are listed in Schedule 1 of the Act, are discussed further in Chapters 5 and 6 below.

¹⁰ The STD for mobile co-location was first introduced in 2008.

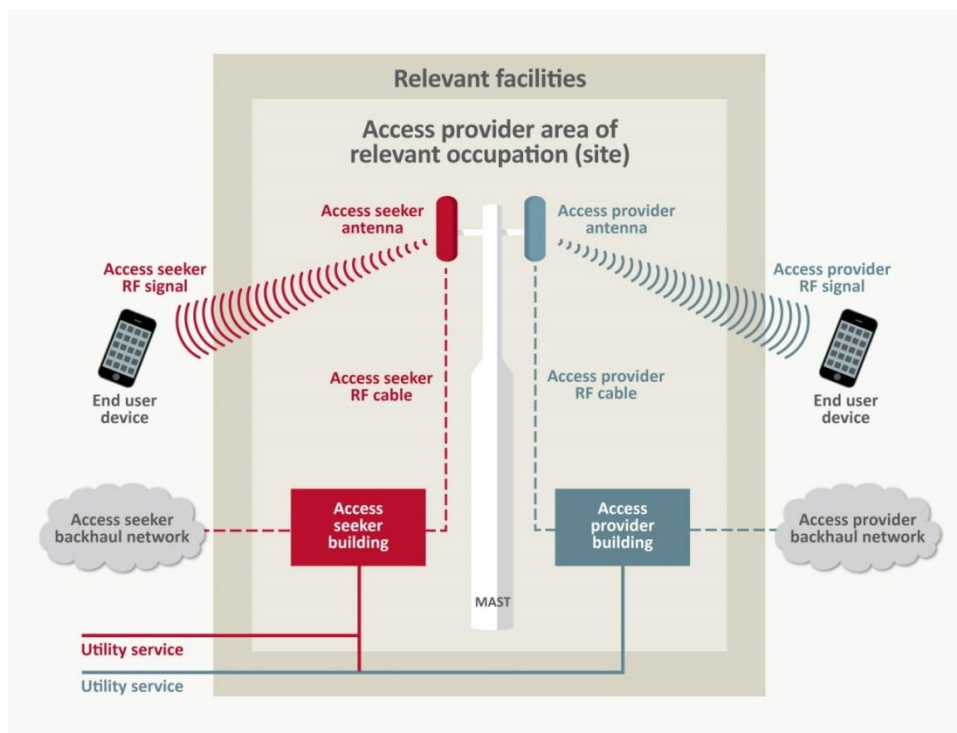
51. MTAS are the termination services a network operator needs to purchase to allow its subscribers to communicate with the subscribers of another mobile network. The MTAS service is shown in Figure 3.

Figure 3: Mobile termination access service



52. Mobile co-location is a service that enables an MNO to install mobile network transmission and reception equipment on the mast of another MNO. Mobile co-location is shown in Figure 4.

Figure 4: Mobile co-location



53. Local and mobile number portability allows customers to keep their number when switching between service providers.
54. Schedule 3 of the Telecommunications Act requires us to consider, at 5 yearly intervals from when a Schedule 1 service came into force, whether that service

should be deregulated (by removing it from Schedule 1). The two step process requires us to first consider whether reasonable grounds exist to commence an investigation. Only if we consider reasonable grounds exist, are we required to conduct an investigation.

55. We are currently considering whether to initiate a Schedule 3 investigation into omitting national roaming as a specified service from Schedule 1 of the Telecommunications Act. On 9 July 2018, we published our preliminary view that there are insufficient grounds to launch an investigation to remove the national roaming service from Schedule 1. We expect to release our final decision on 4 September 2018.
56. The MTAS service was reviewed in 2015. The mobile co-location and number portability services were reviewed as part of our 2016 Schedule 3 review of 14 Schedule 1 services.

Changes to regulation

57. The Telecommunications (New Regulatory Framework) Amendment Bill has gone through Select Committee and is awaiting its second reading in Parliament. The Amendment Bill primarily relates to the regulation of fibre services, but also currently provides for the introduction of retail service quality obligations and powers, including the ability for the Commission to review existing industry codes and create codes that could apply to mobile services.

Chapter 3 – Framework for the study

Purpose of this chapter

58. This chapter outlines our approach to assessing how mobile markets are currently performing and developing, and how the mobile landscape may evolve in the future. We are looking at the current state of competition in relation to mobile services, future developments and the potential impacts on competition and consumers. This includes examining issues on both how the supply of mobile services in New Zealand has performed, barriers to new entry and expansion, and the extent to which consumers of mobile services are engaged and can take advantage of competing retail offers.

Evolution and current state of the supply of mobile services

59. We are assessing the development of mobile services in New Zealand to date using the following key indicators:
- 59.1 market structure and market shares, including by market segment;
 - 59.2 bundling of mobile services with other services;
 - 59.3 pricing, including how prices for mobile services have moved over time, and how prices in New Zealand compare to prices in other countries;
 - 59.4 usage trends, including how volumes of mobile calls, messaging services, and mobile data have changed over time, and the importance of mobile services to consumers;
 - 59.5 investment in mobile access infrastructure and spectrum; and
 - 59.6 quality of mobile services, including network coverage, availability, mobile data speeds, and customer service.

Entry and expansion conditions and regulatory settings

60. We are examining entry and expansion conditions, including economies of scope, and how these conditions differ depending on whether entry or expansion is occurring at the MVNO level or at the MNO level.
61. This includes examining access to essential inputs and regulatory issues in relation to wholesale services that are required to supply mobile services, including:
- 61.1 access to spectrum;
 - 61.2 national roaming;
 - 61.3 mobile co-location and other forms of infrastructure sharing;
 - 61.4 access to transport services (backhaul); and
 - 61.5 mobile interconnection services.

Consumer behaviour and engagement in relation to mobile services

62. We are considering consumer engagement with mobile services, including:
- 62.1 the ability of consumers to:
 - 62.1.1 access the information required in order to compare retail offers and to assess which retail offers best suit their current and future needs; and
 - 62.1.2 act by making informed purchasing decisions, including the ease of switching between service providers.
 - 62.2 consumer satisfaction with mobile services, how this has changed, and how satisfaction with mobile services compares with other sectors.

Possible future developments and their potential impacts on competition

63. We are exploring potential future developments in the supply of mobile services, and what they might mean for competition and market outcomes in New Zealand. These include:
- 63.1 the development of 5G networks;
 - 63.2 infrastructure sharing;
 - 63.3 network slicing;
 - 63.4 spectrum issues; and
 - 63.5 e-SIMs.

Chapter 4 – The development of mobile services and competition in New Zealand

Purpose of this chapter

64. This chapter looks at the development of mobile networks and services, and competition in relation to the supply of mobile services. We are interested in better understanding how competition has evolved, and whether there are any factors which may have affected competitive pressures in recent years.
65. We examine a number of key indicators: market structure and market shares, bundling of services, pricing, usage trends, investment, and quality of mobile services.

Market structure

66. Mobile services are currently predominantly supplied by three MNOs, Vodafone, Spark, and 2degrees:
- 66.1 Spark's predecessor Telecom deployed New Zealand's first mobile network in 1987, using analogue technology and 800MHz spectrum. Telecom invested in a CDMA network in 2001, before transitioning to 3G UMTS technology in 2009.¹¹ In addition to its 3G network, Spark is currently operating a 4G LTE network. Spark launched a sub-brand called Skinny in 2012 and repositioned it as a budget brand in 2013;
- 66.2 Vodafone entered the New Zealand mobile market in 1998, when it acquired BellSouth's GSM network.¹² Vodafone operates a 2G, 3G UMTS and a 4G LTE network; and
- 66.3 2degrees launched its GSM mobile network in 2009, initially relying on roaming on Vodafone's network which allowed 2degrees to offer national coverage as it built out its own network. In 2010, 2degrees commenced its 3G UMTS network, followed by its 4G network launch in 2014.
67. 2degrees' own network was initially limited to the main urban areas, covering 47% of New Zealand's population.¹³ 2degrees has progressively invested in extending its coverage to levels that are comparable to Spark and Vodafone, as shown in Table 2.

Table 2: Mobile network population coverage

	Total coverage	4G coverage
Vodafone	98.5%	95%
2degrees	98%	92%
Spark	97.5%	95%

Source: Vodafone and Spark websites, 2degrees submission to Radio Spectrum Management (2018)

¹¹ Spark closed its CDMA network in July 2012.

¹² BellSouth entered as New Zealand's second MNO in 1993 with its 900MHz GSM mobile network.

¹³ 2degrees "Telecommunications Act Review: Options Paper – Two Degrees Mobile Limited Submission to the Ministry of Business, Innovation & Employment" (2 September 2016), page 28.

68. The expansion in the coverage of wireless and mobile networks in rural areas has been partly delivered through infrastructure sharing. Examples include co-location of equipment on cell sites under the Government’s initial Rural Broadband Initiative (RBI1), and the joint venture between the 3 MNOs participating in the Rural Broadband Initiative 2 (RBI2) programme.
69. In addition to the MNOs, there are a small number of MVNOs, who purchase wholesale mobile services from the MNOs and resell these services to retail customers. Earlier MVNOs in New Zealand included TelstraClear, Orcon and Black&White. There are now three MVNOs, but they collectively supply less than one percent of mobile services. Table 3 summarises the current MVNOs and their host MNOs.

Table 3: Mobile virtual network operators

MVNO	MNO host
Compass	Spark
Vocus	Spark
Warehouse Mobile	2degrees

Source: Commerce Commission annual monitoring, websites

70. Vodafone has recently announced an MVNO agreement with Kogan Mobile.¹⁴ MyRepublic has also announced that it intends to launch MVNO services in Australia and New Zealand within the next 12 months.¹⁵
71. Competition in the supply of mobile services has strengthened since the arrival of 2degrees in 2009, as described below. The mobile market has become less concentrated as 2degrees has gained market share, particularly in the prepaid mobile services market segment but also more recently in the on account residential mobile services market segment. Prices appear to have declined, with the exception of prices for high volume bundles of mobile services and standalone mobile data which remain relatively high. Usage has increased, particularly in terms of calling and data.

Market shares

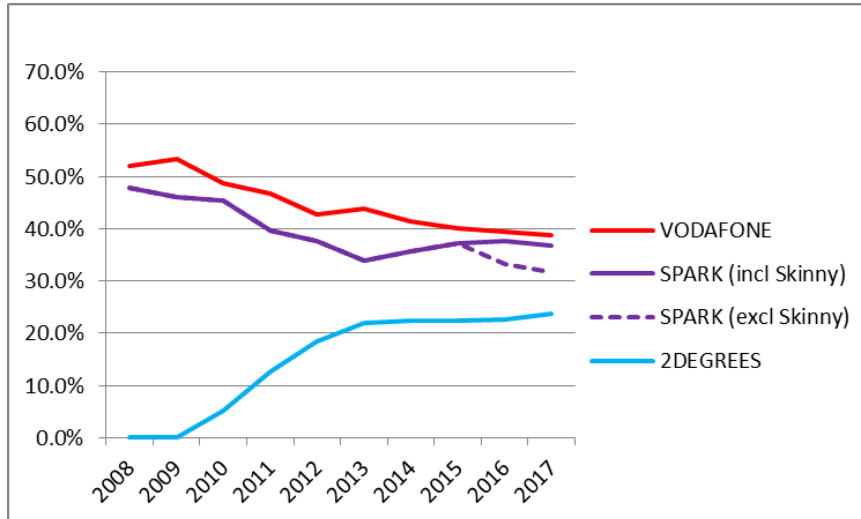
72. Figure 5 summarises the market shares of the MNOs by mobile subscribers, over the period since 2degrees entered the market.
- 72.1 2degrees initially rapidly increased its share of mobile subscribers, reaching 22% by 2013. Since 2013, the growth in 2degrees’ share of mobile subscribers has flattened.
- 72.2 Vodafone’s share of mobile subscribers has dropped from around 53% at the time of 2degrees’ entry to 39% by 2017.

¹⁴ Corinne Reichert “Kogan Mobile launches off Vodafone in New Zealand.” *ZDNet* (4 June, 2018), at <https://www.zdnet.com/article/kogan-mobile-launches-off-vodafone-in-new-zealand/>

¹⁵ Communications Day “MyRepublic plans ANZ MVNO launch within a year” (26 June 2018).

- 72.3 Spark's share of mobile subscribers dropped from 46% in 2009 to 34% by 2013, but has recovered in recent years, as Spark's Skinny brand has expanded.

Figure 5: Mobile subscriber market shares – total subscribers



Source: Commerce Commission annual monitoring data.

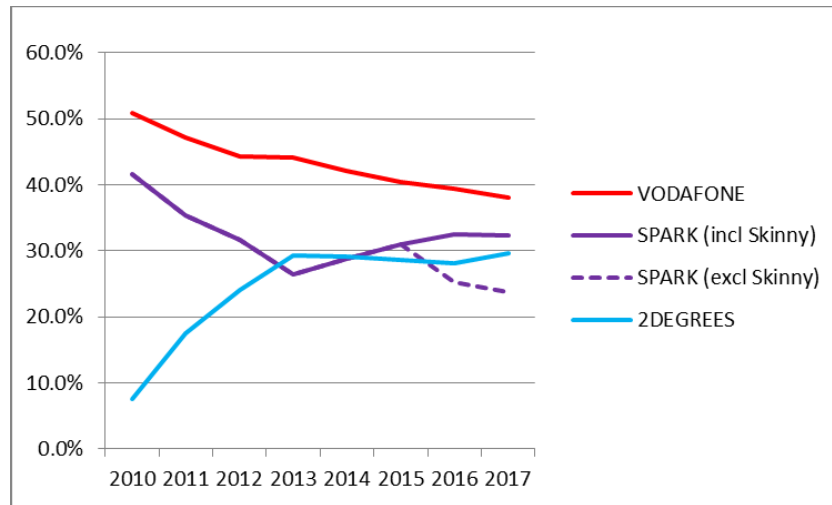
73. Based on recent monthly number porting data, there appears to be a similar level of switching between each of the MNOs, which suggests that 2degrees may provide a similar constraint on Spark and Vodafone as they do on one another.¹⁶
74. Our annual monitoring programme collects information on mobile subscribers and revenues across three segments: prepaid mobile services, on account residential mobile services, and on account business mobile services. The prepaid mobile services segment is relatively low value, with average revenue per user (ARPU) of just over \$13 per month in 2017. By comparison, the ARPU for on account subscribers was more than \$50 per month in 2017.¹⁷
75. According to the segmented data, 2degrees' initial growth was focused in the lower value prepaid segment of the market, where its market share increased through to 2013 and has remained flat since. Figure 6 shows that the prepaid market shares of both Spark and Vodafone initially declined, although since 2013, Spark's share has increased. We have previously noted that the closure of Spark's CDMA network in

¹⁶ Porting data is only available for subscribers overall, so it is not possible at this stage to assess switching patterns within segments of the market, such as on account residential, on account business or prepaid services.

¹⁷ These ARPUs are derived from aggregate mobile revenues and mobile subscribers for the three MNOs. These figures are consistent with ARPUs reported by 2degrees' parent, Trilogy International Partners: "In 2017, 2degrees' post-paid subscribers generated almost five times the ARPU of prepaid subscribers, at [US]\$36.36 compared to prepaid ARPU of [US]\$7.79." Trilogy International Partners "Annual Information Form for the Year Ended December 31, 2017", page 14.

July 2012 resulted in a reduction in Spark's reported mobile subscribers of over 200,000 subscribers, leading to a drop in Spark's market share in 2013.¹⁸

Figure 6: Mobile subscriber market shares – prepaid subscribers



Source: Commerce Commission annual monitoring data.

76. Although 2degrees was able to increase its share of prepaid subscribers, Vodafone and Spark may not have initially responded aggressively due to the relatively low value of the prepaid segment. In the higher value on account residential and business segments, 2degrees has experienced more moderate growth in market share, in particular for on account business subscribers. On account subscribers may be on fixed term contracts or on open term plans with fixed term commitments such as interest free handset repayments. In the business segment our 2015 study found that 73% of businesses surveyed were on fixed term contracts for mobile voice and data services. Of these, 69% were on contracts with a term of two years.
77. Spark's share of prepaid subscribers has increased since 2013, with Spark's Skinny brand gaining traction. In 2013, Skinny repositioned itself as a budget mobile brand, and this resulted in an increase in the number of subscribers switching to Skinny.¹⁹ This is reflected in number porting data, which shows the volume of numbers ported to Skinny has increased since 2014. While some of the numbers ported to Skinny appear to be from Spark, Skinny has also gained subscribers at the expense of Vodafone and 2degrees.

¹⁸ Commerce Commission "Annual Telecommunications Monitoring Report 2013", pages 23, 24.

¹⁹ Commerce Commission "Annual Telecommunications Monitoring Report 2014", page 25.

78. The on account segments represent a significant proportion of mobile revenues for the three MNOs. As shown in Table 4, prepaid revenues represented 27% of retail mobile service revenues for the year to June 2017, while on account revenues represented 73%.

Table 4: Retail mobile revenues by customer segment (2017)

	3 MNOs
Prepaid	27%
On Account Residential	41%
On Account Business	32%
	100%

Source: Commerce Commission annual monitoring data.

79. As a result of having a lower share of higher value subscribers, 2degrees' share of mobile revenues has been lower than its share of mobile subscribers.
80. 2degrees' share of total mobile revenues has been fairly flat since 2013, although it's on account residential mobile revenues have been increasingly important. This changing mix of revenues has been described by 2degrees' parent, Trilogy International, which has noted that 2degrees is in the process of transitioning its customer mix towards higher value on account customers:²⁰

Despite having an overall market share of all wireless customers of approximately 24%, 2degrees' market share of higher-value post-paid customers was only approximately 15% as of December 2017. As a result, management estimates that there is a significant opportunity to drive incremental Services Revenues and Adjusted EBITDA from both (i) converting prepaid customers into post-paid customers, and (ii) gaining greater market share in the post-paid space.

81. The on account business segment remains more concentrated, due to 2degrees' relatively small share of business mobile subscribers. The level of concentration in the business segment of the mobile market led us to undertake a study in 2015 into whether there may be barriers to expansion that were inhibiting competition in this segment. At the time, 2degrees had a negligible share of the business segment.
82. Our 2015 study did not uncover any evidence of anti-competitive behaviour or structural factors that were inhibiting competition in the business segment of the mobile market.
83. However, we identified a number of key factors that business customers value when selecting a mobile provider, including reliable coverage, good customer service, and competitive pricing. The ability of a service provider to offer a bundle of services was also an important consideration among business customers, as was having an established reputation and track record.²¹ Many business customers stated that

²⁰ Trilogy International Partners "Annual Information Form for the Year Ended December 31, 2017", page 14.

²¹ UMR Research "Competition for Business Customers in the Mobile Industry: A Report for the Commerce Commission" (December 2015), page 86.

“...ten years was the milestone they viewed as the length of time required to show that a company is established and likely to be around for the long haul.”²²

84. While there was a general perception among business customers that 2degrees represented a low cost brand with lower service quality and offering less extensive coverage, those business customers who actually subscribed to 2degrees were the most satisfied (93% of business customers were satisfied with their mobile service, compared to 77% for Spark and 81% for Vodafone).²³
85. Given the comparable levels of network coverage that 2degrees has now achieved compared to Spark and Vodafone, as well as the length of time that 2degrees has been present in the market, we are interested in views on whether 2degrees has been able to increase competitive tension in the on account business segment of the mobile market since 2015.

Questions

- Q1. How, and to what extent, do competitive conditions for mobile services vary by customer segment in New Zealand?
- Q2. In the on account business segment, what evidence is there that the issues identified in our business study have changed since 2015? Specifically;
- Q2.1 what are the most important features of a mobile service for business consumers?
- Q2.2 how have business consumers perceptions towards 2degrees changed since 2015?

Bundling of mobile services

86. Bundling involves offering two or more services as a single package to customers. Bundling can be beneficial for consumers, for example by offering the convenience of a single bill, or by offering the bundled services at a lower price than when the services are purchased separately. For service providers, the use of bundling can reduce customer churn, which can raise customer acquisition costs.
87. Potential competition concerns may arise if a service provider offers bundles of services that its competitors cannot replicate. In the case of bundles involving mobile services, such foreclosure concerns may be mitigated by competition between the MNOs, unless an MNO offers a “must have” service that the others cannot replicate.
88. However, concerns around the ability of non MNOs to compete in the supply of bundles may remain. According to a submission on behalf of Trustpower, Analysys

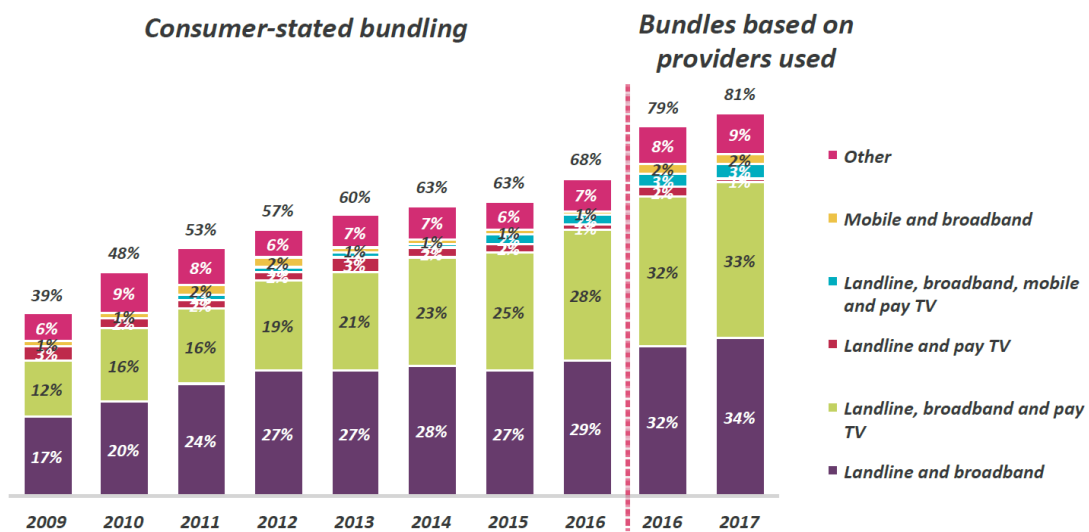
²² UMR Research “Competition for Business Customers in the Mobile Industry: A Report for the Commerce Commission” (December 2015), page 4.

²³ UMR Research “Competition for Business Customers in the Mobile Industry: A Report for the Commerce Commission” (December 2015), page 87.

Mason has observed that the take up of triple play and quad play bundles, involving fixed, mobile, and content services, has been significant in some markets, and that “...if bundled offers of fixed and mobile services become highly attractive, the lack of competitive dynamism of the current mobile market might adversely affect the relatively more competitive fixed retail market.”²⁴

89. We are interested in better understanding the prevalence of bundles which involve mobile services in New Zealand, and whether such bundling is likely to raise competition concerns. In the United Kingdom, the Office of Communications (Ofcom) research indicates that bundles involving mobile services do not currently appear to be significant, as shown in Figure 7.

Figure 7: Bundling of communications services in the United Kingdom



Source: Ofcom Communications Market Report (2017)

90. Submissions in relation to the Sky/Vodafone clearance application also observed that in New Zealand, “...bundles including mobile connectivity were still at a nascent stage in 2016.”²⁵ We also note the following:

90.1 in our 2015 study into the business segment of the mobile market, respondents to our business survey identified the ability to offer all telecommunications services in a single bundle as being important;²⁶ and

90.2 the three MNOs in New Zealand all offer discounted prices for fixed broadband services if a qualifying mobile subscription is also purchased.

91. Based on our annual monitoring data, the volume of fixed broadband services sold by the three MNOs at a discount due to a mobile service also being purchased

²⁴ Analysys Mason “Report for Trustpower: Input to Commerce Commission mobile market review” (28 November 2017), page 14.

²⁵ Plum Consulting “Assessing the proposed merger between Sky and Vodafone NZ: A report for 2degrees and TVNZ” (August 2016), page 20.

²⁶ UMR Research “Competition for Business Customers in the Mobile Industry: A Report for the Commerce Commission” (December 2015), page 28.

accounts for less than 20% of their fixed broadband services. This suggests that, absent adverse changes in the market, the potential for the MNOs' bundles of fixed and mobile services to lead to the foreclosure of non MNOs may be limited.

92. We also note that there are a range of bundles supplied in New Zealand, including the bundling of energy and broadband services by Trustpower and Vocus. Such bundling could help service providers compete with bundles of fixed and mobile services supplied by the MNOs.

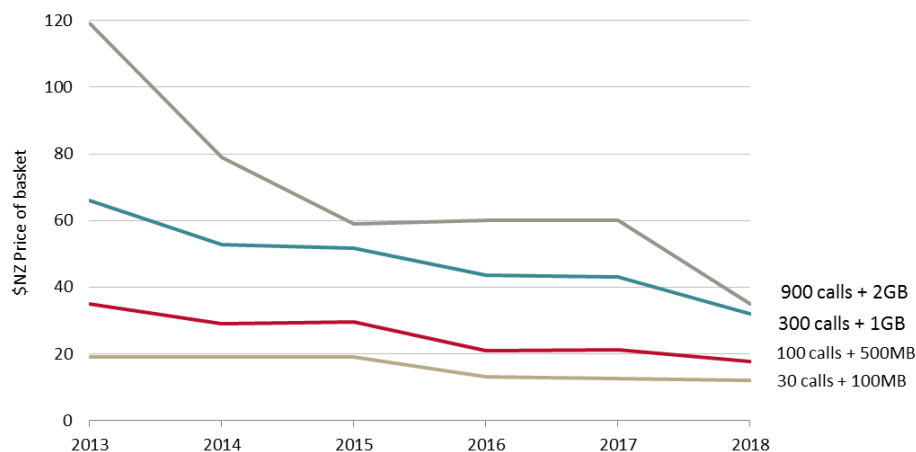
Questions

- Q3. How, and to what extent, have consumers benefited from bundling of mobile services?
- Q4. What are the constraints on non MNO fixed line broadband providers' ability to compete by supplying their own bundles, such as bundling of fixed line broadband and electricity by Trustpower and Vocus?

Pricing

93. In our annual telecommunications monitoring reports, we have noted that mobile consumers typically purchase bundles of mobile services which provide a monthly allowance of minutes, texts, and data. In order to examine how prices for mobile services have moved over time, and how prices in New Zealand compare to other countries, we look at the cost of filling various benchmarking 'baskets'. Teligen undertakes price benchmarking for the Organisation for Economic Co-operation and Development (OECD), and we report on the results of Teligen's benchmarking in our annual monitoring reports. Teligen's price benchmarking of mobile services is based on the two largest MNOs in each country in the OECD, and allows prices to be compared across a range of usage baskets.
94. Retail prices for various baskets of mobile services have been declining in New Zealand, as shown in Figure 8.

Figure 8: Retail prices for mobile services in New Zealand, 2013-2018



Source: Teligen.

95. In a submission on behalf of Trustpower, Analysys Mason has noted that New Zealand’s mobile ARPU has increased in recent years, whereas ARPU levels have fallen in other countries.²⁷ We note that an increase in ARPU does not necessarily mean that prices have increased – for example, where consumers are migrating to higher value retail plans offering a greater volume of calls or data, this may result in an increase in ARPU but a lower unit price. In this regard, we note that the proportion of New Zealand mobile subscribers on low ARPU prepaid services has been gradually declining, from 68% in 2010 to 60% in 2017. This may, in part, explain the increase in ARPU observed by Analysys Mason.
96. In our annual monitoring reports, we have also observed that mobile prices in New Zealand are generally below average OECD prices, and below mobile prices in Australia for lower usage baskets. However, prices for higher volume baskets in New Zealand are relatively expensive, particularly when compared to Australia. This can be seen from Table 5, which includes price comparisons across the baskets used in our recent annual monitoring reports, as well as a higher usage basket which includes unlimited calls and 20GB data. These comparisons are based on Teligen’s May 2018 benchmarking.

Table 5: OECD benchmarking comparisons of retail prices for mobile services in New Zealand, Australia, and OECD

Mobile phone services basket	NZ rank in OECD	May 2018 price (NZD PPP)			NZ % price var. from	
		NZ	Aust.	OECD Average	Aust.	OECD Average
30 calls + 100MB GST included	3/36	12	22	23	-46%	-46%
100 calls + 500MB GST included	5/36	18	22	33	-19%	-45%
100 calls + 2GB GST included	15/36	28	22	41	24%	-32%
300 calls + 1GB GST included	16/36	32	22	41	45%	-22%
900 calls + 2GB GST included	17/36	35	22	53	55%	-34%
unlimited calls + 20GB	18/30	65	56	198	17%	-67%

Source: Teligen

97. The reductions in retail prices for mobile services shown in Figure 8 may be due to a reduction in the cost of supplying mobile services, or due to increased competition (or a combination of both). For most of the baskets shown in Table 5, New Zealand’s mobile prices have fallen faster than in Australia and the OECD average since 2014, resulting in a reduction in the New Zealand price relative to the prices overseas.
98. Mobile data is becoming an increasingly important service in New Zealand and other countries. According to Consumer NZ, mobile data usage in 2018 is 16 times greater

²⁷ Analysys Mason “Report for Trustpower: Input to Commerce Commission mobile market review” (28 November 2017), Figure 2.2, page 4.

than in 2012, and consumers now rank data as more important than calling or texts.²⁸

99. Our annual monitoring data shows that although the majority of mobile subscribers in New Zealand are on bundles which include less than 3GB of data, the take-up of bundles offering more than 3GB is increasing rapidly. For example, the total number of on account residential subscribers purchasing bundles of voice, SMS, and data allowances of 3GB or more increased from approximately 133,000 subscribers in 2016 to 319,000 subscribers in 2017.
100. Accordingly, the pricing of baskets with higher volumes of data are of particular interest. In this regard, Subscriber Identity Module (SIM)-only mobile bundles in New Zealand offer unlimited calls and SMS, with data allowances of up to 25GB, for \$65 per month (Skinny Direct) and \$70 per month (2degrees). By comparison, the following SIM-only plans are available in Australia:²⁹
- 100.1 Telstra is offering unlimited calls and SMS and 60GB for A\$89 per month;
- 100.2 Optus is offering unlimited calls and SMS and 80GB for A\$52 per month; and
- 100.3 Vodafone is offering unlimited calls and SMS and 80GB for A\$60 per month.
101. Each of the retail plans referred to above offer a range of different features and inclusions. For example, the Telstra plan is a 12 month subscription and includes unlimited international calls and international roaming in selected countries. The Optus and Vodafone Australia plans are promotional offers on 12 month subscriptions, and include international calls to selected countries. By comparison, the 25GB plans offered by Skinny Direct and 2degrees have no fixed term; although only include calls within New Zealand and to Australia.
102. While acknowledging these differences, retail prices for mobile bundles with higher calling and data allowances appear to be relatively high in New Zealand.
103. Retail prices for standalone mobile data (for data dongles and connected tablets, for example) also appear to be relatively expensive in New Zealand. As we noted in our 2016 annual monitoring report, the New Zealand benchmarked prices for a 1.5GB and a 6GB mobile broadband service were 46% and 164% above the OECD averages respectively.

Questions

- Q5. What are the reasons for high retail prices for higher volume bundles of mobile services in New Zealand compared to other countries?
- Q6. What are the reasons for high retail prices for standalone mobile data services in New Zealand compared to other countries?

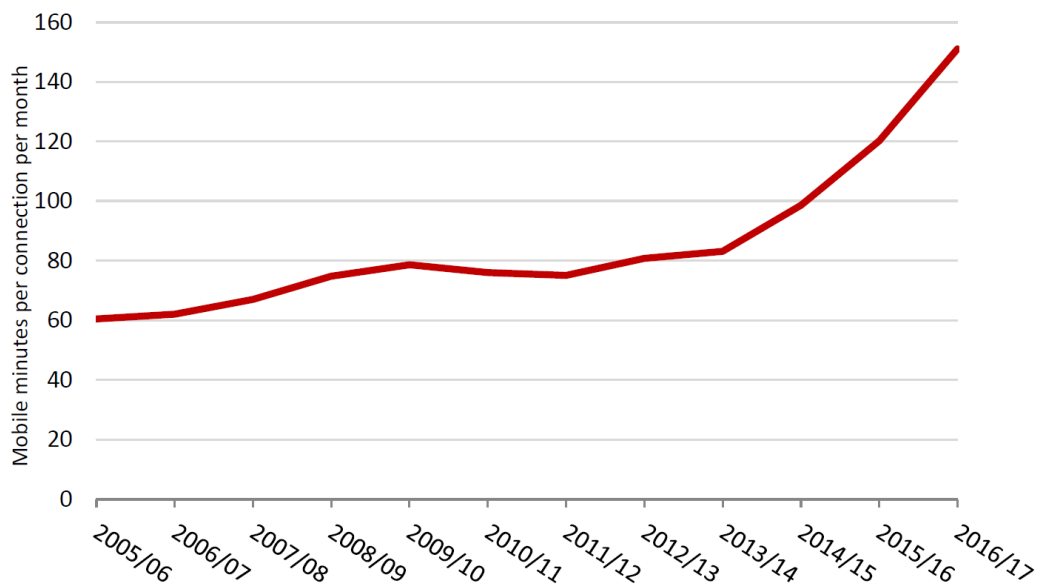
²⁸ Consumer NZ “consumer: Issue 587” (February 2018), page 11.

²⁹ Telstra, Optus, and Vodafone websites, accessed August 2018.

Usage trends

104. The total number of mobile connections in New Zealand has continued to increase in recent years, reaching 6.4 million connections in 2017, an increase of 5.1% on the previous year. The total volume of calls originated on mobile phones has also continued to grow and replace fixed calling volumes, with mobile calling minutes reaching 8.77 billion minutes in 2017, compared to 4.92 billion minutes for fixed calls. Mobile consumers are making more calls per month, with average mobile calling in New Zealand of just over 150 minutes per month, as shown in Figure 9.

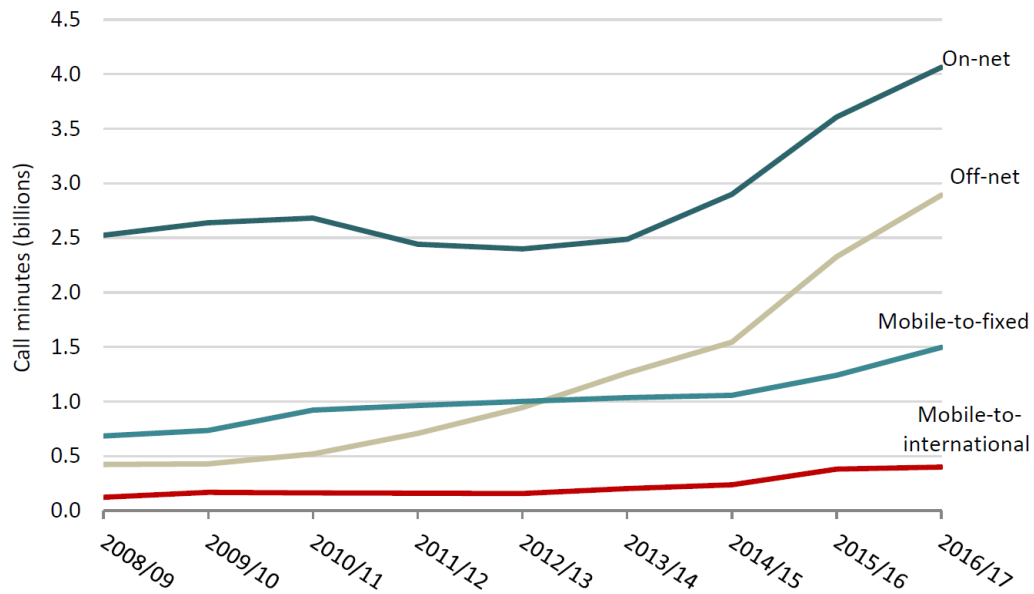
Figure 9: Mobile calling minutes per connection



Source: Commerce Commission Annual Telecoms Monitoring Report 2017 (Figure 15).

105. As we have previously noted, the growth in mobile calling is likely to be a result of mobile calls being relatively inexpensive and convenient. Many mobile offers have large or unlimited monthly allowances of calling minutes, which means the marginal cost to the consumer of making an additional call is zero.³⁰
106. Figure 10 shows that much of the growth in mobile calling has been due to growth in calling between mobiles, including calling between mobile customers on the same network (“on-net” calling) as well as calling between networks (“off-net” calling). The relative importance of off-net calls has continued to increase, with the ratio of on-net minutes to off-net minutes dropping below 1.5 (compared to a ratio of over 6.0 in 2010). This trend is likely to have been influenced by the regulated reduction in mobile termination rates since our MTAS STD in 2011 and the reduced importance of closed calling groups, making it easier for smaller MNOs to compete.

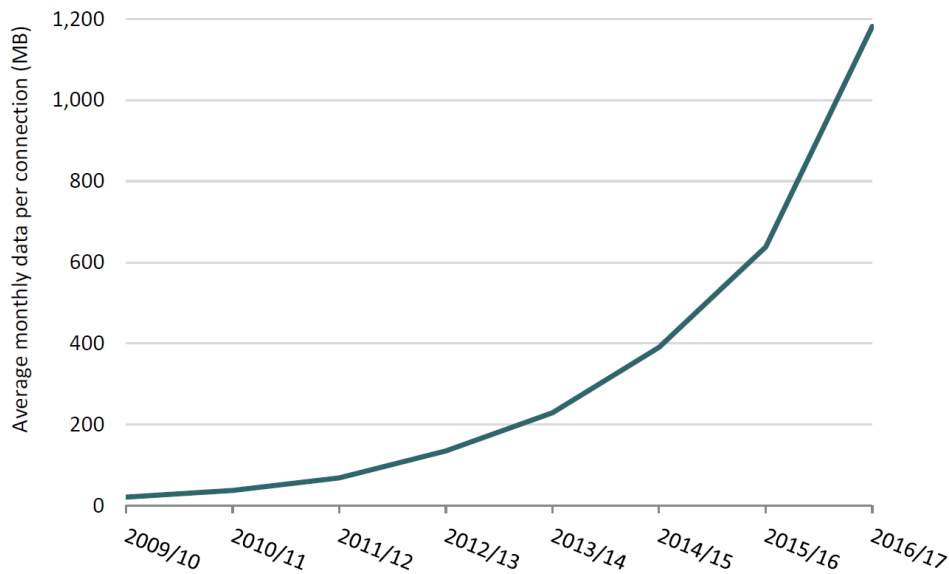
³⁰ Commerce Commission “Annual Telecommunications Monitoring Report 2017”.

Figure 10: Mobile calling minutes by call type

Source: Commerce Commission Annual Telecoms Monitoring Report 2017 (Figure 16).

107. The volume of text messages in New Zealand has continued to drop, despite many mobile plans offering unlimited volumes of texting. This is likely to be due to the increasing popularity of over-the-top (OTT) messaging services such as WhatsApp, Facebook Messenger, and Viber.
108. In contrast, the volume of mobile data used by mobile consumers has grown strongly, with the average monthly data consumed exceeding 1GB in 2017. During 2017, the mobile data allowances offered by the MNOs increased significantly, with monthly data allowances of at least 15GB becoming available.³¹ For example, in April 2017, 2degrees launched an open ended mobile plan offering unlimited calling, unlimited texts, and ‘unlimited’ data (subject to fair use and other restrictions). Spark followed with a similar plan (although speeds are reduced once a threshold of 22GB is reached, and no tethering or hotspotting is allowed unless Spark’s Hotspot Extra service is purchased). Spark lowered the price of its unlimited plan in September 2017 (from \$130 to \$79.99 per month). In July 2018, Vodafone introduced its ‘Unlimited Mobile’ plan for \$79.99 per month (although speeds are reduced once 22GB has been reached, no tethering or hotspotting is permitted, and restrictions are applied to the quality of video streaming).

³¹ Commerce Commission “Telecommunications market developments in 2017: Topic paper” (10 April 2018), page 2.

Figure 11: Mobile data consumption (excluding WiFi)

Source: Commerce Commission Annual Telecoms Monitoring Report 2017 (Figure 19).

109. The exponential growth in mobile data shown in Figure 11 is consistent with the results of consumer research undertaken by Consumer NZ.³² As noted earlier, the volume of mobile data used by consumers in 2018 is 16 times greater than in 2012, and consumers now regard data as being more important than calling or texts.

Questions

- Q7. How are mobile data usage trends expected to evolve in the next few years, and how might that affect suppliers of mobile services?
- Q8. How do you view mobile calling and messaging services evolving, given the emergence of OTT services?

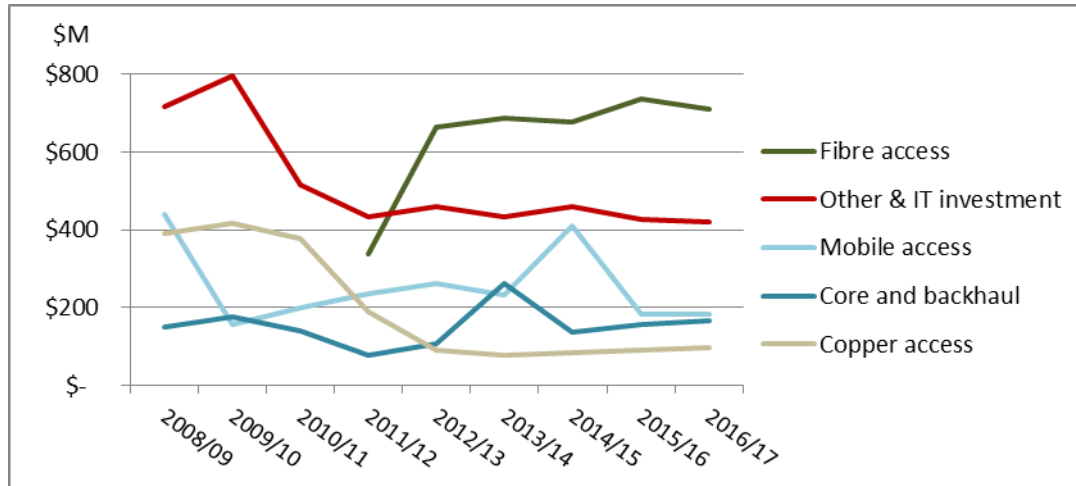
Investment

110. In the mobile sector, we have seen the MNOs continuing to invest in their mobile networks, both in terms of network upgrades and expansion of network coverage. Such investment is critical in supporting improved quality and new services and keeping up with demand.

³² See paragraph 98 above.

111. In our Annual Telecommunications Monitoring Report 2017, we reported investment levels in telecommunications infrastructure, broken down by the components shown in Figure 12. The aggregate investment in mobile access by the MNOs has fluctuated between \$200 million and \$400 million per annum.

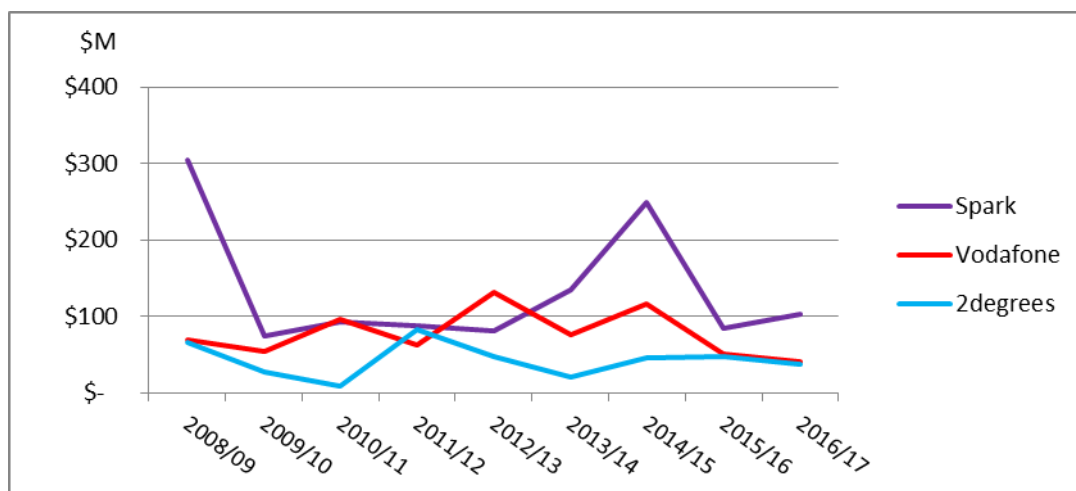
Figure 12: Investment in telecommunications



Source: Commerce Commission Annual Telecoms Monitoring Report 2017 (Figure 19).

112. In Figure 13, the investment in mobile access is broken down by MNO. In most years, each MNO has invested up to \$100 million per annum in their mobile networks. The investment peaks appear to relate to Telecom's investment in its new W-CDMA network in 2009,³³ and investment by the three MNOs in 700MHz spectrum in 2015.³⁴

Figure 13: Investment in mobile access, by MNO



Source: Commerce Commission annual monitoring data.

³³ Telecom's Annual Report 2009, refers to capital expenditure during 2009 of \$300M on its new XT mobile network.

³⁴ The results of the 700MHz auction were announced in June 2014, with Spark acquiring 2x20MHz for \$158M; Vodafone acquiring 2x15MHz for \$68M; and 2degrees acquiring 2x10MHz for \$44M; MBIE "700MHz auction: notice of provisional results" (19 June, 2014).

113. In addition to investment by the MNOs, the government has in recent years contributed funding through its RBI and Mobile Black Spot Fund (MBSF) initiatives for the expansion of mobile and wireless infrastructure into more remote areas.

Quality of mobile services

114. The quality of mobile services has a number of dimensions, including network coverage, availability of service, mobile broadband speeds, and customer service.
115. In terms of overall coverage, the MNOs offer mobile services to more than 97% of New Zealand on a population basis, with 4G coverage at around 95%, as shown earlier in Table 2. According to the Ministry of Business Innovation and Employment (MBIE), the geographic coverage of the mobile networks in New Zealand in 2017 was around 50%. Under its RBI2 and MBSF programmes, the Government intends to increase the geographic coverage of the mobile networks by 20%-30%.³⁵
116. Mobile broadband speeds have been increasing with the deployment of 4G LTE technology. OpenSignal tracks 3G and 4G performance, and in its latest report on 4G performance, New Zealand's 4G download connection speed was 33.52Mbps, which was 8th fastest out of 88 countries.³⁶
117. New Zealand also performed well in terms of the availability of 3G or 4G services, where availability is defined as the percentage of time that users can connect to the service. According to OpenSignal,³⁷
- ... the availability metric determines whether the network is 'doing its job' by providing a connection where it's needed most. Looking at availability adds a key element of network assessment, time, that is not covered by more traditional metrics such as population and geographic coverage.
118. For New Zealand, the availability of 3G or 4G services was reported as being 94% in August 2016, which was 6th best out of 95 countries.³⁸
119. However, in February 2018, OpenSignal reported the availability of 4G only mobile services in New Zealand at 69%, or 65th out of 88 countries.³⁹
120. In terms of customer service, Consumer NZ has identified long customer service waiting times as a common problem for mobile customers, with 17% of survey respondents saying that they regularly experience long customer service call waiting times.⁴⁰ According to Consumer NZ, the larger MNOs tend to perform relatively poorly in terms of customer service waiting times. As discussed further in Chapter 6

³⁵ <http://www.mbie.govt.nz/info-services/sectors-industries/technology-communications/fast-broadband/broadband-and-mobile-programmes#mobile>

³⁶ OpenSignal "The State of LTE (February 2018)", at <https://opensignal.com/reports/2018/02/state-of-lte>

³⁷ <https://opensignal.com/methodology>

³⁸ OpenSignal "Global State of Mobile Networks (August 2016)", at <https://opensignal.com/reports/2016/08/global-state-of-the-mobile-network>

³⁹ OpenSignal "The State of LTE (February 2018)", at <https://opensignal.com/reports/2018/02/state-of-lte>

⁴⁰ Consumer NZ "consumer: Issue 587" (February 2018), page 11.

below, the larger MNOs also rank relatively poorly in terms of customer satisfaction overall.

Questions

- Q9. Do you agree that we have identified the relevant measures of mobile service quality?
- Q10. What further measures and evidence may be relevant for monitoring retail service quality?
- Q11. What are the incentives and constraints in New Zealand for improving customer service quality?

Chapter 5 – Entry and expansion conditions and regulatory settings

Purpose of this chapter

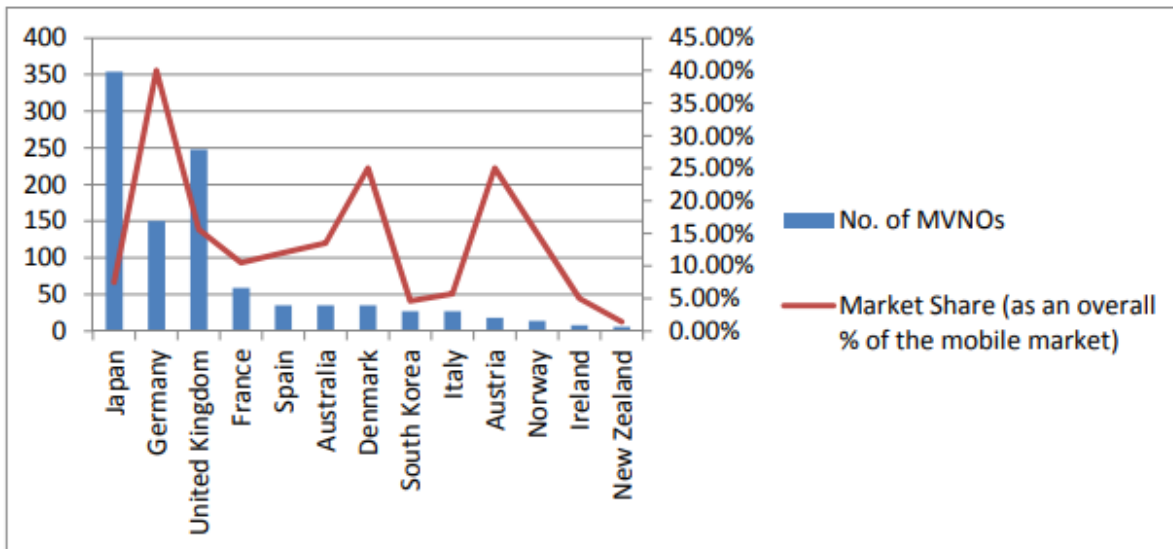
121. This chapter examines conditions for entry and expansion in relation to the supply of mobile services in New Zealand.
122. Entry at the retail level may be based either on an MVNO model, where the entrant purchases capacity from an existing MNO and uses this to supply retail services, or as an MNO, where the entrant deploys its own mobile network.

MVNO based entry

123. MVNO access allows non-MNOs to acquire network capacity from an MNO and use this to supply mobile services. MVNO access allows for entry at the retail level without having to invest at the network level.
124. There are a range of MVNO models, depending on the division of functions between the MVNO and the host MNO network. ‘Light’ MVNOs focus on marketing and customer relations, and largely involve reselling the host MNO’s services (with wholesale arrangements based on per minute or per MB rates). Other forms of MVNOs will undertake additional functions (such as managing their own IT systems and billing systems) and purchase capacity in bulk from the host MNO. Deeper MVNOs have a greater ability to innovate, although more investment by the MVNO is likely to be required.
125. The wholesale market for MVNO services has remained relatively limited in New Zealand compared to other countries. The existing MVNOs in New Zealand appear to be relatively light, based on the resale of MNO services. MVNOs currently supply less than one percent of mobile services in New Zealand.
126. In its 2015 submission on MBIE’s review of the Telecommunications Act, Trustpower noted that the number and market share of MVNOs in New Zealand is low compared to other countries, as shown in Figure 14 below.⁴¹

⁴¹ Trustpower “Promoting a vibrant mobile market in New Zealand submission” (3 November 2015), page 2.

Figure 14: Number of MVNOs and MVNO market share



Source: Trustpower "Promoting a vibrant mobile market in New Zealand submission" (3 November 2015), page 2.

127. In its same submission, Trustpower noted the following:

127.1 MVNO access in a number of countries has been subject to various forms of regulation, such as through conditions on the award of spectrum; access regulation; or conditions placed on mergers.⁴² MVNO access has been regulated in a number of countries through a finding of either single firm or joint dominance (including South Korea, Spain, and Chile). MVNOs have also emerged through commercial agreements in countries such as Australia and the United Kingdom, where there has been sufficient competition between MNOs.⁴³; and

127.2 competitive tension at the wholesale level between the three MNOs in New Zealand may be less than in other markets with three MNOs, as 2degrees is a relatively late entrant with more limited coverage than the other MNOs, and as a result, 2degrees remained reliant on roaming. Trustpower⁴⁴ referred to concerns expressed to the Commission in 2013 by 2degrees and its consultant (Covec) during the 700MHz spectrum acquisition clearance process. Covec indicated that capacity constraints as a result of spectrum allocations may inhibit the ability of 2degrees to compete at the wholesale level.⁴⁵

128. However, 2degrees has recently submitted that it is completing the deployment of its national mobile network, and that it "is now in a position to pursue a range of

⁴² Trustpower "Promoting a vibrant mobile market in New Zealand submission" (3 November 2015), page 8.

⁴³ Trustpower "Promoting a vibrant mobile market in New Zealand submission" (3 November 2015), Attachment B.

⁴⁴ Trustpower "Promoting a vibrant mobile market in New Zealand submission" (3 November 2015), page 12.

⁴⁵ Covec "Economic Analysis of 700MHz Spectrum Allocation: Prepared for Two Degrees Mobile Limited" (26 November 2013), page 10.

wholesale opportunities that will enable new retail competitors.”⁴⁶ As noted earlier in Table 2, 2degrees has achieved a level of network coverage that is the same as that of the other MNOs. This suggests that, absent adverse changes in the market, the above concerns around 2degrees’ ability to compete in the wholesale market may have diminished.

129. A number of other parties have suggested that more vigorous competition at the wholesale level will result in better outcomes for consumers.
- 129.1 Vocus has described the lack of MVNO services as a market failure, and that MVNOs bring a level of innovation to the market that the MNOs do not;⁴⁷
- 129.2 InternetNZ has also noted the low MVNO penetration in New Zealand when compared with other countries, and supports better understanding the reasons for this difference; and⁴⁸
- 129.3 Analysys Mason, on behalf of Trustpower notes the high mobile market concentration in New Zealand, and that ARPU is rising, against the trend of other countries.⁴⁹ Analysys Mason suggests that a more dynamic retail mobile market would result in better outcomes for consumers.
130. We note that if bundling involving mobile services becomes more prevalent at the retail level, the ability of non-MNOs to compete in the supply of fixed line services could depend on wholesale access to mobile services. In a 2013 report for the European Commission on the review of markets subject to ex ante regulation, Ecorys considered the potential impact on competition if consumers exhibited a preference to purchase fixed and mobile services from the same service provider: “In that case, the market addressable by fixed service providers will decrease unless they are able to obtain mobile access on reasonable terms.”⁵⁰
131. However, Ecorys concluded that an adverse effect on competition was unlikely, “partly because the extent of quadruple play bundling is still low and partly because consumers would still retain the option to buy fixed and mobile services from separate suppliers.”⁵¹ These two factors working together meant that fixed line service suppliers would not be foreclosed from a significant share of the market. The wholesale market for mobile access, which is the market in which MVNO services are

⁴⁶ 2degrees “Mobile Market Review – Issues for consideration” (30 November 2017), page 1.

⁴⁷ Vocus “Mobile Market Study Scoping” (30 November 2017).

⁴⁸ InternetNZ “Mobile Market Study – Internet NZ’s feedback on study scope” (30 November 2017), paragraph 5B.

⁴⁹ Analysys Mason “Report for Trustpower: Input to Commerce Commission mobile market review” (28 November 2017), pages 3 to 5.

⁵⁰ Ecorys “Future electronic communications markets subject to ex ante regulation” (18 September 2013), page 161.

⁵¹ Ecorys “Future electronic communications markets subject to ex ante regulation” (18 September 2013), pages 161 and 162.

supplied, is no longer included in the European Commission's recommendation of markets subject to ex ante regulation.⁵²

132. We also note that regulation of MVNO access could have an adverse impact on investment, which is a consideration under section 18 of the Telecommunications Act. For example, an MNO may be discouraged from investing in coverage or new technology if it were to be mandated to offer wholesale access to a downstream competitor. Any such impact would need to be considered along with the potential benefits from regulating MVNO access.

Questions

- Q12. Do you agree we have described the key factors relevant to wholesale competition both currently and into the immediate future? Are there any other factors likely to influence wholesale competition for mobile services, going forward?
- Q13. Please describe how you see wholesale competition evolving over the next 2-5 years.
- Q14. Why do MVNOs account for a small share of subscribers and revenue in New Zealand?
- Q15. How have the competitive conditions changed in the wholesale mobile services market? What impact has 2degrees had in the wholesale market in recent years?
- Q16. Has 2degrees' completion of deployment of its national network changed, or is likely to change, the competitive environment for wholesale mobile service going forward? If so, please describe.
- Q17. Are MVNOs able to negotiate competitive wholesale access arrangements with MNOs? What are the key constraints facing MVNOs in New Zealand, and how do they differ from other countries?
- Q18. Where MVNOs have entered the market and expanded in other countries, to what extent has such entry been the result of commercial agreements, or based on regulated MVNO access or other conditions imposed by regulatory or competition authorities (such as conditions of mergers and/or obligations on spectrum licences)?
- Q19. To what extent has the emergence of MVNOs overseas resulted in improved outcomes for consumers in those countries? What effect has MVNO entry had in other countries on pricing, choice, and investment?
- Q20. What are the risks that fixed line only broadband providers could be foreclosed by providers of mobile and fixed line broadband bundles and what are the potential consequences of that for competition?

⁵² <https://ec.europa.eu/digital-single-market/en/news/commission-recommendation-relevant-product-and-service-markets-within-electronic-communications>

MNO based entry

133. There are a number of barriers to entry at the network level. A new MNO needs access to spectrum as well as to invest in the radio access network infrastructure required to deliver mobile services.
134. Given the significant fixed costs associated with deploying a mobile network, an entrant MNO is initially likely to experience higher costs per user than established incumbent MNOs as it seeks to gain sufficient scale. NZ Institute of Economic Research (NZIER) has previously noted the importance of economies of scale, particularly in more remote areas:⁵³

Size matters a great deal for mobile services. Like most networked services, the average cost of infrastructure falls with every additional customer.

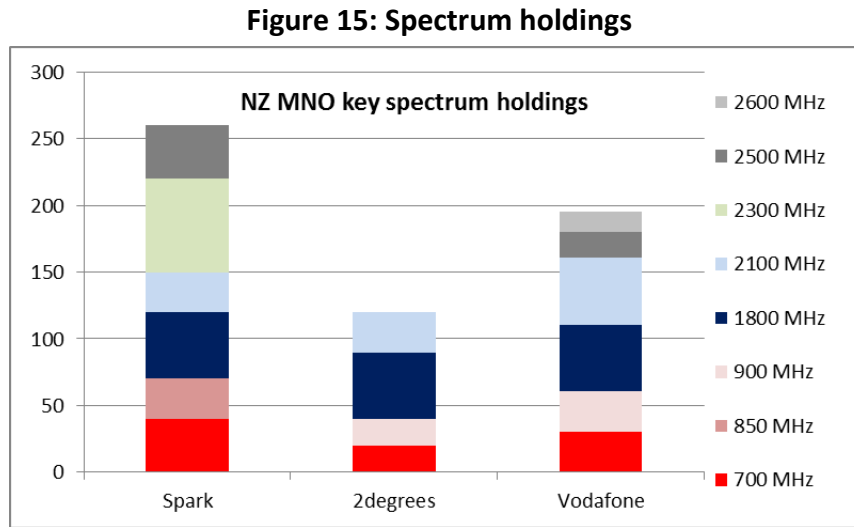
135. NZIER estimated that network costs in the more sparsely populated parts of New Zealand are on average 50% higher than the average network costs. Furthermore, the substantial fixed costs of building a network are largely sunk, making MNO entry highly risky. Such barriers to entry can be lowered through infrastructure sharing arrangements such as roaming, co-location, and sharing of active equipment.
136. Additional barriers to entry and expansion relate to establishing a brand and reputation particularly among higher value customers. Potential barriers could also arise as a result of bundling or exclusive dealing arrangements with incumbents and we discuss these further in Chapter 6 and Chapter 7 below.

Access to spectrum

137. Spectrum is a critical input for MNOs. As discussed earlier, the propagation characteristics of lower frequency spectrum (typically sub 1GHz) allows MNOs to cover larger geographic areas and achieve more effective indoor coverage than higher frequency spectrum. Higher frequency spectrum is used to provide additional capacity in specific regions. For example, sub gigahertz frequencies are utilised to provide mobile coverage in rural areas where geographic coverage is more important than data transfer capacity. At the other end of the scale the higher frequency ranges (for example 23GHz Fixed Band) are used more for providing point to point wireless backhaul from where fibre isn't feasible.

⁵³ NZIER "Mobile industry in New Zealand: Performance and prospects" (October 2014), page 4.

138. The current holdings of spectrum used by the 3 MNOs are shown in Figure 15.



Source: Radio Spectrum Management website

139. There are some asymmetries in the current holdings of key spectrum bands used by the 3 MNOs to supply mobile services:

139.1 in the sub 1GHz bands, Spark holds a total of 70MHz spectrum (700MHz/850MHz), Vodafone holds a total of 60MHz spectrum (700MHz, 900MHz), and 2degrees holds a total of 40MHz spectrum (700MHz/900MHz);

139.2 in the 1800MHz band, each of the MNOs owns 50MHz spectrum; and

139.3 in the 2100MHz band, Spark and 2degrees each own 30MHz, while Vodafone owns 50MHz.

140. Despite holding a smaller block of sub 1GHz spectrum, 2degrees' parent, Trilogy International, has stated that:⁵⁴

Management believes 2degrees has ample spectrum to compete effectively against other New Zealand wireless operators and expects to renew all or substantially all of its spectrum position once the applicable license expiration dates are reached.

141. The additional spectrum held by Spark and Vodafone, particularly in the 2300MHz-2600MHz bands, has enabled them to launch fixed wireless services. For example, in our decision to clear Spark's acquisition of 70MHz of radio spectrum in the 2300MHz band, we noted Spark's rationale for the acquisition:⁵⁵

Through its Skinny brand, Spark is currently offering a fixed wireless product, utilising its existing spectrum infrastructure. This means that its fixed wireless product is currently sharing Spark's cellular bandwidth. ... The additional spectrum Spark is seeking to acquire

⁵⁴ Trilogy International Partners "Annual Information Form For the Year Ended December 31, 2017" (21 March 2018), page 16.

⁵⁵ Commerce Commission, "Determination: Spark New Zealand Trading Limited and Craig Wireless New Zealand Spectrum Operations Limited and Woosh Wireless Holdings Limited [2016] NZCC7" (23 March 2016), paragraphs 26-27.

would enable it to migrate its fixed wireless offering to a dedicated spectrum band. Currently, Spark's fixed wireless service is available in limited areas, so as to minimise disruption to its existing cellular network.

142. The ability to supply both fixed wireless services and mobile services is likely to confer some economies of scope on the supply side, both in relation to spectrum and equipment. Similarly, the allocation of spectrum to support 5G services (which are likely to include both fixed wireless services and mobile services) will enable successful bidders to benefit from such economies of scope.
143. The Commission has previously considered the competition implications of spectrum acquisitions through the clearance regime (such as in the case of the 700MHz spectrum). Absent changes to the Commerce Act or the Radiocommunications Act, any concerns around future acquisition of spectrum are likely to be considered under the Commerce Act clearance regime as well as through the use of spectrum caps in future spectrum allocations.
144. As discussed in Chapter 7 below, MBIE's Radio Spectrum Management (RSM) team is planning to allocate further spectrum in 2019 to support the development of 5G services. This could allow for a new entrant to acquire spectrum and enter at the network level. Such an entrant might seek to rely on roaming in order to be able to offer national coverage.

Question

- Q21. To what extent, and in what ways, do the current spectrum holdings constrain competition in the supply of retail or wholesale mobile services in New Zealand?

National roaming

145. National roaming is a wholesale mobile access service, which allows customers on one MNO to roam onto the network of another MNO. Roaming is typically used by new entrants or smaller MNOs to offer national coverage in the mobile markets. National roaming is currently a specified service under Schedule 1 of the Telecommunications Act, which allows us to determine non-price terms of access. However, national roaming is not currently subject to an STD.
146. When it first entered the mobile market in New Zealand, 2degrees had deployed a mobile network which covered 47% of New Zealand's population. In order to be able to offer national coverage, 2degrees initially relied on roaming on Vodafone's mobile network, which it secured through a commercial agreement. 2degrees has since invested in expanding the footprint of its own network, and now reaches 98% of the population.

147. During 2017, we reviewed the terms of the original contract and contract variations relating to the commercial roaming service that Vodafone has supplied to 2degrees. In our summary of findings, we noted that the supply of roaming services involves a number of conflicting incentives:

For instance, a mobile operator offering national roaming risks giving up some of their competitive advantage (in terms of coverage) in retail mobile markets. The mobile network operator offering national roaming must balance this potential loss of competitive advantage and differentiation against the additional wholesale revenues earned by providing roaming on their remote sites. In addition, the provision of national roaming on a commercial basis may alleviate the need for regulatory intervention to set the terms for access to the roaming service.

148. We concluded that there was nothing of concern in the current national roaming contract, with conditions relating to access to new sites and new technologies reflecting the balance above. We noted that provisions in earlier variations of the roaming agreement were concerning, although these have been superseded.
149. We are separately undertaking a review of the roaming service as part of the five yearly reviews of services in Schedule 1 of the Telecommunications Act. Our preliminary view is to retain the roaming service as a specified service.

149.1 the reasons we provided for retaining national roaming as a specified service included the potential competition issues arising from the allocation of spectrum for 5G. A potential new entrant would almost certainly require a roaming arrangement to provide immediate coverage whilst it built out its physical network; and⁵⁶

149.2 we also noted that the regulated service is specified only, which means that we do not set price terms. This mitigates the risk that roaming will distort investment incentives facing both the MNO relying on roaming and the MNO supplying roaming. However, roaming as a regulated service acts as an important backstop in the event of commercial negotiations failing.

Mobile co-location and other forms of infrastructure sharing

150. Mobile co-location allows an MNO to install equipment on the passive infrastructure (cell site) of another MNO. Other forms of infrastructure sharing include the sharing of spectrum and radio access network equipment.
151. Mobile co-location is a specified service in New Zealand, and has been subject to an STD since 2008.⁵⁷ We reviewed whether mobile co-location should remain a specified service in 2016 and concluded that it should remain in Schedule 1.⁵⁸

⁵⁶ Commerce Commission “Review of National Roaming: Preliminary view on consideration of deregulation of national roaming” (9 July 2018), paragraph 16.

⁵⁷ Commerce Commission, “Standard Terms Determination for Co-location on Cellular Mobile Transmission Sites, Schedule 1 Mobile Co-location Service Description” (11 December 2008).

⁵⁸ Commerce Commission “Review of Designated and Specified Services under Schedule 1 of the Telecommunications Act 2001” (5 July 2016), paragraph 154.

- 151.1 we noted that the ability to co-locate equipment on the infrastructure of another MNO facilitates the efficient deployment of mobile technology by sharing the cost of facilities such as towers and masts. The ability to share such costs is likely to become increasingly important as a mechanism for reaching more remote areas with current and new technology such as 4G LTE and 5G; and⁵⁹
- 151.2 we also noted that there had been increased use of co-location, particularly during the period from 2012 to 2015, and that co-location had been occurring both on RBI and non-RBI sites. We referred to information from Vodafone that it was “co-locating on hundreds of sites, both as an access seeker and access provider, and in excess of 75% of new Vodafone RBI towers have been co-located by other mobile and wireless operators.”⁶⁰
152. Under RBI1, Vodafone was appointed by the Government to upgrade existing cell sites and build new cell sites in rural areas, with the support of Government funding. Vodafone is required to offer co-location services in respect of cell sites funded through RBI1. MBIE has reported that 154 new cell sites have been built under RBI1, all of which allow for co-location by competing operators. In addition, 387 cell sites have been upgraded.⁶¹
153. Co-location on existing cell sites can be more challenging than on new cell sites, as existing cell site infrastructure may have been built to accommodate a single set of equipment. The installation of additional equipment may require strengthening of the mast infrastructure, and may also result in the equipment being located further down the mast, leading to reduced coverage.
154. The second stage of the RBI programme (RBI2) is further extending mobile coverage in rural areas, while the Government’s MBSF is providing greater mobile coverage along state highways and in tourism destinations where no coverage currently exists. The Rural Connectivity Group (RCG) is a joint venture between the three MNOs appointed by the Government to build the infrastructure to extend mobile coverage under the RBI2 and MBSF programmes. This differs from the RBI1 scheme in that under the RCG model, the three MNOs will share radio access network equipment and antennae on each site constructed by RCG.

Question

- Q22. What evidence is there on whether or not national roaming and co-location regulation have promoted the efficient expansion of 3G and 4G coverage in New Zealand?

⁵⁹ Commerce Commission “Review of Designated and Specified Services under Schedule 1 of the Telecommunications Act 2001” (5 July 2016), paragraph X28.1.

⁶⁰ Commerce Commission “Review of Designated and Specified Services under Schedule 1 of the Telecommunications Act 2001” (5 July 2016), paragraph 157.

⁶¹ <http://www.mbie.govt.nz/info-services/sectors-industries/technology-communications/fast-broadband/resolveuid/e4a46ef96ec644c2b028441fbdc08cba>

- Q23. What evidence is there that the other forms of infrastructure sharing such as provisions of RBI1 and the RCG, have been effective in allowing competing operators to expand their coverage?
- Q24. Have there been any problems in relation to the infrastructure sharing provisions of RBI1 that could inform infrastructure sharing arrangements in the future?

Transport services (backhaul)

155. The MNOs rely on transport services to connect cell sites and other network nodes. Such connectivity may be by way of active services (such as leased lines), or passive services (such as the direct fibre access service). We understand that Spark and Vodafone self-supply some of their mobile transport requirements, but also acquire transport from other parties such as Chorus. In 2017, 2degrees announced that it had selected Chorus as the primary service provider of wholesale backhaul services to support its fixed and mobile services.⁶²
156. Although backhaul can be provided by way of a number of technologies, including wireless, fibre based backhaul services are becoming increasingly important to provide the capacity required to supply higher speed mobile data services. This is expected to continue with the deployment of 5G mobile networks. Wireless backhaul may also be used where fibre is not available.
157. The level of competitive intensity in the supply of backhaul services varies around New Zealand. In some regions, there are a number of competing backhaul networks, such as Chorus, Spark, Vodafone, Vocus, and the Local Fibre Companies. In other areas, the options are more limited. We are currently reviewing the supply of regional backhaul services in our backhaul study.⁶³

Mobile interconnection services

158. A mobile network needs to be able to interconnect with other networks to ensure that its subscribers can communicate. Interconnection services include both origination and termination services.
159. Mobile origination services are supplied on a wholesale basis in respect of calls to 0800 numbers, where the call recipient pays for the call. In its submission on our draft scope for the mobile study, Vocus notes that mobile origination rates are 8-9 cents per minute, which “are excessively high as a result of avoiding regulation.”⁶⁴
160. MTAS allows calling and messaging services from one mobile network to be terminated on another mobile network. MTAS is a designated access service under Schedule 1 of the Telecommunications Act, which allows us to determine the price

⁶² “2degrees announces Chorus as primary provider of national backhaul” (8 August 2017), at <https://www.2degreesmobile.co.nz/company/news-and-media-releases/2degrees-announces-chorus-as-primary-provider-of-national-backhaul/>

⁶³ <http://www.comcom.govt.nz/regulated-industries/telecommunications/monitoring-reports-and-studies/study-of-telecommunications-backhaul-services/>

⁶⁴ Vocus Communications “Mobile Market Study Scoping” (30 November 2017), paragraph 43.

and non-price terms of the service. We reviewed whether MTAS should remain a designated service in 2015, and concluded that it should remain in Schedule 1. Our reasons for retaining MTAS as a designated service included that each MNO has a monopoly over the termination of calls on its network under the calling party pays principle, and that the ability to increase MTAS prices can distort downstream competition.⁶⁵

161. In 2011, we finalised a STD in respect of the MTAS, in which we set mobile termination rates for voice and text services. These are summarised in Table 6.

Table 6: Mobile termination rates

Effective from	6 May 2011	1 Oct 2011	1 Apr 2012	1 Apr 2013	1 Apr 2014
Voice (cpm)	7.48	5.88	3.97	3.72	3.56
SMS (cpSMS)	0.06				

Source: Commerce Commission Decision 724

162. In our MTAS STD, we noted that there had been a significant differential in retail prices for on-net and off-net calls, and that we expected to see a decrease in this differential and an increase in off-net traffic. As noted in Figure 10 above, the volume of off-net traffic has increased strongly since 2011.
163. A number of submissions on our scope paper for the mobile study noted that the regulated reductions in voice MTRs finished in 2014, and that international evidence indicates that the cost of mobile termination is decreasing.⁶⁶ These submissions recommended that a review of the MTAS STD should be undertaken.

Question

- Q25. What are your views on the current regulation of mobile interconnection services?
- Q26. Does the current regulated MTAS, including the pricing principles, remain appropriate?

⁶⁵ Commerce Commission “Consideration of whether to commence an investigation into whether to omit the Mobile Termination Access Services from Schedule 1 of the Telecommunications Act 2001” (23 September 2015), paragraph 4.

⁶⁶ Chorus “Submission in response to the Commerce Commission’s Mobile Market Study Terms of Reference” (30 November 2017); Vocus Communications “Mobile Market Study Scoping” (30 November 2017).

Chapter 6 – Consumer engagement and satisfaction with mobile services

Purpose of this chapter

164. This chapter looks at the nature and effectiveness of consumer engagement in the mobile market and the extent to which the needs and expectations of consumers have been met in relation to mobile services. If consumers have difficulty choosing the services that best meet their needs, this in turn creates barriers to entry and expansion in the competitive supply of mobile services.
165. We are interested in better understanding the demand side of the market for mobile services, in particular:
- 165.1 the ability of consumers:
- 165.1.1 to access the information required in order to compare retail mobile offers and to assess which retail offers best suit their current and future needs; and
- 165.1.2 to act by making informed purchasing decisions, including the ease of switching between service providers.
- 165.2 consumer trust and satisfaction with mobile services, how this has changed, and how satisfaction with mobile services compares with other sectors.

The ability of consumers to take advantage of competing retail offers

166. The ability of consumers to assess alternative offers and to switch between service providers, and to new suppliers, is a crucial source of competitive pressure on suppliers of mobile services. Where consumers are confident that they can easily compare retail offers and switch to offers that better suit their needs, service providers will face stronger incentives to both compete for new customers as well as to retain their existing customers. Where consumers find it difficult to compare offers and to switch between service providers, such incentives will be more muted.
167. The extent to which consumers are able to take advantage of competing mobile offers and make informed purchasing decisions will depend on whether they can access the information required to compare retail mobile offers and assess which retail offers best suit their current and future needs. Consumers must also be able to act on those comparisons by switching between competing service providers. We discuss each of these below.

The ability of consumers to access and assess information on retail mobile services

168. As with many markets, mobile markets exhibit price discrimination. For example the price of a call minute or a GB of data varies, depending on whether it is purchased as a prepaid service or an on account service. Such price discrimination can be beneficial to the extent that it expands demand and results in consumers being served who would otherwise not be.

169. However, where there are a lot of complex choices, or where there are non-transparent add on costs (such as excess charges where calling or data allowances are exceeded, or international roaming charges), consumers may find it challenging to compare retail offers. Complexity around the terms and conditions of mobile services may also contribute to the difficulty of comparing competing services and deciding whether to switch between providers.
170. Consumer NZ gathers some information through its telecommunications consumer survey on the ease with which consumers can compare mobile services. For example, in 2017, Consumer NZ reported that:⁶⁷
- Overall, consumers were more comfortable weighing up mobile companies and services compared with internet companies and services: 60 percent agreed it was easy to navigate the mobile market. Skinny's plans were considered significantly easier than others to compare.
171. Although the majority of consumers consider that they are able to easily compare mobile plans, it appears that there may be a significant proportion of mobile users (40%) who still face some difficulty.
172. Pricing comparator websites can facilitate the comparison of different mobile service plans and lower search costs for consumers,⁶⁸ provided that they are based on complete and up to date information and adequately disclose any commercial relationships with service providers whose offers are being compared. Ofcom⁶⁹, the European Commission⁷⁰, and the UK Competition and Markets Authority⁷¹ have each published guidelines or high level principles for comparator websites in order to support consumer trust in such tools.
173. In order to be able to make meaningful comparisons, either through the use of price comparator websites or by independently comparing plans, consumers will need to be aware of their usage. A lack of transparency of how many minutes or how much data they download each month may mean that consumers end up paying more than they could have done for mobile services if they are on an unsuitable plan. It may also be the case that consumers find it difficult to anticipate what their needs will be, particularly when their data consumption is growing.
174. If consumers cannot readily compare service offers and/or they fail to correctly anticipate their own requirements, they may end up subscribing to retail plans that do not best meet their needs, or that produce unexpected 'bill shock'. For example, a consumer may switch to a mobile bundle offering a monthly allowance of calling minutes, texts, and data for a fixed monthly price. If the consumer uses up the data allowance, they may end up having to purchase additional data at a relatively high price per GB. Similarly, if the consumer travels overseas, they may incur additional

⁶⁷ Consumer NZ "Consumer" (February 2017), page 10.

⁶⁸ A number of such websites are available in New Zealand, such as www.glimp.co.nz/mobile

⁶⁹ <https://www.ofcom.org.uk/consultations-and-statements/category-2/price-calculator-accreditation>

⁷⁰ https://ec.europa.eu/info/publications/comparison-tools-and-third-party-verification-schemes_en

⁷¹ <https://www.gov.uk/cma-cases/digital-comparison-tools-market-study>

charges for international roaming services. Such charges may not have been transparent or influential in making the original decision to subscribe to the plan.

175. UK studies have identified some significant issues in this regard:

175.1 recent research undertaken by Ofcom for the United Kingdom found that 24% of consumers in communications markets are not confident that they are on the best deal for their needs, and 30% find it difficult to understand the different options in the market;⁷² and

175.2 in 2015, research in the United Kingdom estimated that mobile customers were overpaying £355 million per year by failing to switch when they came to the end of their mobile contract.⁷³

176. Ofcom has recently proposed rules requiring service providers to notify customers when their contract period is coming to an end, and to inform customers of any changes to prices and of options that could save them money.⁷⁴ In New Zealand, on account customers might be on a fixed term contract with a handset or on an open term contract that is paired with monthly interest free handset repayments over a fixed term. If the customer on the fixed term contract is unaware of the expiry of the fixed term and does not move to a SIM only plan, they are likely to end up paying more than they could have done as the fixed term price usually takes into account an amount for the handset.

177. The Australian Government has recently decided to introduce legislation for a Consumer Data Right (CDR) to give consumers greater control over their data.⁷⁵ The CDR is essentially a data portability right, which should enable consumers to use the information that service providers hold about them to compare services that meet their needs and to move their business, driving competition.⁷⁶

178. The CDR is initially being introduced for the banking sector, with energy and telecommunications to follow. According to the ACCC,⁷⁷ whose role is to develop and enforce rules around the implementation of the scheme, the CDR will improve consumers' ability to compare competing service offers and switch between services on offer.⁷⁸

⁷² Ofcom "Helping consumers to engage in communications markets – Update on next steps" (27 April 2018).

⁷³ Behavioural Insights Team "Applying behavioural insights to regulated markets" (26 May 2016), page 45, at <http://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjaiZGNvpPdAhXM62EKHcdODXoQFjAAegQIAhAC&url=http%3A%2F%2Fwww.behaviouralinsights.co.uk%2Fwp-content%2Fuploads%2F2016%2F05%2FApplying-behavioural-insights-to-regulated-markets-final.pdf&usg=AOvVaw3CpVboeplb-jHiFd0Q2tHX>

⁷⁴ Ofcom "Helping consumers to engage in communications markets: Consultation on end-of-contract and out-of-contract notifications" (31 July 2018).

⁷⁵ <https://treasury.gov.au/consumer-data-right/>

⁷⁶ <https://www.accc.gov.au/speech/consumer-data-and-regulatory-reform>

⁷⁷ ACCC "Communications Sector Market Study: Final report" (April 2018), pages 161 and 162.

⁷⁸ <https://www.accc.gov.au/media-release/accc-welcomes-consumer-data-right>

179. The UK Department for Business, Energy and Industrial Strategy (BEIS) has also been consulting recently on how to ensure that consumers benefit from well-functioning markets. BEIS recognises the importance of both price comparison websites and consumer access to their own data:⁷⁹

Data is at the heart of these new approaches. Companies hold large amounts of data about consumers and their use of particular products and services. Too often this data works against consumers rather than for them, for example when companies identify loyal customers and put them on expensive deals. We want to end this information asymmetry so that consumers can use their own data to get the best deals and drive competition.

180. The Commission has also identified the telecommunications sector as a key sector where standard form consumer contracts may contain unfair contract terms (UCT), as per the provisions of the Fair Trading Act.^{80 81} In our 2016 review of consumer contracts of telecommunications providers, we found that most of the companies had made genuine efforts to comply with the Fair Trading Act, although each of the companies had relied on terms that we considered were potentially unfair. These included terms relating to the limitation of the liability of the company, the unilateral variation of price and services, the responsibility of the customer for unauthorised charges, and the exclusion of the trader's liability for consequential loss.
181. We noted that the telecommunications companies had advised that they would make some changes to their terms and conditions as a result of the Commission's engagement with them, and that we had provided advice to them about their obligations to comply with the UCT provisions of the Fair Trading Act.
182. Contracts may not contain any UCTs, and yet may still be inaccessible to consumers. The BEIS has noted that "The way that terms and conditions are presented can make a real difference to consumer comprehension. Consumers are more likely to read and understand terms and conditions if they are shortened and simplified."⁸²
183. The business segment covers a range of business customers, with differing abilities and attitudes to reviewing competing mobile plans. Smaller enterprises may face similar search costs and challenges as residential customers when assessing retail offers. Larger corporate customers with higher levels of spend on mobile services or with more specific requirements may have dedicated procurement teams that periodically tender out their mobile services.
184. In the business segment, our 2015 study found that 73% of businesses surveyed were on fixed term contracts for mobile voice and data services. Of these, 69% were

⁷⁹ Department for Business, Energy, and Industrial Strategy "Modernising Consumer Markets: Consumer Green Paper" (April 2018), page 21.

⁸⁰ Section 26A of the Fair Trading Act 1986.

⁸¹ Commerce Commission "Telecommunications Contract Review: Unfair contract terms", February 2016.

⁸² Department for Business, Energy, and Industrial Strategy "Modernising Consumer Markets: Consumer Green Paper" (April 2018), page 41.

on contracts with a term of two years. Over half (52%) of businesses on contracts for mobile services were unaware of when their contract expired.⁸³

The ability of consumers to switch

185. In addition to being able to compare the price and non-price terms of mobile services, consumers should be able to switch between service providers with as little cost (monetary or otherwise) as possible. Mobile number portability was introduced in New Zealand to reduce switching costs. It has done this by allowing consumers to retain their mobile number when they change service providers. Mobile number portability is a designated multi-network service in Schedule 1 of the Telecommunications Act, and in 2016 we re-determined the arrangements for the porting of mobile numbers.⁸⁴
186. Other developments which are likely to have reduced switching costs include the penetration of multi-band handsets which are compatible with the spectrum frequencies operated by all of the MNOs in New Zealand. In the United Kingdom, BEIS refers to the emergence of new technologies such as automatic switching services or apps which have the potential to significantly reduce the costs for consumers to make informed choices.⁸⁵
187. However, there may be other costs which inhibit customers switching service providers. These include the imposition of early termination fees for contracts and the use of long term contracts, both of which have been highlighted by the ACCC in its recent communications sector study in Australia.⁸⁶ We note that interest free payment plans for handsets may provide a valuable option for consumers to spread the cost of a new handset over a 12, 24 or 36 month period. However, such practices may also have the effect of increasing consumer stickiness.
188. The practice of handset locking, which prevents a handset from operating on a competitor's network, also has the effect of raising switching costs. We have previously commented on the locking of mobile handsets. For example:
- 188.1 in 2008, we expressed our concerns regarding Vodafone's intention to implement handset locking for all mobile devices purchased at its stores, particularly at a time when a new mobile entrant was expected;⁸⁷
- 188.2 in 2012, we reiterated our concerns regarding the potential anti-competitive effects of handset locking, although noted that a transparent lock in period

⁸³ UMR Research "Competition for Business Customers in the Mobile Industry: A Report for the Commerce Commission" (December 2015), pages 84 and 85.

⁸⁴ Commerce Commission "Determination for the designated multi-network services of 'local telephone number portability service' and 'cellular telephone number portability service': Final determination under section 39 of the Telecommunications Act 2001", 19 December 2016.

⁸⁵ Department for Business, Energy, and Industrial Strategy "Modernising Consumer Markets: Consumer Green Paper" (April 2018), page 21.

⁸⁶ ACCC "Communications Sector Market Study" (April 2018), pages 128 to 129.

⁸⁷ Commerce Commission letter to Vodafone "Locking of mobile handsets" (29 April 2008).

that reflects the recovery of subsidised costs may not undermine competition.⁸⁸

189. Handset locking still occurs, and this is likely to have the effect of raising switching costs for consumers. For example, Vodafone notes that a small number of Vodafone mobile handsets are locked to its network, and that these handsets can be unlocked at no charge if the handset was purchased more than 9 months ago (otherwise Vodafone charges a fee of \$30).⁸⁹ Spark will also unlock a handset for free if the handset has been on Spark's network for at least 9 months (or for a charge of \$30).⁹⁰ 2degrees does not charge to unlock handsets on its network.⁹¹
190. New wearable devices (i.e. smart watches) are embedded with e-SIMs⁹² which has led to concerns over a new type of locking where wearable device manufacturers enter into exclusive supply deals with MNOs. For example; in New Zealand Samsung's Gear S3 can only be purchased from Spark and its e-SIM is locked to Spark's network.⁹³
191. The ACCC has expressed concern over similar practices in Australia:⁹⁴

We are concerned that restrictions associated with the e-SIM model are impeding the ability of some mobile service providers, who have not reached agreement with device manufacturers to offer these devices, to compete with the mobile service providers who have, thereby reducing consumer choice.

192. The willingness of customers to switch between service providers may also be reduced where the customer purchases a bundle of services from its current provider. For example, in our decision on the Sky/Vodafone clearance application, we referred to evidence that customer churn is significantly reduced where customers are on bundles, which could significantly increase customer acquisition costs for rival retail service providers.⁹⁵ Where a reduction in churn reflects an increase in value derived by customers from their existing bundle of services, this may not be a cause for concern. However, as noted by an independent report prepared for Sky, the ability to bundle can make "price and value comparisons more difficult and provid[e] disincentives for subscribers to churn."⁹⁶

⁸⁸ Commerce Commission letter to Two Degrees "Skinny mobile handset locking", (24 February 2012).

⁸⁹ <https://www.vodafone.co.nz/help/mobile-phones/unlock/> (accessed August 2018).

⁹⁰ <https://www.spark.co.nz/myspark/mymobile/unlockingdevices/> (accessed August 2018).

⁹¹ <https://www.2degreesmobile.co.nz/help-and-support/mobile/your-phone-or-device/unlock-your-phone/> (accessed August 2018).

⁹² e-SIMs are discussed in greater detail in Chapter 7.

⁹³ Spark "Samsung and Spark bring Kiwis smartwatch with standalone connectivity." (25 August, 2017).

⁹⁴ <https://www.sparknz.co.nz/news/Samsung-and-Spark-bring-Kiwis-smartwatch/>

⁹⁵ ACCC "Communications Sector Market Study" (April 2018), page 153.

⁹⁶ Commerce Commission "Determination Vodafone Europe B.V. and Sky Network Television Limited [2017] NZCC1, Sky Network Television Limited and Vodafone New Zealand Limited [2017] NZCC2" (22 February 2017), paragraph X26.

⁹⁶ Commerce Commission "Determination Vodafone Europe B.V. and Sky Network Television Limited [2017] NZCC1, Sky Network Television Limited and Vodafone New Zealand Limited [2017] NZCC2" (22 February 2017), paragraph 183.

193. We have examined data on the volume of number porting in recent years in New Zealand, and have compared the annual volumes of ported numbers with the total number of mobile subscribers. This indicates that around five percent of New Zealand mobile subscribers port their numbers each year as shown in Table 7 below.

Table 7: Ported mobile numbers as % of mobile subscribers

	2014	2015	2016	2017
Porting as a percentage of mobile subscribers	4.9%	5.4%	4.8%	4.7%

Source: Commerce Commission analysis

194. Consumer NZ has found a higher level of customer switching reported in its consumer surveys, which may in part be explained by customers relinquishing their number. In February 2017 Consumer NZ noted that nine percent of consumers had switched mobile providers in the previous 12 months, and that a further nine percent said they were very likely to switch in the year ahead.⁹⁷ According to Consumer NZ, most mobile consumers (69%) consider switching between mobile providers to be easy.
195. In our 2015 study into the business segment of the mobile market, we found that 14% of businesses surveyed had changed their mobile provider within the previous 2 years, and that 11% of businesses were likely to switch in the next 12 months.⁹⁸ By comparison, 26% of respondents had switched power companies in the previous two years; 16% had switched between providers of fixed broadband services; 15% had switched between insurance providers; and 5% had switched between banks.⁹⁹
196. In our 2015 study, the main reasons given for businesses changing their mobile provider were poor coverage, high prices charged by the previous supplier, and being approach by a competing provider with a better deal.¹⁰⁰ The main reasons for not switching were that businesses were satisfied with the service and prices of their current provider.

Questions

- Q27 What difficulties do consumers face in comparing retail offers for mobile services? How could consumers access better information about prices and plan packages, service levels and associated facilities like international roaming in order to identify the package that best suits their needs?
- Q28. Should mobile providers be required to provide consumers nearing the end of a fixed term with information on options that could better meet consumer needs?

⁹⁷ Consumer NZ "Consumer" (February 2017), page 10.

⁹⁸ UMR Research "Competition for Business Customers in the Mobile Industry: A Report for the Commerce Commission" (December 2015), pages 89, 91.

⁹⁹ UMR Research "Competition for Business Customers in the Mobile Industry: A Report for the Commerce Commission" (December 2015), page 96.

¹⁰⁰ UMR Research "Competition for Business Customers in the Mobile Industry: A Report for the Commerce Commission" (December 2015), page 92.

- Q29. Should mobile providers be required to provide consumers with access to their data (usage, locations etc) in a format that facilitates comparison of services that best meet their needs?
- Q30. What barriers and costs do consumers face when switching and what improvements could be made to make switching easier?

Customer Satisfaction

197. A direct measure of how well service providers serve consumers is the reported level of consumer satisfaction. Consumer NZ undertakes periodic surveys of consumer satisfaction across a range of services, including mobile services. According to the results of the latest Consumer NZ survey in relation to mobile services (undertaken in December 2017 and published in February 2018), 54% of customers said they were very satisfied with mobile services (unchanged from 54% in 2016, and 49% in 2015). Customers of 2degrees and Skinny are the most satisfied with their service provider with:¹⁰¹
- 197.1 75% of Skinny customers and 61% of 2degrees customers were very satisfied with their service provider; and
- 197.2 49% of Spark's customers, and 48% of Vodafone's customers, were very satisfied with their service provider.
198. The latest satisfaction ratings are consistent with previous years, where both Skinny and 2degrees performed relatively well:
- 198.1 in December 2016, Skinny had the highest overall satisfaction (with 69% of Skinny customers very satisfied), followed by 2degrees (59%), Spark (53%), and Vodafone (50%);¹⁰² and
- 198.2 in November 2015, Skinny had the highest overall satisfaction (84% very satisfied), followed by 2degrees (69%), Vodafone (42%), and Spark (41%).¹⁰³
199. The above results may to some extent reflect the different expectations of customers of each of the service providers. For example, as noted in Chapter 4, Skinny repositioned itself as a budget mobile brand, and it may be that Skinny's customers may expect and receive a level of service that reflects this. Customers of the other mobile operators report lower levels of satisfaction, but may be reluctant to switch if there is a perception that Skinny will not be able to meet their expectations.
200. Compared to other sectors surveyed by Consumer NZ, satisfaction levels with mobile services appear towards the lower end, as shown in Table 8.

¹⁰¹ Consumer NZ "Consumer" (February 2018), page 10. It is noteworthy that Skinny—even though a subsidiary of Spark—has been able to establish a different level of customer service.

¹⁰² Consumer NZ "Consumer" (February 2017), page 11.

¹⁰³ Consumer NZ "Consumer" (February 2016), page 10.

Table 8: Consumer satisfaction by sector

Industry (number of businesses)	Overall Satisfaction			
	Largest	Best	Worst	Average
Mobile (4)	48%	75%	48%	54%
Banking (7)	52%	87%	52%	60%
House insurance (16)	47%	82%	39%	52%
Contents (16)	49%	87%	41%	54%
Car insurance (19)	55%	98%	78%	88%
Retail – Small appliances (13)	62%	83%	48%	62%
Retail – Home tech (10)	62%	78%	57%	63%
Retail – Mobile handsets (10)	62%	85%	49%	61%

Source: derived from Consumer NZ (Mobile 2017, Banking 2018, Car Insurance 2017, Retail 2017, House Insurance 2016, Contents Insurance 2016). Red numbers show the lowest industry in each satisfaction category, green numbers the highest. 'Largest' refers to the consumer satisfaction for the largest supplier in each industry.

201. MBIE's latest National Consumer Survey (NCS) reports on the level of consumer trust in businesses, by product or service category. In 2016, 31% of consumers surveyed said they did not trust mobile service providers in terms of being misled or treated unfairly. This was the fourth highest level of mistrust of the 17 product or service categories in the survey.¹⁰⁴ This indicates that consumers of mobile services may not always be confident that they are getting a good deal.
202. MBIE's NCS also found that 23% of respondents who had purchased a mobile service reported having a problem with their mobile service. This was the third highest rate of consumer dissatisfaction of all sectors surveyed.¹⁰⁵ The most common complaint reported in relation to mobile services related to hidden fees or unexpected charges.¹⁰⁶
203. In our Consumer Issues Report 2016/17 (covering the financial year to 30 June 2017), we noted that telecommunications remained the most complained about sector, generating 603 complaints related to the provisions of the Fair Trading Act (9% of Fair Trading Act complaints).¹⁰⁷ Telecommunications has been the most complained about sector to the Commission since 2014.
204. An analysis of complaints data for the 2017 calendar year shows that the majority of telecommunications complaints relate to fixed line services, with mobile services generating approximately one-third of telecommunications complaints for the

¹⁰⁴ MBIE "National Consumer Survey 2016", Figure 20, available at <https://www.consumerprotection.govt.nz/assets/PDFs/NCS-Final-Report-Summary-Findings.pdf>. This is a biennial survey undertaken by MBIE to better understand consumer awareness of their rights and the types of issues experienced by consumers.

¹⁰⁵ MBIE "National Consumer Survey 2016", Figure 28.

¹⁰⁶ MBIE "National Consumer Survey 2016", page 37.

¹⁰⁷ Commerce Commission "Consumer Issues 2016/17", page 4.

period. A prominent theme in complaints about mobile services in 2017 was prepaid mobile billing practices, with consumers complaining about minimum top-up levels, consumers stating that they were not informed of price changes, and issues with carry over data and minutes.

205. In our 2015 study into the business segment of mobile services, we found that business customers were generally satisfied with their mobile service provider. Overall, 80% of respondents said they were satisfied with their main provider of mobile services, with satisfaction levels highest among 2degrees' business customers (at 93%), followed by Vodafone (81%) and Spark (77%).¹⁰⁸

Questions

- Q31. How would you describe the relationship between customer satisfaction and switching in New Zealand?
- Q32. To what extent have lower levels of customer satisfaction with Vodafone and Spark resulted in consumers switching to Skinny and 2degrees?

¹⁰⁸ UMR Research "Competition for Business Customers in the Mobile Industry: A Report for the Commerce Commission" (December 2015), page 87.

Chapter 7 – Possible future developments and their impacts on competition and market outcomes

Purpose of this chapter

- 206. This chapter sets out some of the potential future developments in the supply of mobile services, and seeks feedback on their potential impacts on competition, consumers and the efficiency of mobile services.
- 207. We firstly introduce a key focus area and provide a short description of its function within mobile markets. Secondly, we identify key issues within that focus area and, lastly, we ask a set of questions to enable stakeholders to provide information to help us better understand the likely benefits and potential drawbacks of these emerging trends.
- 208. This information will help us develop a fuller picture of the likely trajectory of mobile markets, the competition effects, and consumer outcomes and highlight areas that may require either further scrutiny or closer monitoring in future.

Emerging trends

- 209. The telecommunications sector is undergoing rapid technological change with associated benefits to consumers and challenges for regulatory authorities and policy makers. In this chapter we focus on emerging trends in mobile markets that are most likely to have the largest impact on competitive outcomes in the near future.
- 210. The focus areas we have identified through our preliminary research are as follows:
 - 210.1 Development of 5G networks;
 - 210.2 Infrastructure sharing;
 - 210.3 Network slicing;
 - 210.4 Spectrum issues; and
 - 210.5 e-SIMs.

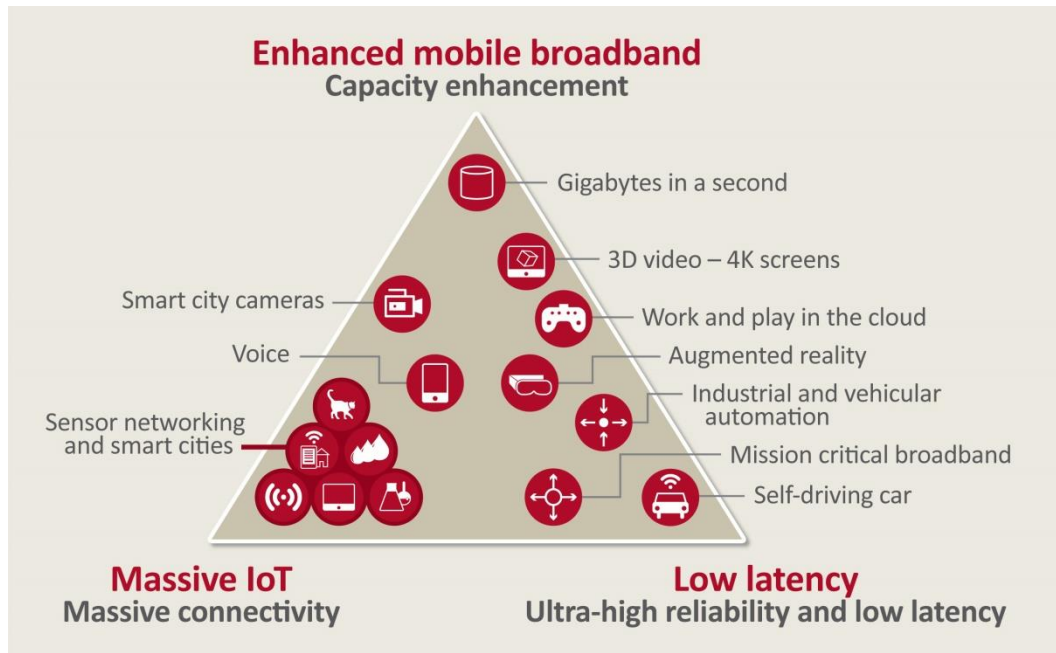
Development of 5G networks

- 211. 5G is the next generation of mobile internet connectivity and will require mobile operators to invest in all areas of their networks; spectrum, radio access network (RAN), transport and core networks. In New Zealand and globally, developments are well underway with several proofs of concept trials pointing to the first stage of commercial deployment around 2020.¹⁰⁹

¹⁰⁹ Ferry Crijpink, Alexandre Ménard, Halldor Sigurdsson, and Nemanja Vučević “The road to 5G: The inevitable growth of infrastructure cost”, *McKinsey & Company* (February 2018).

212. As Figure 16 illustrates, the International Telecommunications Union (ITU), which is the United Nations agency for information and communications technologies, expect possible 5G use cases to fall into the following three broad areas; enhanced mobile broadband, massive IoT, and low latency.

Figure 16: ITU 5G Use Cases¹¹⁰



213. The rollout of 5G networks will enable MNOs to further benefit from supply side economies of scope by offering multiple services over the same infrastructure, particularly fixed wireless, mobile services and IoT. While there is a lot of industry and media interest about all three of the ITU use cases, the initial focus from MNOs in New Zealand appears to be in the enhanced mobile and fixed wireless broadband space.
214. In their recent Briefing Paper on 5G, Spark discuss the expected enhancements to mobile broadband and fixed wireless broadband services that will be enabled by 5G. Spark refers to “Mobile services that deliver unlimited data plans and fibre-like speeds to mobile devices”, and “Wireless broadband that delivers fibre-like broadband performance to homes and business”.¹¹¹
215. Ofcom also note that the initial focus for 5G network deployments is likely to be around delivering greater capacity to meet increasing consumer demand for mobile and fixed wireless broadband services.¹¹²
216. Spark and Vodafone are also deploying IoT networks. Spark, for example, already have a Long Range (LoRa)¹¹³ network for use in rural areas and envisage a massive

¹¹⁰ From ITU-R IMT 2020 requirements

¹¹¹ Spark “5G: The evolution towards a revolution: Briefing Paper” (August 2018), page 11.

¹¹² Ofcom “Enabling 5G in the UK” (9 March 2018), Chapter 3.

¹¹³ LoRa is a Low Power, Wide Area wireless network.

increase in the number of connected devices that will far outnumber the volume of connections to the population. Vodafone is rolling out a Narrowband-IoT network in anticipation of the massive increase in demand for IoT applications across a number of industry sectors including agriculture, transport and horticulture.

217. In order to deliver these 5G use cases, MNOs are spending significant time and money working through what this means in the following key areas; spectrum, cell sites, and backhaul.
218. Chorus, in their submission on the RSM 5G spectrum discussion document, considers at least two clear alternate scenarios. Firstly, the deployment of three national 5G networks as proposed by Vodafone, Spark and 2degrees and, secondly, a single national monopoly provider.¹¹⁴

Spectrum

219. While the delivery of 5G may involve a range of spectrum bands, the main band expected to support the initial deployment of 5G in New Zealand is the 3.5GHz band. Higher frequency bands, such as the 26GHz band, are also likely to be used as 5G networks develop. As higher frequency spectrum has a shorter effective range, additional cell sites may need to be built. This is particularly the case for the 26GHz band where industry has talked about deploying many small cell sites and using possible 'hub and spoke' layouts where larger cells sites act as the main hub for smaller cell sites.
220. MBIE's RSM team is currently consulting on how to allocate 5G spectrum in 2019. Some existing spectrum licences will expire in 2022. RSM are considering two key spectrum bands for 5G:¹¹⁵
- 220.1 the 3.5GHz band (3.4-3.7GHz); and
- 220.2 the 26GHz band (24-28GHz).
221. RSM's initial priority is the 3.5GHz band, most likely released prior to 2020, followed by the 26GHz band thereafter.¹¹⁶
222. We expect to have a clearer indication of RSM's plans for spectrum allocation and the allocation methods being considered later in 2018.
223. We also consider it useful to understand the likely entry and expansion costs for a fourth MNO, and whether a fourth MNO is viable given the small size of the New Zealand mobile market, which in turn would impact on the likelihood of entry. The economics of entry may, however, be affected by economies of scope across multiple 5G services. As part of this, we are interested in how a fourth MNO would go about acquiring spectrum in the 3.5GHz band or other 5G bands, and how the method to allocate spectrum would affect this.

¹¹⁴ Chorus, "Preparing for 5G in New Zealand" Submission, pages 2 and 4.

¹¹⁵ RSM "Preparing for 5G in New Zealand Discussion document", (March 2018).

¹¹⁶ The 26GHz band has yet to be specified at the ITU.

Cell Sites

224. In its initial phase, 5G will be a basic overlay on existing 4G technology platforms. On 14 June 2018 the 3rd Generation Partnership Project (3GPP), which is the international body that governs cellular standards, signed off on the standalone 5G New Radio (NR) specification.¹¹⁷ This complements and completes the December 2017 non-standalone 5G specification which allows for the deployment of 5G networks on top of existing legacy LTE networks.
225. Much like the transitions from 3G to 4G and 4.5G, the initial launch of 5G will involve the replacement of equipment on existing base stations. As data usage increases, and the 26GHz spectrum is utilised and new uses of 5G emerge, additional cell sites will have to be built. This will increase the cost of 5G deployment compared to the initial phase and introduce complexities in the form of consent, site sourcing, site access and environmental consents.¹¹⁸ These are not new complexities *per se* for new cell sites in any network roll out, but contrast to the scale of investment required for existing technology transitions.
226. Spark, Vodafone, and 2degrees have all indicated that they plan to roll out competing 5G networks by leveraging their existing network infrastructure.¹¹⁹ Blue Reach have also suggested that they intend to be an early adopter of 5G and that they are in the process of developing an LTE network that can be readily converted to 5G.¹²⁰

Backhaul

227. With more cell sites being built, the relative importance of fibre backhaul will also increase, as there is a possibility that the failure to secure adequate fibre backhaul will act as a potential bottleneck for 5G rollout and subsequent service provision—if the backhaul market is not sufficiently competitive. Government agencies in the United Kingdom believe that 5G will need large amounts of fibre connections for mobile backhaul.¹²¹
228. Wireless backhaul may also play a significant part in the transport requirements of 5G networks, potentially as a complement or direct competitor to fibre backhaul

¹¹⁷ 3GPP “Mobile industry works together to deliver complete 5G system standard on time” at http://www.3gpp.org/news-events/3gpp-news/1965-rel-15_news

¹¹⁸ Land Access and the National Environmental Standard for Telecommunication Facilities (NESTF) concerns were raised in a number of submissions to RSM’s “Preparing for 5G in New Zealand” discussion document.

¹¹⁹ Spark submission on “Preparing for 5G in New Zealand: Discussion Document”, (30 April 2018), page 1, Vodafone New Zealand submission on “Preparing for 5G in New Zealand: Discussion Document”, (May 2018), page 2, and 2degrees submission on “Preparing for 5G in New Zealand: Discussion Document”, page 2.

¹²⁰ Blue Reach submission on “Preparing for 5G in New Zealand” (30 April 2018), page 2. According to RSM Blue Reach hold some spectrum (in the 1800MHz (20MHz), 2000MHz (5MHz), and 2600MHz bands (15MHz).

¹²¹ Department of Culture Media & Sport, and HM Treasury “Next Generation Mobile Technologies: A 5G Strategy for the UK” (March 2017) at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/597421/07.03.17_5G_strategy_-_for_publication.pdf

services. The spectrum requirements, capacity and practicalities of wireless backhaul remain unresolved at present, but could be a viable backhaul option for mobile networks.

Infrastructure sharing

229. Infrastructure sharing also has the potential to significantly affect the economics and speed of 5G deployments by MNOs. One of the considerations for the deployment of 5G networks is whether economies of scale are such that network based competition may not be viable in all areas. In such cases, infrastructure sharing may result in efficiencies in terms of lowering deployment costs and more efficient use of spectrum.

230. BEREC, the Body of European Regulators for Electronic Communications, have recently produced a snapshot of infrastructure sharing arrangements across European National Regulatory Authorities. They define infrastructure sharing as follows:

Mobile infrastructure sharing (both passive and active) describes the process by which operators share infrastructure to deliver a mobile service to end users. "Passive sharing" is the sharing of the passive elements of network infrastructure such as masts, sites, cabinet, power, and air conditioning. "Active sharing" is the sharing of active elements in the radio access network such as antennas and radio network controllers (RNC).¹²²

231. The trade-off between the costs of deployment and infrastructure competition may become more pronounced given the potential densification of cell sites required for 5G.

232. In this context, the infrastructure established by the RCG could be relevant. The RCG plans to deploy 520 cell sites and share spectrum in order to improve rural coverage and connectivity.¹²³ They state:

The cell sites we build will be shared by New Zealand's mobile network operators – Vodafone, Spark, 2degrees – to provide mobile services from all three mobile companies and ensure competitive broadband services to rural customers. The towers will also be open access for wireless internet service providers to utilise. The infrastructure will allow all operators to share the radio access network equipment and one set of antennas, meaning the size of the infrastructure can be flexible to suit the geographic location.¹²⁴

233. We are aware that the RCG have signed a Deed of Open Access Undertakings, which includes non-discrimination obligations that relate to access to the services that they provide to access seekers. The non-discrimination provision in the Deed of Open Access Undertakings states that the "RCG will ensure there is Non-discrimination in

¹²² BEREC "Report on Infrastructure sharing" (14 June 2018), BoR (18) 116, page 2

¹²³ The Telecommunications Act gives restrictive trade practices authorisation for the RBI2 and the MBSF from the Commerce Act 1986. At this stage we are simply noting this fact but propose to consider the implications for competition of joint infrastructure builds.

¹²⁴ <http://www.thercg.co.nz/why-is-rcg-unique/>.

relation to the supply of a Relevant Service”. The Relevant Services are Wholesale Tower Co-location and Wholesale Backhaul.¹²⁵

234. Depending on its configuration, parts of the RCG infrastructure could be reused for future deployment of 5G technology by MNOs, at lower cost than a greenfields implementation. In this way, it is possible that it will be economic to provide 5G services in areas in which it might otherwise be uneconomic.
235. Blue Reach, a potential fourth entrant, in its submission to RSM, supported national roaming and shared use of infrastructure, suggesting that it may be less likely to enter if national roaming and co-location were not specified.^{126 127}
236. Jointly investing and thereby lowering individual investment costs could make it profitable to invest in more areas. These factors may be of particular importance when considering urban versus rural coverage.
237. Where sharing extends to radio spectrum, there may be additional efficiency gains in terms of spectrum usage. For example, where blocks of spectrum are awarded to different parties, some spectrum must be used as guard bands to prevent interference. Where a single block of spectrum is awarded and shared, the amount of spectrum set aside as guard bands may be reduced, freeing up more spectrum to be used.
238. Internationally, there are currently a wide range of infrastructure sharing models in operation, from the Mexican model of a single 4G national provider to the Chinese model of the government backed merger of the three mobile operators’ tower operations. In the transition to 5G there are a range of initiatives and different approaches to infrastructure sharing being undertaken in the United States, the United Kingdom and most noticeably in South Korea. These arrangements vary in approach in how they seek to deliver both very dense urban deployments and deal with coverage issues in rural areas.¹²⁸
239. Infrastructure sharing on 5G networks could limit the incentives for MNOs to build a superior network in order to differentiate themselves based on quality. We note that the ACCC decided not to declare domestic roaming in Australia, partly based on concerns that this could reduce MNO investment.¹²⁹

¹²⁵ Deed of Open Access Undertakings RCG, paragraph 5.1 at https://comcom.govt.nz/data/assets/pdf_file/0020/90443/Rural-Connectivity-Group-RBI2-Deed-8-September-2017.PDF

¹²⁶ Blue Reach Services, “Response to Radio Spectrum Management Discussion Document “Preparing for 5G in New Zealand”, page 2.

¹²⁷ We have recently consulted on our view that there are not reasonable grounds to commence a schedule 3 investigation into the deregulation of national roaming as a regulated service, due to the support it might provide for the rollout for 5G.

¹²⁸ “Korea sets the pace for infrastructure sharing, which is vital to 5G”, *Wireless Watch*, (25 April 2018).

¹²⁹ ACCC, “Domestic Mobile Roaming Declaration Inquiry 2016 Final report”, (23 October 2017).

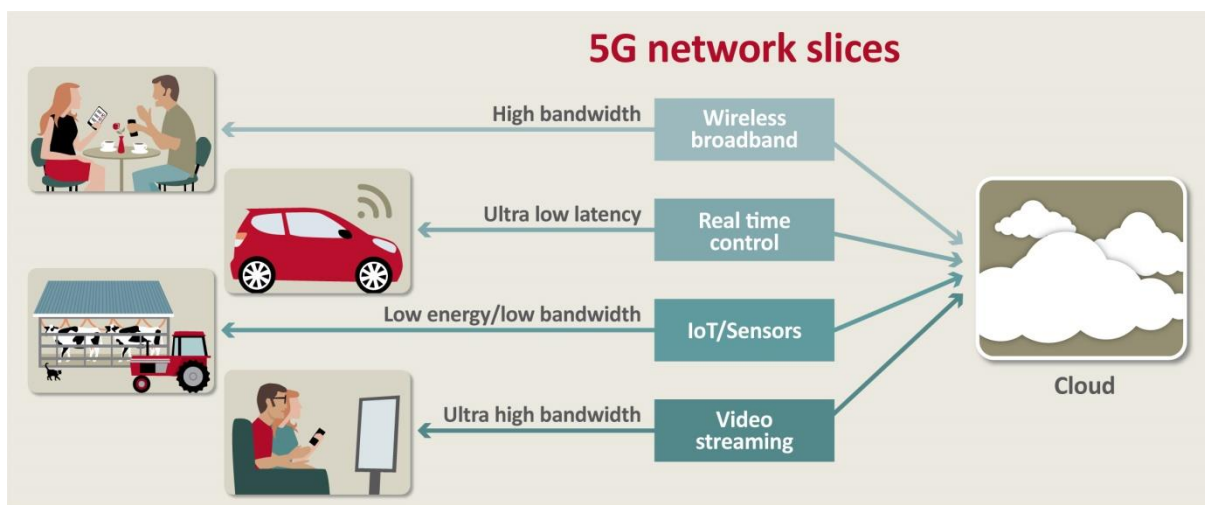
Questions

- Q33. How important is infrastructure sharing likely to be to facilitate the widespread and timely deployment of 5G services—urban and rural—in New Zealand by improving the economics of a 5G deployment?
- Q34. If 5G fixed wireless becomes a substantial substitute for fibre to the home, what is the right approach to setting the price of backhaul from mobile towers and from the additional cell sites?
- Q35. What are the most likely forms, benefits, risks and costs of infrastructure sharing for 5G in New Zealand? Please provide reasons covering both cost and competitive effects.
- Q36. What aspects of infrastructure sharing are most likely to facilitate the entry of a fourth MNO, or expansion of existing MNOs once 5G has been rolled out?
- Q37. How and in what ways could the current regulation of mobile services deter some 5G investment?
- Q38. How well do regulated mobile services as currently framed in Schedule 1, both specified and designated (and associated STDs for designated services), support (a) efficient investment in 5G infrastructure (b) efficient sharing of 5G infrastructure? Are there any ways in which this could be improved?
- Q39. What are the likely incentives for infrastructure owners to expand sharing arrangements and to provide access to their network infrastructure assets to third parties?
- Q40. What are your views on the viability of three or more separate 5G networks, and what alternative models do you consider as potentially viable?
- Q41. How important is access to the infrastructure established by the Rural Connectivity Group to roll out 5G services to rural areas?

Network slicing

240. Network slicing is a form of virtual networking architecture. In simple terms it allows network owners to divide up their physical network into multiple virtual end to end networks. This virtualisation enables a variety of different services to be offered,¹³⁰ each able to be carefully tailored. Such services may include IoT, fixed wireless services, mobile gaming and new forms of MVNO access, as shown in Figure 17.
241. The likely benefits to consumer in an IoT slice, for example, could be in the form of high availability, a specified latency, and enhanced security. Similarly, a different network slice could be provided to consumers that would guarantee high throughput, higher data speeds and low latency.

Figure 17: Network Slicing



242. Network slicing uses virtualisation technologies such as Network Function Virtualisation (NFV) or Software Defined Networking (SDN). These technologies offer an effective way to exploit the benefits of a common network infrastructure, enabling operators to establish and run multiple network services in parallel.^{131 132}

Each virtual network (network slice) comprises an independent set of logical network functions that support the requirements of the particular use case, with the term 'logical' referring to software. Each will be optimised to provide the resources and network topology for the specific service and traffic that will use the slice. Each will be completely isolated so that no slice can interfere with the traffic in another slice.¹³³

¹³⁰ Mohammad Asif Habibi et al, "Network Slicing in 5G Mobile Communications: Architecture, Profit, Modeling and Challenges", Conference Paper, (August 2017).

¹³¹ Matias Richart et al "Resource Slicing in Virtual Wireless Networks: A Survey", *IEEE Transactions on Network and Service Management*, Vol. 13 Issue 3, (September 2016), page 462.

¹³² Nokia "Dynamic end-to-end network slicing for 5G", (June 2016).

¹³³ <https://5g.co.uk/guides/what-is-network-slicing/>

243. Network slicing has the potential to enable non-traditional providers such as Apple and Google to purchase dedicated network slices to run their services.¹³⁴ There are “...market opportunities stemming from the provision of attractive fee based on-demand service guarantees by the MNOs towards third party service providers, such as OTT players (eg, streaming providers) and vertical industries (eg, e-health, surveillance, automotive), exploiting the available cloud and communication resources”.¹³⁵
244. These providers will still be reliant on the MNO networks and may provide complementary services rather than providing an additional competitive constraint on MNOs.
245. Network slicing potentially provides the ability for network owners to offer different and tailored services at a wholesale and retail level more easily and cheaply, and segment the mobile markets for services further by providing higher quality innovative services that may have a higher ARPU.
246. However, this also raises the potential for priority traffic and price and product differentiation for both business and residential services.
247. We are investigating whether or not very large hardware, content and operating system providers, as a result of greater bargaining power are likely to be able to gain more attractive wholesale access arrangements with MNOs than those currently achieved by MVNOs.

Question

- Q42. Is network slicing likely to increase the presence of non-traditional providers such as Apple and Google in mobile markets, and are these providers likely to be able to negotiate competitive wholesale access arrangements with MNOs?
- Q43. Given the non-traditional providers’ economies of scale, what are the likely benefits and harms that may materialise for existing MNOs, potential MVNOs and consumers in New Zealand should a non-traditional provider enter the market?

Spectrum issues

248. This section discusses how much 3.5GHz spectrum is likely to be needed for MNOs to implement viable and high quality 5G services. It considers the needs of existing MNOs as well as the potential needs of new MNOs whose entry into the mobile markets could enhance competition for the long term benefit of end users. There are several interrelated questions that are relevant to the assessment of 3.5GHz spectrum allocation including:

¹³⁴ Matteo Vincenzi et al, “Multi-Tenant Slicing for spectrum Management on the Road to 5G”, *IEEE Wireless Communications Magazine*, Vol. 24, No. 5, (October 2017), pages 118 to 125. Konstantinos Samdanis et al, “From Network Sharing to Multi-tenancy: The 5G Network Slice Broker”, *IEEE Communications Magazine*, Vol. 54, Issue: 7, (July 2016).

¹³⁵ Vincenzi et al, *Ibid*, page 1.

- 248.1 whether MNOs are likely to require 80-100MHz of 3.5GHz spectrum each, as indicated in MNO submissions on the RSM 5G spectrum discussion document, and how the spectrum blocks proposed by the MNOs in New Zealand compare with the amount of 3.5GHz spectrum allocated to MNOs in other OECD countries;
- 248.2 whether MNOs could compensate for having less spectrum by building more mobile sites in order to deliver the same quality of service; and
- 248.3 whether a potential new MNO would actually be likely to enter if it obtained spectrum.
249. 5G spectrum allocation could have a significant impact on competition in mobile markets. The key issues with regards to spectrum allocation are whether the three existing MNOs will each be able to acquire sufficient spectrum to enable them to provide high quality 5G services, and, further, whether an inability to acquire spectrum could deter a new MNO entrant.
250. RSM has indicated that it could make 280MHz of 3.5GHz spectrum available, in the 3410 to 3690MHz range.¹³⁶ By contrast, Spark and Vodafone have suggested that up to 400MHz of 3.5GHz spectrum should be made available.¹³⁷ Clearly, the more spectrum that is made available, the more likely it is that existing MNOs will be able to acquire sufficient spectrum to provide high quality services, and that there will also be sufficient spectrum for a potential fourth MNO entrant without compromising the 5G quality of service provided by the existing three MNOs.
251. Spark and Vodafone have indicated that MNOs may require 100MHz of 3.5GHz spectrum, and 2degrees has suggested that MNOs require 80-100MHz.¹³⁸ This would exhaust 280MHz of spectrum, but would potentially leave spectrum unallocated if MBIE were to make 400MHz available.
252. We would like to better understand the rationale behind MNO's stated requirements of 80-100MHz of spectrum or whether they may be able to use less than this amount and still provide high quality 5G services. We note that some operators in Australia have indicated that they require 100MHz of contiguous spectrum for the forthcoming ACMA auction. In July 2018 the Australian government directed the ACMA to impose allocation limits of 60MHz of spectrum in metropolitan areas and 80MHz of spectrum in regional areas.¹³⁹

¹³⁶ RSM, "Preparing for 5G in New Zealand: Discussion document", (March 2018), page 5.

¹³⁷ Spark submission on "Preparing for 5G in New Zealand: Discussion Document", (30 April 2018), pages 18 and 19, and Vodafone New Zealand submission on "Preparing for 5G in New Zealand: Discussion Document", (May 2018), pages 4 and 11 to 12.

¹³⁸ Spark submission on "Preparing for 5G in New Zealand: Discussion Document", (30 April 2018), pages 2, 8 and 24, Vodafone New Zealand submission on "Preparing for 5G in New Zealand", (May 2018), page 11, and 2degrees submission on , "Preparing for 5G in New Zealand: Discussion document", pages 3, 5 to 6, 20 and 22.

¹³⁹ <https://www.minister.communications.gov.au/minister/mitch-fifield/news/5g-spectrum-auction-one-step-closer>

253. In the first auction of 5G spectrum in the UK, which only related to the 3410 to 3600MHz band, the largest block of spectrum acquired (by Vodafone) was 50MHz (with the other UK MNOs each acquiring 20MHz or 40MHz).¹⁴⁰
254. We are investigating actual and planned 3.5GHz spectrum purchases in other countries, such as the UK and Australia. It will also be relevant to consider whether MNOs could offset reduced spectrum purchases with a more extensive mobile site roll-out.
255. Finally, it is only likely to make sense to consider the spectrum needs of a new fourth MNO if this MNO was actually likely to enter the mobile markets and deploy a 5G network. While Blue Reach has indicated that it is developing an LTE network that could be readily converted to 5G, it is unclear whether it would enter in practice and how extensive its network is likely to be.¹⁴¹

Questions

- Q44. To what extent can MNOs compensate for a reduction in network quality from having less spectrum by building or acquiring access to more mobile sites?
- Q45. What restrictions, if any, ought to be placed on the forthcoming 5G spectrum allocation to best facilitate competition in 5G services?

e-SIMs

256. An e-SIM performs the functions that are today undertaken by a physical SIM card. Instead of the user having to physically switch SIMs in the device in order to change networks, this can be done by electronic means instead. This means both that the process can be undertaken much more quickly and dynamically, and that it can be undertaken remotely from both the physical device itself and from the user.
257. For devices which are difficult to access, the emergence of e-SIMs may have a significant impact in lowering switching costs. As Analysys Mason has noted:¹⁴²
- Changing the SIM is impractical for devices that are deployed in difficult to reach locations (such as many IoT devices) and for certain devices that need to be very small, or water-tight (e.g. connected watches), where an embedded SIM would be preferable. As a result, there are now electronically updatable SIMs being deployed (such as e-SIM).
258. However, as mentioned in Chapter 6, connected watches may be part of exclusive supply deals between MNOs and device manufacturers. So e-SIMs may increase switching costs if they are embedded in carrier-locked wearables. Such

¹⁴⁰ https://www.ofcom.org.uk/data/assets/pdf_file/0017/112931/2.3-GHz-and-3.4-GHz-band-plans-based-on-final-auction-results.pdf

¹⁴¹ Blue Reach "Response to Radio Spectrum Management Discussion Document "Preparing for 5G in New Zealand", page 2.

¹⁴² Analysys Mason "Report for Trustpower: Input to Commerce Commission mobile market review" (28 November 2017), page 13.

arrangements could also lead to the exclusion of other mobile service providers, such as MVNOs.

259. The impact of e-SIMs on customers with traditional handsets is dependent on the development of e-SIM capable devices, and supporting systems.¹⁴³ While the GSMA has released initial e-SIM standards, their e-SIM specification work has been halted while the Department of Justice (DoJ) in the United States investigates possible collusion between AT&T, Verizon, and the GSMA.¹⁴⁴ The investigation centres on whether the parties worked together in an attempt to limit e-SIM technology.¹⁴⁵
260. There is currently one mobile handset with an e-SIM, the Pixel 2.¹⁴⁶ The Pixel 2 is part of Google's ProjectFi which allows customers in the US to dynamically switch to the fastest available partner network (T-Mobile, Sprint, and U.S. Cellular) and gain access to secure WiFi hotspots. ProjectFi is not limited to Pixel 2, as customers can also place a SIM card in compatible handsets¹⁴⁷ to use the service. While ProjectFi is limited to the three mobile networks in the United States and compatible handsets, it provides an interesting insight into future possibilities of dynamic switching.
261. The tablet market has also seen the emergence of e-SIMs with Apple launching the Apple SIM. The Apple SIM is either embedded in new generation iPad Pro devices or physically placed in compatible iPad models. It allows customers to choose mobile data plans from selected carriers in 180 countries (including New Zealand).¹⁴⁸ However, at this stage the non-embedded SIM cards are only compatible with iPad products and are not yet available for purchase instore in New Zealand.
262. Google and Apple's involvement in the e-SIM space could signal their interest in becoming 'mega-consumers' who marshal the collective purchasing power of all of the users on their mobile operating systems to get competitive deals from MNOs. In this scenario MNOs become mainly wholesale access providers for large overseas companies.

It appears that the possible future impacts of e-SIMs (or carrier neutral SIMs) varies greatly depending on the creation and adoption of embedded (or compatible) devices, and the co-ordination and level of agreement between and among device manufacturers and mobile network operators.

¹⁴³ Wik "Economic aspects of embedded SIM for the telecommunications consumer segment", (2017).

¹⁴⁴ GSMA "GSMA statement regarding development of eSIM standard" (21 April 2018). <https://www.gsma.com/newsroom/press-release/gsma-statement-regarding-development-of-esim-standard/>

¹⁴⁵ Cecilia Kang "U.S. investigating AT&T and Verizon over wireless collusion claim" *The New York Times* (20 April 2018). <https://www.nytimes.com/2018/04/20/technology/att-verizon-investigate-esim.html>

¹⁴⁶ Joy Xi "Look, ma, no SIM card!" *Google* (4 October 2017). <https://blog.google/products/project-fi/device-setup-esim/>

¹⁴⁷ Pixel, Android One Moto X4, Nexus 6P, Nexus 5X, and Nexus 6 are the only compatible handset models.

¹⁴⁸ All embedded and compatible iPad models are supported by Spark and Vodafone, with the exception of the iPad Pro 9.7-inch which is only supported by Vodafone.

Questions

Q46. What impacts are e-SIMs likely to have on consumer switching costs?

Q47. How will MNOs support the use of e-SIMs in mobile devices?

Chapter 8 – Consolidated questions

Market shares

- Q1. How, and to what extent, do competitive conditions for mobile services vary by customer segment in New Zealand?
- Q2. In the on account business segment, what evidence is there that the issues identified our business study have changed since 2015? Specifically;
- Q2.1 what are the most important features of a mobile service for business consumers?
- Q2.2 how have business consumer perceptions towards 2degrees changed since 2015?

Bundling of Mobile Services

- Q3. How, and to what extent, have consumers benefited from bundling of mobile services (the discount vs the increased complexity of switching provider)?
- Q4. What are the constraints on non MNO fixed line broadband providers' ability to compete by supplying their own bundles, such as bundling of fixed line broadband and electricity by Trustpower and Vocus?

Pricing

- Q5. What are the reasons for high retail prices for higher volume bundles of mobile services in New Zealand compared to other countries?
- Q6. What are the reasons for high retail prices for standalone mobile data services in New Zealand compared to other countries?

Usage Trends

- Q7. How are mobile data usage trends expected to evolve in the next few years, and how might that affect suppliers of mobile services?
- Q8. How do you view mobile calling and messaging services evolving, given the emergence of OTT services?

Investment

- Q9. Do you agree that we have identified the relevant measures of mobile service quality?
- Q10. What further measures and evidence may be relevant for monitoring retail service quality?
- Q11. What are the competition incentives and constraints in New Zealand for improving customer service quality?

MVNO based entry

- Q12. Do you agree we have described the key factors relevant to wholesale competition both currently and into the immediate future? Are there any other factors likely to influence wholesale competition for mobile services, going forward?
- Q13. Please describe how you see wholesale competition evolving over the next 2-5 years.
- Q14. Why do MVNOs account for a small share of subscribers and revenue in New Zealand?
- Q15. How have the competitive conditions changed in the wholesale mobile services market? What impact has 2degrees had in the wholesale market in recent years?
- Q16. Has 2degrees' completion of deployment of its national network changed, or is likely to change, the competitive environment for wholesale mobile service going forward? If so, please describe.
- Q17. Are MVNOs able to negotiate competitive wholesale access arrangements with MNOs? What are the key constraints facing MVNOs in New Zealand, and how do they differ from other countries?
- Q18. Where MVNOs have entered the market and expanded in other countries, to what extent has such entry been the result of commercial agreements, or based on regulated MVNO access or other conditions imposed by regulatory or competition authorities (such as conditions of mergers and/or obligations on spectrum licences)?
- Q19. To what extent has the emergence of MVNOs overseas resulted in improved outcomes for consumers in those countries? What effect has MVNO entry had in other countries on pricing, choice, and investment?
- Q20. What are the risks that fixed line only broadband providers could be foreclosed by providers of mobile and fixed line broadband bundles and what are the potential consequences of that for competition?

MNO based entry

- Q21. To what extent, and in what ways, do the current spectrum holdings constrain competition in the supply of retail or wholesale mobile services in New Zealand?

Roaming, co-location, and infrastructure sharing

- Q22. What evidence is there on whether or not national roaming, co-location regulation have promoted the efficient expansion of 3G and 4G coverage in New Zealand?
- Q23. What evidence is there that the infrastructure sharing such as provisions of RBI1 and the RCG, have been effective in allowing competing operators to expand their coverage?

Q24. Have there been any problems in relation to the infrastructure sharing provisions of RBI1 that could inform infrastructure sharing arrangements in the future?

Mobile interconnection services

Q25. What are your views on the current regulation of mobile interconnection services?

Q26. Does the current regulated MTAS, including the pricing principles, remain appropriate?

The ability of consumers to switch

Q27. What difficulties do consumers face in comparing retail offers for mobile services? How could consumers access better information about prices and plan packages, service levels and associated facilities like international roaming in order to identify the package that best suits their needs?

Q28. Should mobile providers be required to provide consumers nearing the end of a fixed term with information on options that could better meet consumer needs?

Q29. Should mobile providers be required to provide consumers with access to their data (usage, locations etc) in a format that facilitates comparison of services that best meet their needs?

Q30. What barriers and costs do consumers face when switching and what improvements could be made to make switching easier?

Consumer satisfaction

Q31. How would you describe the relationship between customer satisfaction and switching in New Zealand?

Q32. To what extent have lower levels of customer satisfaction with Vodafone and Spark resulted in customers switching to Skinny and 2degrees?

Infrastructure sharing

Q33. How important is infrastructure sharing likely to be to facilitate the widespread and timely deployment of 5G services—urban and rural—in New Zealand by improving the economics of a 5G deployment?

Q34. If 5G fixed wireless becomes a substantial substitute for fibre to the home, what is the right approach to setting the price of backhaul from mobile towers and from the additional cell sites?

Q.35 What are the most likely forms, benefits, risks and costs of infrastructure sharing for 5G in New Zealand? Please provide reasons covering both cost and competitive effects.

- Q36. What aspects of infrastructure sharing are most likely to facilitate the entry of a fourth MNO, or expansion of existing MNOs once 5G has been rolled out?
- Q37. How and in what ways could the current regulation of mobile services deter some 5G investment?
- Q38. How well do regulated mobile services as currently framed in Schedule 1, both specified and designated (and associated STDs for designated services), support (a) efficient investment in 5G infrastructure (b) efficient sharing of 5G infrastructure? Are there any ways in which this could be improved?
- Q39. What are the likely incentives for infrastructure owners to expand sharing arrangements and to provide access to their network infrastructure assets to third parties?
- Q40. What are your views on the viability of three or more separate 5G networks, and what alternative models do you consider as potentially viable?
- Q41. How important is access to the infrastructure established by the Rural Connectivity Group to rollout 5G services to rural areas and is their Deed of Open Access Undertakings adequate to facilitate the rollout of improved mobile services in rural areas?

Network slicing

- Q42. Is network slicing likely to increase the presence of non-traditional providers such as Apple and Google in mobile markets, and are these providers likely to be able to negotiate competitive wholesale access arrangements with MNOs?
- Q43. Given the non-traditional providers' economies of scale what are the likely benefits and harms that may materialise for both existing MNOs and consumers in New Zealand should a non-traditional provider enter the market?

Spectrum issues

- Q44. To what extent can MNOs compensate for a reduction in network quality from having less spectrum by building or acquiring access to more mobile sites?
- Q45. What restrictions, if any, ought to be placed on the forthcoming 5G spectrum allocation to best facilitate competition in 5G services?

e-SIM

- Q46. What impacts are e-SIMs likely to have on consumer switching costs?
- Q47. How will MNOs support the use of e-SIMs in mobile devices?