Witness Statement

Re: Application for merger authorisation by Telstra Corporation Limited and TPG Telecom Limited for sharing of active infrastructure and spectrum in regional Australia

Statement on behalf of Singtel Optus Pty Ltd

Statement of:	**Kanagaratnam Lambotharan**
Address:	1 Lyonspark Road, Macquarie Park, New South Wales
Occupation:	Vice President of Networks

Date:	18 October 2022

Contents

Document number	Details	Paragraph	Page
1	Witness statement of Kanagaratnam Lambotharan dated 18 October 2022	1	1
2	"Exhibit LK-1", being a bundle of non-confidential documents	4	2
3	"Confidential Exhibit LK-C1", being a bundle of confidential documents	4	2

I, Kanagaratnam Lambotharan, of 1 Lyonpark Road, Macquarie Park NSW 2113, say:

1. I am the Vice President of Networks at Singtel Optus Pty Limited (**Optus**).

2. I hold a Bachelor of Science Electrical Engineering & Master of Science Electrical Engineering.

3. This statement is made in relation to the authorisation application lodged with the Australian Competition and Consumer Commission (**ACCC**) by Telstra Corporation Limited (**Telstra**) and TPG Telecom Limited (**TPG**) on 23 May 2022 (**Authorisation Application**) for sharing active infrastructure and spectrum in regional Australia (**Proposed Transaction**).

4. Exhibited to me at the time of making this statement is a paginated and tabbed bundle of documents marked:

    (a) **Exhibit LK-1**, which contains documents in respect of which no claim of confidentiality is made by Optus.

    (b) **Confidential Exhibit LK-C1**, which contains documents in respect of which a claim of confidentiality is made by Optus.

5. Where in this statement I refer to documents, I refer to the tab number behind which the document is located and the document identification number which appears on the document. The documents in the exhibit are true and correct copies of the documents referred to in this witness statement. I have reviewed those documents prior to signing this statement.

6. The matters set out in this statement are true and correct to the best of my knowledge and belief.

7. Except where otherwise indicated, the matters set out in this statement are based on my own knowledge. I have also directly and indirectly made enquiries of Optus employees and records. Where I refer to matters on the basis of information provided to me or records reviewed by me, I believe those matters to be true and correct.

1. Role

8. In August 2021, I was appointed as Vice President of Networks at Optus.

9. I report to Optus' Chief Executive Officer (**CEO**), Kelly Bayer Rosmarin.

10. As Vice President of Networks, I am responsible for the design, architecture, deployment, and operation of Optus' mobile network. I am also responsible for the design, architecture, deployment and operation of Optus' fixed line network.

11. My responsibilities extend to overseeing the planning, design, operation and deployment of infrastructure and equipment in Optus' mobile network.

12. I lead a team of 950 employees. Nine employees currently report directly to me.

13. Prior to this role, from December 2019 to August 2021, I was employed as Acting Manager Director of Networks at Optus. In this role, I had the same responsibilities as I have in my current role as Vice President of Networks.

14. From 22 April 2015 to December 2019, I was employed as Head of Network Deployment and Vice President of Network Deployment at Optus. I was responsible for the deployment of Optus' mobile network and fixed networks.

15. In this statement, I cover the following topics:

    (a) First, I outline the development of Optus' strategy for its 5G mobile network rollout and the importance of spectrum to that strategy.

    (b) Second, I outline the existing arrangements between TPG and Optus, ███

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(c)   Third, I provide my views on a future agreement with TPG ██████████
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(d)   Fourth, I describe Telstra's advantages as a result of the proposed Multi-
      Operator Core Network (**MOCN**) sharing arrangement.

(e)   Fifth, I comment on the overall impact of the Proposed Transaction on Optus and
      the market more generally.

2.   Optus' mobile network and spectrum holdings

A.   Overview

16.   The entities that own and operate mobile networks are referred to as mobile network
      operators (**MNOs**).

17.   There are currently three MNOs in Australia: Telstra, Optus, and TPG. Each of these
      MNOs supplies mobile services to retail customers in Australia. Telstra has the largest
      coverage footprint of the three MNOs and is the dominant mobile provider in Australia.

18.   In my role at Optus, I continuously monitor the mobile network investments and rollout
      plans of the other MNOs and look at what they are doing.

19.   There are broadly three "generations" of mobile network technologies in use in mobile
      networks in Australia: 3G, 4G and 5G. The introduction of 5G increases the capacity,
      speed and capability of mobile networks. Mobile devices that use 5G technology will
      have the capacity to send and receive a larger volume of data in a shorter period of time
      than devices that only use earlier generations of mobile technology such as 4G.

20.   In my role at Optus, which has included designing Optus' mobile network, I have
      become familiar with the various components of a mobile network. At a general level, the
      key components are:

      (a)   spectrum;

      (b)   the radio access network (**RAN**);

      (c)   the transmission network; and

      (d)   the core network.

21.   A mobile network is capital intensive and has scale economics with ongoing technology
      upgrades driving ongoing need for capital. Scale economics is driven by two factors.

First, if an operator has a larger customer base, they can generate more revenue and invest more capital. Secondly, if an operator has a larger customer base, the costs are lower on a cost per customer basis.

22. There is also a significant cost in maintaining existing sites in a mobile network. This includes ongoing rental costs, site maintenance and electricity costs (i.e., power consumption). ███

23. Optus has studied analysis that shows ████████████████████████████
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24. In this section, I describe:

   (a)   the Huawei Ban and its impact on Optus' 5G network rollout;

   (b)   the process for obtaining capital expenditure (**capex**) approval for Optus' mobile network investment;

   (c)   the approval from ████████████████████████████████████
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   █████████████████████████████████████; and

   (e)   the importance of spectrum to Optus' 5G network,████████████████████
   ████████████████████████████for the auction of mmWave and 850 / 900 MHz spectrum which occurred in April and December 2021 respectively.

B.   The Huawei Ban and its implications on Optus

25. On 23 August 2018, the Federal Government published a media release concerning security guidance for 5G mobile networks in Australia (**Security Guidance**). A copy of the media release is at **Tab 1** of **Exhibit LK-1**. The press release recorded that the Federal Government "*considers[ed] that the involvement of vendors who are likely to be subject to extrajudicial directions from a foreign government that conflict with Australian*

law, may risk failure by the carrier to adequately protect a 5G network from unauthorised access or interference."

26.   On 18 September 2018, the Telecommunications Sector Reforms (**TSSR**) came into effect. These reforms were directed at ensuring security in Australia's telecommunications networks. The reforms introduced new measures such as the requirement on carriers, including Optus, to take steps to protect their networks from unauthorised access or interference, and the ability for government to intervene and issue directions in cases where there are significant national security concerns that cannot be addressed through other means.

27.   Whilst neither the Security Guidance nor the TSSR framework expressed that Huawei 5G RAN equipment would be banned, I understood from various discussions with employees of Optus that the announcement effectively was a ban on using Huawei equipment in 5G mobile networks.

28.   In this statement, I refer to the 23 August 2018 announcement as the "**Huawei Ban**".

29.   I was involved in considering the implications of the Huawei Ban on Optus' 5G mobile network rollout.

30.   Optus' current mobile network is predominantly a 4G mobile network. Optus' 4G mobile network uses Huawei 4G equipment (as well as ▮▮ and ▮▮ equipment). ▮▮
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31.   The Huawei Ban essentially meant that MNOs would not be allowed to operate a 5G mobile network in which transmissions using 5G mobile technology passed through Huawei RAN equipment at any stage. It was clear to me that Optus could not use any Huawei RAN equipment in its proposed 5G mobile network, including any Huawei 4G RAN equipment to which the network was connected when providing 5G mobile services.

32.   Optus' initial 5G mobile network rollout is based on a "non-standalone" network, meaning that the elements of the existing 4G network (including the 4G RAN equipment) are required to be used in providing 5G mobile services on the network. Non-standalone 5G involves using a new 5G RAN, anchored to a 4G RAN layer and then connected to an existing 4G network core. The 5G RAN remains reliant on the 4G core network to manage control and signalling information and the 4G RAN continues to operate.

33. A 5G mobile network can also be implemented as a "standalone" network. In this type of network, the 5G network is not dependent on a 4G network to provide 5G mobile services. Standalone 5G uses the 5G access network on a new 5G network core and does not depend on the 4G RAN or 4G core to operate. Optus has recently commercially launched a 5G standalone network in August 2022.

34. Irrespective of whether Optus' network is a 5G "standalone" or "non-standalone" network, as a result of the Huawei Ban, Optus would have to remove the Huawei 4G RAN equipment from the network and replace it with equivalent equipment provided by a non-Huawei vendor (███████ and ███). The swap of the Huawei 4G equipment is required for the following reasons:

    (a) for Optus to unlock the full value of 5G;

    (b) to combine the 4G and 5G RAN network to support carrier aggregation (described at paragraph 186 - 187 below);

    (c) to make all its available spectrum bands and the associated RAN equipment available for 5G deployment both now and in the future; and

    (d) to achieve the optimal 5G coverage, capacity and speed.

35. Further, Optus' 4G and 5G networks both use the Huawei transmission equipment. This equipment will also have to be replaced.

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37. As a result, in my view, the Huawei Ban made the rollout of Optus' 5G network significantly more complex than it would otherwise have been, for the following reasons:

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38. I am aware that TPG was also affected by the Huawei Ban. I understand that Telstra does not use Huawei equipment for its 3G or 4G network. Telstra does therefore not face the issues I describe at paragraph 37 above and can upgrade their existing 4G equipment to 5G without: ██████████████████████████████████

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39. Therefore, the Huawei Ban (in combination with other matters which I address in detail below, ███████████████████████████████████

████████) has a significant negative impact on Optus' 5G rollout as compared to Telstra's, and customer perceptions of Optus' network as compared to Telstra's. ████

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40. Network perceptions can have a significant impact on an MNO's market share. For example:
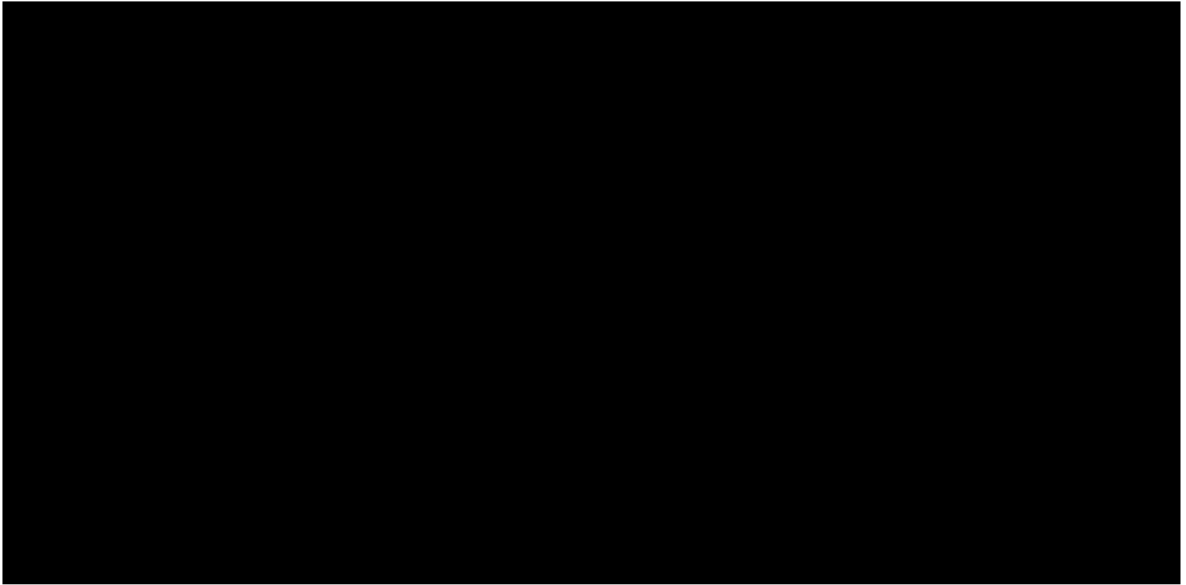
(a) I am aware that Vodafone Hutchison Australia (**Vodafone**) experienced significant issues through 2010 – 2013 where Vodafone experienced a period of poor network performance as a result of its network failing to keep pace with growing data demand from its customers. ████████████████████

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(b) A survey undertaken by Optus ████████████████████████████

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C. *Capex Approval Process*

42. There is an internal process for Optus to obtain approval for capex investment for the mobile network. I have participated in this process over the last three years. My role is to prepare the strategy and the recommended mobile network capital investment plan. ████
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45.   I am responsible for proposing network capex and opex and for the preparation of the papers that are submitted to each of the Executive Committee, the Management Committee and the Board. ███████████████████████████████

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D.   Approval of the Optus 2020 5G Business Case in July 2020

48.   Between 2018 and 2020, I, together with Kent Wu Zeyi (Head of Access Network Planning & Quality), Dennis Wong (Acting Managing Director of Networks) and Lim Yu Leong (Vice President of Digital Networks) was responsible for:

(a)   developing Optus' strategy for its 5G mobile network rollout; and

(b)   seeking to obtain approval for the capex spend associated with the approved strategy.

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i. *Analysis of potential investment options*

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Other key assumptions

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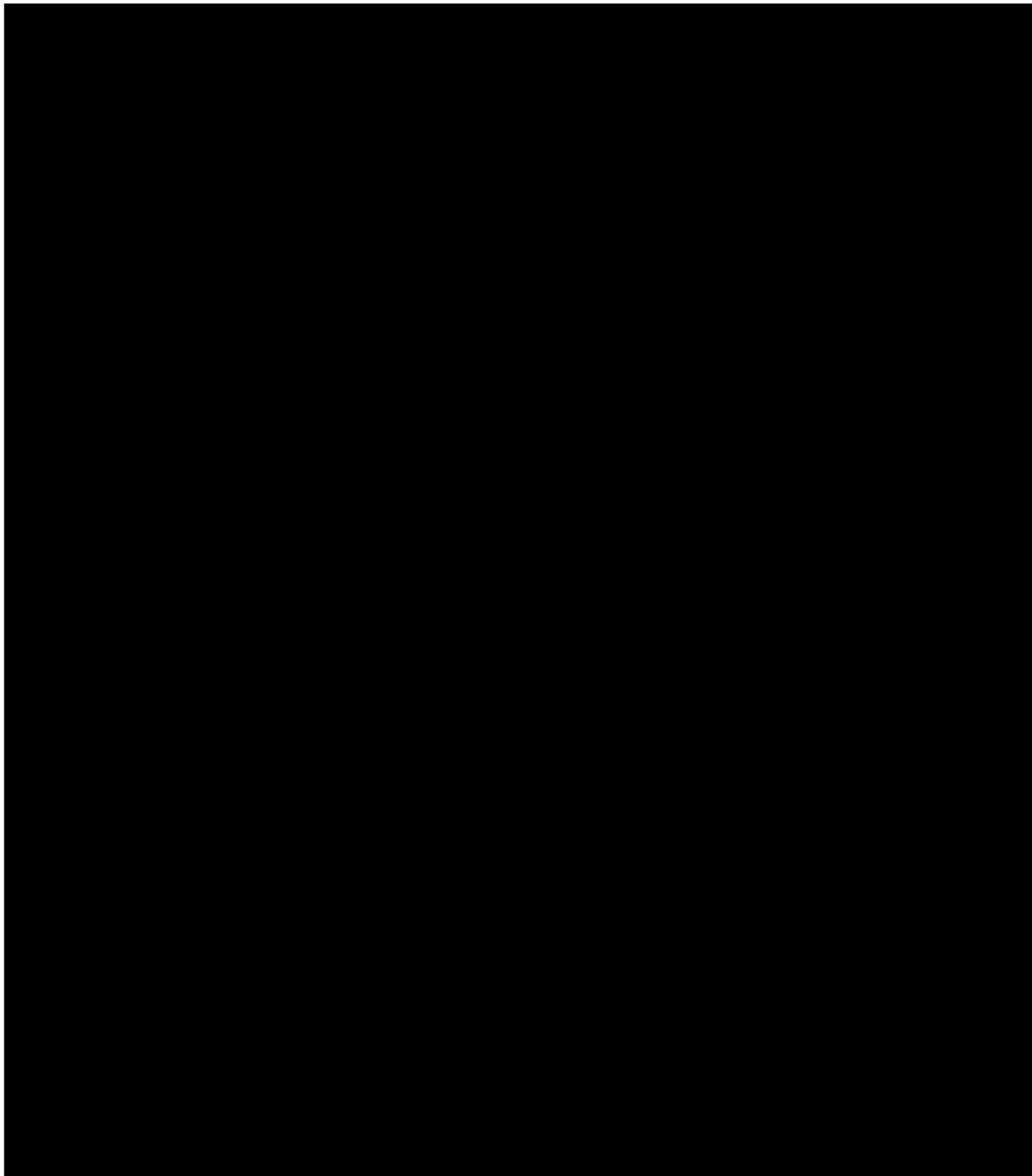
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F.   *Spectrum auctions in April and December 2021*

Low Band Spectrum and High Band Spectrum

86.   The potential capacity and speed of a mobile network may be increased by acquiring more spectrum. All other things being equal, an MNO with higher quantities of spectrum will be able to offer greater capacity and speeds on its mobile network than an MNO with lower quantities of spectrum. The other key way to increase the potential capacity and speeds of a mobile network is by building more sites, which is sometimes referred to as 'densification'.

87.   The amount of spectrum, or bandwidth, available to an MNO directly influences the overall amount of traffic that can be carried and speeds that can be achieved on a base station or within a geographical area. This can be the overall throughput demanded by the connected users, in the case of data, or the number of simultaneous connections that can be supported in the case of a voice or video call.

88.   There are significant differences in attributes of low, mid and high band spectrum:

(a) **Low band spectrum** (700 MHz, 850 MHz, 900 MHz) provides superior coverage over broader geographic areas compared with mid band (3.5 GHz, 2.6 GHz, 2.3 GHz, 2100 MHz, 1800 MHz) or high band (26GHz) spectrum. Low band spectrum also provides better in-building penetration compared with mid or high band spectrum.

(b) **Mid band spectrum** provides a balance of coverage and capacity.

(c) **High band spectrum** provides the most amount of capacity due to the higher amount of spectrum available on the high spectrum bands but with very limited coverage.

89. The superior coverage of low band spectrum makes it more suitable and attractive to mobile network providers for providing mobile service coverage, particularly over large geographic areas such as regional areas. This is because fewer sites are required for providing coverage over an area relative to the number of sites required when using mid or high band spectrum.

90. Spectrum is a finite resource and is vital to MNOs. The Australian Media & Communications Authority (**ACMA**) oversees the allocation of spectrum licences in Australia.

91. Optus holds the following spectrum licences in metropolitan and regional areas:

(a) **700 MHz:** 2 x 10 MHz (Australia-wide). This is used almost exclusively for 4G.

(b) **900 MHz:** Optus' current holding is 2 x 8.4 MHz (Australia wide). Optus has applied for an additional Early Access 2 x 8.4 MHz (in selected areas). From July 2024, Optus will hold 2 x 25 MHz (Australia-wide). This licence was acquired in the 850/900 MHz band spectrum auction described below at paragraph 97. This band is currently used for 3G and 4G and planned to be used for 5G in areas where early access can be obtained.

(c) **1800 MHz:** 2 x 15 MHz (metropolitan areas) and 2 x 20 – 2 x 25 MHz (regional areas). This is used for 4G.

(d) **2100 MHz:** 2 x 5 MHz – 2 x 15 MHz (regional areas) and 2 x 20 MHz (metropolitan areas). This is used predominantly for 4G and 5G. Use for 3G is limited to fewer than 50 sites.

(e) **2300 MHz:** 98 MHz (Sydney, Melbourne, Brisbane, Adelaide, Perth) and 70 MHz (Canberra). This is used for 4G and 5G.

(f) **2600 MHz**: 2 x 20 MHz (Australia-wide). This is used predominantly for 4G.

(g) **3.5 GHz**: 30 – 35 MHz (outer metropolitan areas), 65 – 100 MHz (metropolitan areas), 30 – 35 MHz (major regional centres) and 0 – 65 MHz (regional areas). This is used for 5G only.

(h) **26 GHz**: 800 MHz for metropolitan and major regional towns except 600 MHz for Hobart, Margaret River. This is used for 5G only.

92. Optus does not hold any 850 MHz spectrum licences.

mmWave Spectrum Auction

93. In April 2021, ACMA conducted an auction for 2.4GHz of 26 GHz mmWave spectrum in all large population areas of Australia, metropolitan and regional. This mmWave spectrum could be used to run 5G networks. The allocation limit for the auction was set at 1GHz per bidder.

94. ██ ██. This is because mmWave spectrum enables superior speeds. ████████████████████████ ████████████████████████████████.

95. Accordingly, I was involved in taking the following steps to seek and obtain approval for Optus to bid for mmWave in the auction:

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96.   Optus was ultimately successful in obtaining 800MHz of mmWave spectrum in Sydney, Melbourne, Brisbane, Perth, Adelaide, Canberra and a range of regional areas. A copy of Optus' press release dated 23 April 2021 is at **Tab 4** of **Exhibit LK-1.**

850/900 MHz Spectrum Auction

97.   [REDACTED]

98.   Between 30 November 2021 and 6 December 2021, ACMA conducted an auction for spectrum in the 850/900 MHz band spectrum. This spectrum band can be used to run 3G, 4G or 5G networks. [REDACTED]

99.   [REDACTED]

[REDACTED]

119. Ultimately, Optus was successful in acquiring 2 x 25MHz of 900MHz spectrum at the auction. A copy of Optus' press release dated 8 December 2021 is at **Tab 5** of **Exhibit LK-1**.

3. Arrangements between Optus and TPG

120. A joint venture arrangement known as the **eJV** between Optus and TPG has been in place since 2004. The eJV provides for passive network sharing ██████████ ███ as defined in the eJV) and 3G roaming ██ ██████████.

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4. My views on Optus entering into an Agreement with TPG

150. From a technical perspective, Optus would contemplate entering into an agreement with TPG which is similar to the Proposed Transaction. In my view, there are various reasons why an agreement would make sense for Optus.

151. *First,* there would be a reduced cost to Optus due to the revenue generated from TPG's payments to access Optus' network. This would allow Optus to generate a higher return on its investment and to build and deploy more greenfield sites in areas where sharing was to take place.

152. *Second,* by pooling Optus and TPG spectrum, Optus's customers (as well as TPG's customers) would benefit from higher speeds and better network performance. I describe this benefit in further detail in section 5 below.

153. *Third,* with access to TPG's low band spectrum, Optus would be able to provide wider 5G coverage per site and therefore rapidly expand its 5G coverage footprint. Optus would also be able access additional sites from TPG that Optus does not have network equipment on at present resulting in increased coverage for Optus – this is similar to what Telstra and TPG are proposing to do in the Proposed Transaction. As discussed at paragraph 161 below, over time Optus would extend its network coverage by utilising ■ ■■■■■■■■■■ TPG's sites.

154. *Fourth,* Optus would be able to deploy and sell fixed wireless access services due to the additional mid band 5G spectrum that Optus would be able to access through potential spectrum pooling between Optus and TPG. I describe this in further detail in section 7 below.

155. Overall, in my view an arrangement between TPG and Optus would make both Optus and TPG significantly stronger competitors to Telstra in regional areas. This will apply

across multiple important network attributes; coverage, speed, and overall network quality and performance.

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160. [REDACTED]

5. **How Optus could utilise TPG's spectrum**

163. Optus and TPG have different spectrum holdings. Optus and TPG's spectrum holdings in regional areas is shown **Figure 1** below.

<u>**Figure 1**</u>

Band	Band Type	TPG	Optus
700MHz	Low Band	2 x 15MHz	2 x 10 MHz

Band	Band Type	TPG	Optus
850MHz	Low Band	2 x 5 MHz	
900MHz	Low Band		2 x 25MHz (licenced from July 2024)
1800MHz	Mid Band	Between 2 x 10 MHz and 2 x 20 MHz	Between 2 x 20 MHz and 2 x 25MHz
2100MHz	Mid Band	2 x 15MHz	2 x 15MHz
2600MHz	Mid Band		2 x 20MHz
3500/3600MHz	Mid Band	40 MHz in major regional centres 0 – 45 MHz in regional areas	35MHz in major regional centres, 0 – 65 MHz in regional areas

164. ██
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████████████████The pooling of Optus' and TPG's spectrum in regional areas will bring their respective spectrum holdings closer to those of Telstra, which currently holds 1.7 times the combined low band and mid band spectrum bandwidth of Optus, and 2.6 times that of TPG, in regional areas. I consider that spectrum pooling would help both Optus and TPG achieve a stronger market position relative to Telstra and enhance competition in the regional areas.

165. The pooling of Optus and TPG spectrum holdings in the 81.4 – 98.8% coverage zone, as compared to Telstra's spectrum holdings is shown in **Figure 2** below. Due to the various spectrum holdings in different regional areas, the main holdings of Optus and TPG have been used for the purpose of **Figure 2**.

Figure 2

Band	Telstra	Optus & TPG (spectrum pooling)
700MHz	2 x 20MHz	2 x 20 MHz

Band	Telstra	Optus & TPG (spectrum pooling)
850MHz	2 x 25 MHz	2 x 5MHz
900MHz		2 x 25MHz
1800MHz	2 x 40MHz	2 x 40MHz
2100MHz	2 x 20MHz	2 x 30MHz
2600MHz	2 x 40 MHz	2 x 20MHz
3500/3600MHz	80MHz	70MHz

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██ Peak data rate is a typical measure of maximum network capacity and speed provided by a mobile network. The higher the peak data rate is, the greater the network capacity and the higher the user data speed.

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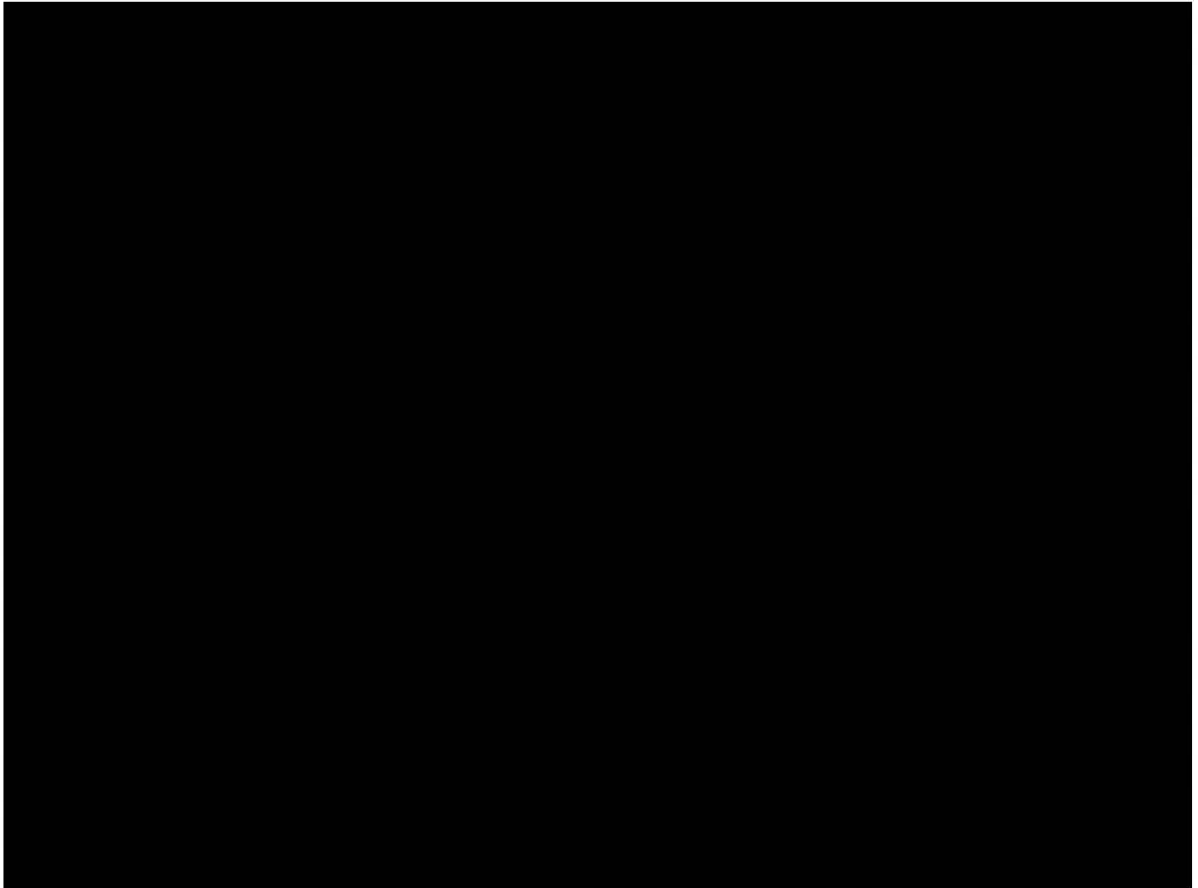
169.   In my view, particular spectrum assets of TPG are more valuable to Optus than others.
        For example:

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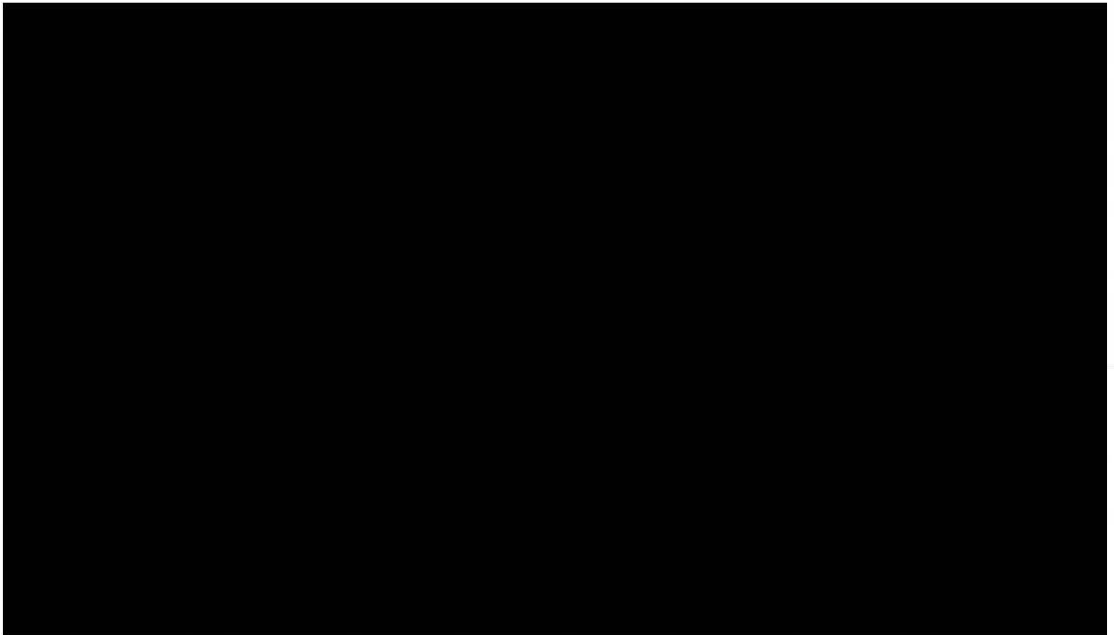
        (b)

        (c)   Optus and TPG have contiguous spectrum resources in 1800MHz and 3500MHz
               band. Spectrum assets which are contiguous are more valuable as they bring
               efficiency in network deployment. This is discussed further in paragraph 184 -

185 below. Therefore, I consider that the pooling of these spectrum bands would be valuable for Optus.

170.   In **Figure 5** below, I set out my views as to the utility in aggregating TPG's and Optus' spectrum assets.

<div align="center"><u>Figure 5</u></div>

Band	Potential benefits for Optus	Optus considerations
Low band spectrum (700/850MHz)		
Mid-band Frequency Division Duplex (**FDD**) spectrum (1800/2100MHz)		
Mid-band Time Division Duplex (**TDD**) spectrum (3500/3600MHz, C-Band)		
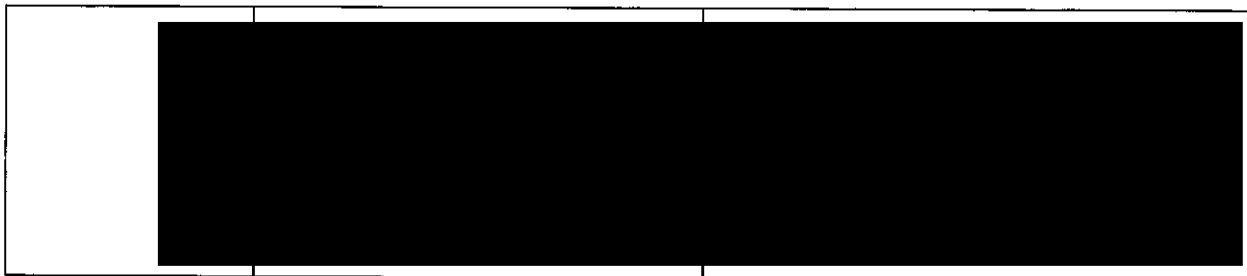
171. I address further below in section 7 alternative uses that TPG and others could put its TPG's spectrum to if the Proposed Transaction did not proceed.

6. The Proposed Transaction

A. Telstra Advantage from TPG spectrum

172. I understand that under the MOCN sharing arrangement in the Proposed Transaction, Telstra obtains access to substantial additional spectrum in regional areas. Telstra will receive a substantial increase in both controlled low band spectrum and controlled mid band spectrum.

173. The effect of this can be assessed by reference to several different metrics which I consider are relevant to comparing the quality of mobile networks:

(a) **absolute spectrum holdings** — all of the spectrum holdings, channels and bandwidths that an operator has. As I describe at paragraph 86 all other things being equal, an MNO with higher quantities of spectrum will be able to offer greater capacity and speeds on its mobile network than an MNO with lower quantities of spectrum.

(b) **peak data rates** — as mentioned above, the peak data rate is a typical measure of maximum network capacity and speed provided by a mobile network. The higher the peak data rate is, the greater the network capacity and the higher the user data speed.

(c) **spectrum bandwidth per population** — measures how much spectrum is available on a per person basis, with reference to the number of people within a specific population. The relevant formula is spectrum available x total physical sites / population count.

174. Telstra's spectrum holdings in the 81.4% – 98.8% coverage zone as a result of the MOCN sharing arrangement, as compared to Optus' spectrum holdings in the same regional areas, is shown in **Figure 6** and **Figure 7** below.

Figure 6

Spectrum holdings in 81.4-98.8% coverage zone

- Telstra
- Telstra (plus MOCN spectrum pooling)
- Telstra+TPG (all spectrum combined)
- Optus
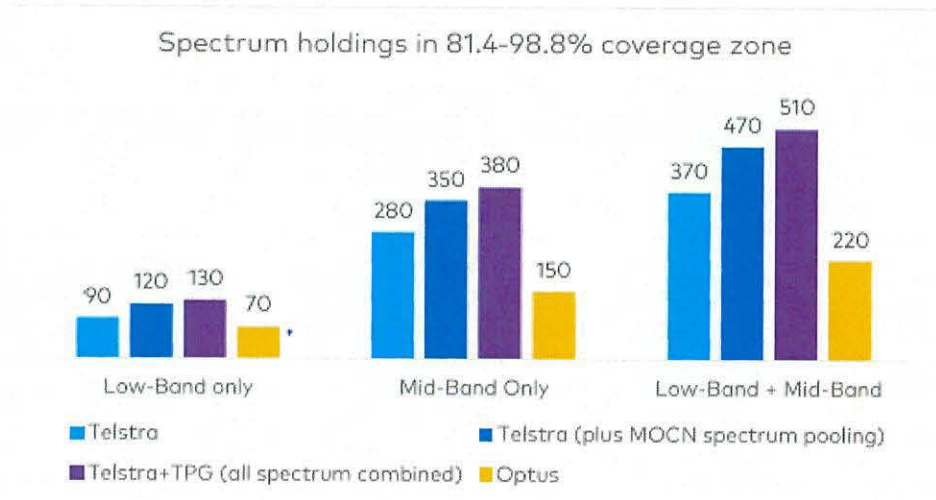
Figure 7

Spectrum Bands	Band Type	Telstra	Telstra (plus MOCN spectrum pooling)	Telstra-TPG (all spectrum combined)	Optus
700MHz (FDD)	Low Band	2 x 20MHz	2 x 30MHz	2 x 35MHz	2 x 10Mz
850MHz (FDD)	Low Band	2 x 25MHz	2 x 30MHz	2 x 30MHz	
900MHz (FDD)	Low Band				2 x 25MHz
1800MHz (FDD)	Mid Band	2 x 40MHz	2 x 40MHz	2 x 55MHz	2 x 25MHz
2100MHz (FDD)[1]	Mid Band	2 x 20MHz	2 x 35MHz	2 x 35MHz	2 x 15MHz
2600MHz (FDD)	Mid Band	2 x 40MHz	2 x 40MHz	2 x 40MHz	2 x 20MHz
3500/3600MHz (TDD)	Mid Band	80MHz	120MHz	120MHz	30 MHz

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176. Telstra's access to additional spectrum will provide it with significant capacity, speed and quality benefits, as acquiring additional spectrum allows an MNO to increase the capacity, speeds and performance of its network (see paragraph 86 - 89 above). This means that Telstra will be able to meet higher demand and connect more simultaneous users and provide much higher speeds and a higher quality network to customers. It is particularly important to note the significant uplift in speeds and performance that customers will perceive on the low band coverage areas, which would be also important for services such as Internet of Things (**IoT**) and remote 4G and 5G connectivity for

agricultural, mining, logistics and similar applications.

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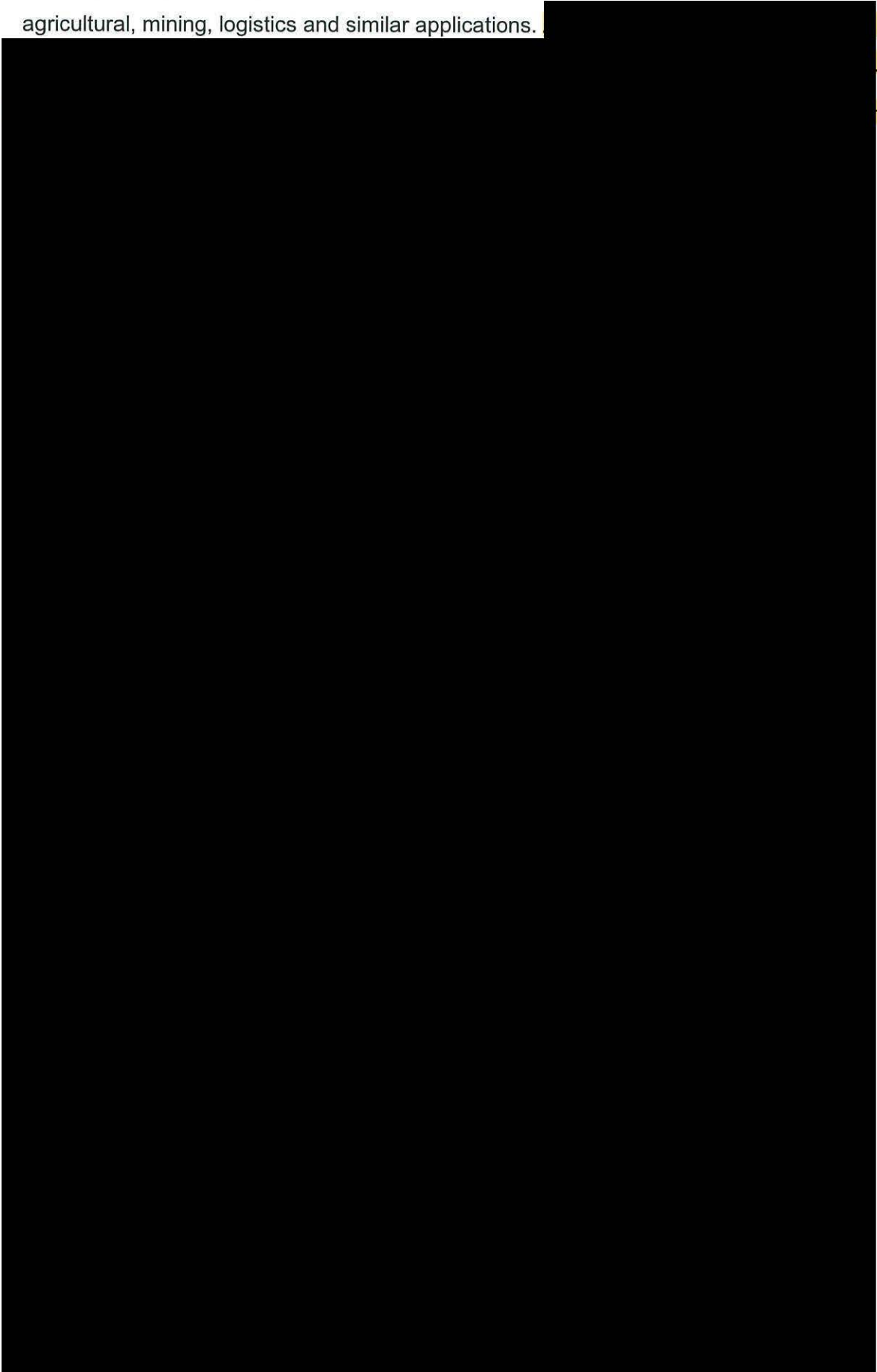
180. I consider that spectrum bandwidth per population count is the correct basis for a spectrum comparison. Spectrum per customer count (as used by Telstra) is not a valid measure because it does not take into account the number of sites that have been deployed and it artificially increases or decreases the spectrum ownership when dividing by customer number. For example, an operator with very large customer numbers will be wrongly projected as owning a low amount of spectrum per customer. Rather, the greater the number of mobile sites installed, the greater the network capacity offered as the sites deployed provide a multiplier effect in terms of available capacity. The spectrum capacity offered in an area should be calculated using the total available spectrum multiplied by the number of installed mobile sites.

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[black redacted box]

183.

184. When considering the pooling of spectrum, the size of the pooled assets is not the only relevant consideration. The *adjacency* of spectrum assets is also significant. Adjacent spectrum holdings can more effectively be combined to realise the potential capacity and speed benefits described above. An increase in spectrum in the same spectrum band and immediately adjacent to an MNO's existing spectrum holdings will increase the maximum speed that an individual user will experience.

185. TPG and Optus' spectrum are adjacent to each other in the 1800 MHz and 2500 MHz bands.

186. If a carrier's spectrum bands are not adjacent to each other, the carrier has two options to better leverage its spectrum holdings: realign the spectrum bands, or carrier aggregation.

187. Carrier aggregation technology allows for discontinuous spectrum channels to be pieced up and used together by combing the data being transmitted or received on both channels as if it is a single logical channel and thus increasing the speeds and capacity.

B. *Congestion in Telstra Network*

188.   I have read the Authorisation Application and refer to section 10.1(C). In my view, Telstra has available to it several other ways to use its existing spectrum assets and alternative network capacity expansion techniques to provide additional capacity and improve the speeds provided to its customers.

189.   Based on analysis that has been done by my team, which is described in more detail in this section, I note the following conclusions:

(a)   Telstra is under-utilising its mid-band spectrum in the regional area. Telstra has deployed its mid-band spectrum holdings on between 10 – 33% of its sites and some mid- bands, such as 1800MHz, are not installed to their full bandwidth.

(b)   Telstra has a significant number of its regional sites (87%, being approximately 3,250 sites) running on low band 3G 850MHz. These sites will likely have the 3G 850 MHz spectrum re-farmed for 4G or 5G deployment in June 2024 when Telstra switches off its 3G network.

(c)   Telstra has not yet deployed its additional 2 x 10 MHz of 850 MHz that Telstra acquired at the 2021 auction.

(d)   There are additional techniques that Telstra could use to expand capacity on its existing sites including twin-beam antennas, sector splits and Massive Multiple-Input Multiple-Output (**MIMO**).

190.   **Figure 12** below sets out Telstra's deployed spectrum bands in the MOCN zone.

Figure 12

Telstra spectrum bands deployed
(in the MOCN zone, as of Apr 2022)
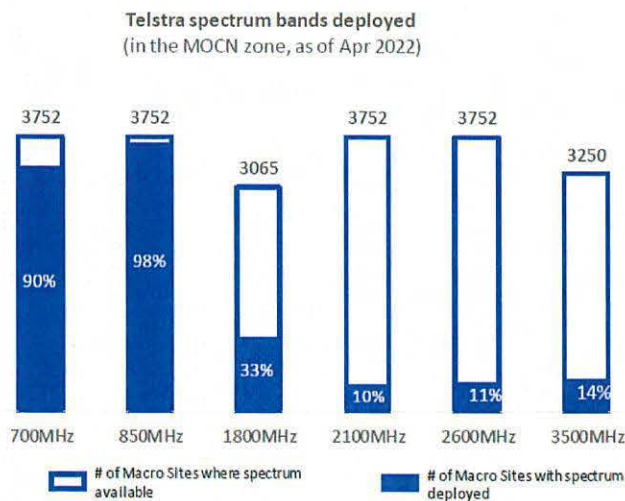
191. *First*, Telstra will have a significant capacity boost from upgrading its sites running on low band 3G 850MHz spectrum. In the context of assessing the Proposed Transaction, I instructed my team to conduct an analysis of the extent to which Telstra's capacity would increase following the re-farming of spectrum. The analysis shows that Telstra's 2 x 15MHz of 850MHz spectrum-refarm from 3G to 4G/5G would increase capacity by 2.4 – 3.6 times for 4G and 5G respectively. Telstra has publicly announced that it will switch off its 3G network in June 2024. I therefore infer that Telstra plans to re-farm this spectrum at this time: either full refarming in June 2024 or even partial refarming commencing before June 2024. Telstra's capacity will also increase further when it deploys its additional 2 x 10MHz of the 850-extension spectrum which it acquired at the 2021 spectrum auction, and which is accessible in July 2024.

192. *Second*, Telstra's 1800MHz spectrum holdings in the region are underutilised. Telstra holds 2 x 40MHz of 1800MHz band in the regional area but has only deployed 1800MHz on 33% of its sites in the regional area. I also understand that 2 x 25MHz of 1800MHz spectrum acquired by Telstra in February 2016 is also not fully deployed on its 33% sites where 1800MHz has been deployed. I am aware of the above based on examination (by me and my team) of the Radio Frequency National Site Archive (**RFNSA**), which is an online system on which mobile operators in Australia have to publish data as to which spectrum bands and what power levels are being emitted on their sites.

193. If Telstra increased its deployment of more mid-band spectrum to more of its existing sites, it would further be able to reduce congestion on sites and provide higher peak and average speeds. ██████████████████████████████████ ██████████████████████████████████ ████████████████████████.

194. *Third*, there are additional technologies, not implemented in the regional area by Telstra, which could improve Telstra's spectrum efficiency and address network congestion or capacity requirements. For example:

(a)   There is a technology called Frequency Division Duplex (FDD) Massive MIMO. FDD Massive MIMO is the use of multiple transmitters and receivers in a single RAN site. Further, when FDD Massive MIMO technology is used, multiple beams of radio signal can be formed from the antenna elements in the single RAN site. Through the use of a concept called spatial and user multiplexing, each beam is separated. Because the beams are separated, each beam can serve a subset of the users and thus reuse the same spectrum channel from the same RAN site, which increases capacity.

(b)   There are additional technologies called sector splits and/or twin bean antennas. Sector split involve increasing the number of sectors/cells per site from the typical three sector per site configuration to four or more sectors, with each sector adding more capacity to the site. Similarly twin-beam antennas provide the same benefit by doubling sector capacity when deployed.

195.   To my knowledge, based on my team and I looking at the RFNSA analysis, technologies such as FDD Massive MIMO on mid-bands, sector splits and multi-sector twin-beam antenna technology (which I describe at paragraph 202 below) have not been introduced into the regional market by Telstra. These could better utilise the spectrum and boost network capacity and coverage significantly.

C.   *Reduction in infrastructure-based competition*

196.   As mentioned above, a mobile network includes both a core network and the RAN.

197.   The RAN refers to the mobile towers or "sites", and associated equipment on those sites, that send and receive radio signals over designated radiofrequency spectrum to and from mobile devices within the geographic area for which the RAN provides mobile service coverage.

198.   The RAN network defines the mobile network's coverage and quality, and directly impacts the end-to-end functionalities. Mobile service differentiation relies on the RAN features and technologies.

199.   Under the Proposed Transaction there will only be one RAN network, owned and operated by Telstra. I understand from reading the Authorisation Application that TPG has very limited control over the RAN network and Telstra has the primary responsibility for designing and building the MOCN. This means that there will be no network differentiation on coverage, quality, and functionalities as between TPG's and Telstra's mobile networks.

200.   I consider it extremely important to have multiple independent mobile networks and infrastructure. I describe below why I consider this to be important, and what I believe the impact of the Proposed Transaction will be.

i. Reduced network innovation and differentiation

201.   Because TPG does not design and build the RAN, TPG will have no independent ability to introduce RAN technology innovations, or to upgrade and optimise the RAN network to improve user experience in the regional market. Rather, TPG's products and service

offerings are subjected to Telstra's RAN strategy, capability and timelines. I set out below some examples of RAN technology innovation.

202.   *First,* there is **multi-sector technology**. This technology is typically only deployed when capacity is constrained by an MNO's spectrum. A traditional mobile site has three sectors and a single radio unit with a single beam antenna. Multi-sector technology introduces a twin-beam antenna and double set of radio units to create more sectors per site (i.e., 6 sectors). Therefore, it creates up to two times capacity gain on the bands deployed on the twin beam configuration. This involves site redesign and the swapping out of the existing single beam antenna.

203.   I understand that Telstra has not implemented multi-sector technology in the regional area. ███
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204.   Given Telstra is responsible for designing and building the MOCN, if TPG wants to use multi-sector configuration to create capacity or coverage in its mobile network, TPG will not be able to implement this technology on its own under the Proposed Transaction. It will be Telstra's decision whether or not to introduce the technology in the regional market.

205.   *Second,* there is **quality of service (QoS) prioritisation service.** QoS prioritisation involves a 'list' whereby operators are able to prioritise various attributes. Attributes can be related to, for example, speed and latency. Operators can then formulate products/services depending on QoS attributes. This is done through the RAN which Telstra has control over the deployment of. Without QoS, the ability to differentiate between the priority of services such as Voice, Fixed Wireless Access and other services will not be possible. TPG does not have the flexibility or control over offering such products/services.

206.   *Third,* there is **network slicing**. Network slicing is a process whereby portions of a network's resources are allocated for various use cases (e.g. gaming). A network slice consists of a RAN part and a core network part. The RAN network needs to support QoS tagging and differentiation, the ability to define and select different RAN slicing attributes and RAN resource allocation and management capability. Without Telstra's RAN slicing awareness feature support and Telstra implementing this in the way TPG requires, TPG cannot independently introduce network slicing services under the Proposed Transaction. TPG's network slicing offering is subject to Telstra's RAN capability and Telstra's willingness to design and implement to TPG's requirements and this

significantly limits TPG's independence with regards technology deployment and roadmap.

207. Other support features such as Mobile Edge Compute, Ultra Reliable Low Latency and IoT have to be activated and the product roadmap for such services is heavily dependent on the RAN network deployment.

208. *Fourth,* the introduction of new spectrum in the area under the Proposed Transaction for higher capacity and higher speeds will require Telstra's agreement to implement on the forward roadmap. Some key spectrum bands that might be available in the future include the 600MHz band.

209. It is technically extremely complex and highly inefficient to provide the above technical capabilities through an alternative commercial arrangement on the sites where the proposed MOCN solution is deployed.

ii. Reduced network choice and infrastructure resilience

210. Under the Proposed Transaction, the regional mobile infrastructure will decrease. I understand that TPG has announced that it will decommission more than 700 towers in major regional towns, including Tamworth, Gladstone and Shepparton. Optus is also reviewing its position and is not likely to be investing in new sites. ███████████

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211. As a result, the Proposed Transaction will reduce the network choice for the regional customers that are currently covered by three networks.

212. The more incentives there are for MNOs to invest and compete, the better the outcomes of consumers. Optus' significant investment in regional Australia over the past five years (commencing in 2016) has significantly improved regional market competition and providing a credible alternative network choice for regional Australians. Optus has deployed over 840 greenfield sites in the proposed Telstra-TPG regional coverage zone. The rollout of the greenfield sites along with a significant number of 4G upgrades on already existing sites over the same period has resulted in Optus performing better than Telstra in regional areas ███████████████████████████████████████

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213. As a result of Optus' investment and network improvement in regional areas, Telstra has increased its regional mobile infrastructure investment from 2017, thereby improving infrastructure and service availability in regional areas.

214. Therefore, it is vital that MNOs are incentivised to invest and to innovate as this drives competition both at an infrastructure level and a network and service quality level. This ultimately benefits the public and customers.

215. Further, it is extremely important to ensure that consumers have access to reliable mobile services in the event of network redundancy caused by a natural disaster, power outages or otherwise. Sharing of mobile network infrastructure reduces the overall resilience of the network in a given location.

216. Having multiple physical networks provides significantly more resilience for various reasons.

    (a) *First,* the physical locations of each of the MNO sites could be different therefore reducing the risk of all sites in one area being impacted by a power outage, bushfire or flood.

    (b) *Second,* the support staff who maintain the sites and respond to outages could be different and therefore respond in different ways to outages.

    (c) *Third,* the RAN equipment and transmission equipment on each of the sites could be from different suppliers and therefore there is a much lower risk of a common software or hardware failure affecting different MNOs.

    (d) *Fourth,* the backhaul transmission for the sites could be on different paths and locations i.e. different fibre rings, different microwave paths and different hub sites.

217. Therefore, the Proposed Transaction risks the availability of a network alternatives to Telstra in regional areas and involves an immediate reduction in network resilience.

7. Alternate Uses for TPG Spectrum

218. If the Proposed Transaction did not proceed, my view is that TPG would seek to monetise its spectrum assets in other ways.

219. Based on my experience in the market, I believe that there would be a range of potential acquirers of TPG's spectrum who could effectively utilise TPG's spectrum.

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222.   Because fixed wireless services deliver broadband services to the home or places of work, fixed wireless customers generally have higher data demands than typical mobile data customers. Accordingly, one factor that affects a MNO's ability to provide a commercially viable fixed wireless network is the amount of spectrum held by the MNO. The higher data demands of users requires the MNO to have greater amounts of spectrum able to be used in the geographic areas where the fixed broadband service is supplied, in order to provide a fixed wireless broadband service with sufficient capacity and speeds.

223.   5G fixed wireless access will mainly be delivered by the 3500/3600 MHz mid-bands. The other mid-bands (1800MHz and 2100MHz) which mainly serve for mobile broadband capacity purposes could supplement the fixed wireless capacity in the areas where mobile broadband traffic load is low.

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232. *Third,* I believe that the National Broadband Network (**nbn**) could effectively utilise TPG's spectrum in the deployment of its fixed wireless access network in regional areas. Nbn's spectrum does not need to be adjacent to TPG's spectrum to do so. As described at paragraphs 186 - 187 above, in circumstances where nbn's spectrum is not adjacent to TPG's spectrum, nbn could realign their spectrum bands or, if Telstra did not agree to a realignment, use carrier aggregation across the equipment. TPG's spectrum would provide customers on nbn's fixed wireless network with greater capacity and speed, and allow nbn to sell services to more customers.

233. *Fourth,* in my view there are some smaller players and potential neutral host providers who would also be interested in TPG's spectrum assets. For example, these include Pivotel, Field Solutions Group (**FSG**) and Broadcast Australia International who specialise in providing coverage in rural and remote locations where current operators are not present. These providers and also private enterprises could use the spectrum to roll out rural network infrastructure for agriculture, mining and other applications. Satellite operators could also use the spectrum to provide mobile network connectively in regional areas.

8. Optus' 5G network investment and the impact of the Proposed Transaction

234. Since the announcement of the Proposed Transaction, my team and I have been working with the business on a commercial evaluation on what network investment Optus would proceed with.

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236.   In my view, if the Proposed Transaction was to proceed:

(a)   Telstra's increased dominance would apply across multiple important network attributes; coverage, speed, latency and overall network quality. With the Proposed Transaction, Telstra will have a significant coverage, speed/performance and cost advantage in the regional sharing zone/area. TPG would also benefit from this.

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(c)   TPG will have access to a wider network compared to Optus. As recorded on

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███████ TPG will have access to the 3,741 Telstra sites within the MOCN 80-98.8% population region. TPG will have around between ██████████████████████ █████████████████████, without having to invest the capex.

(d)   TPG will also achieve a solution to the Huawei Ban through the Proposed Transaction. As described above at paragraph 38, TPG was also affected by the Huawei Ban. As a result of the Proposed Transaction, TPG will avoid having to replace Huawei equipment on the 725 sites to be decommissioned (which I understand to be approximately 11% of their current approximately 6,200 live sites). Further, Telstra will take over 169 sites TPG sites and replace Huawei equipment on these sites.

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240. These views I express above are also based on past experience. For example, Optus launched a significant program in 2016 to roll out many greenfield sites to match Telstra's coverage. ████████████████████████████████████ ██████████████

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241. Despite all the improvements Optus has made in its regional networks, ██████████████

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242. From my current role at Optus, I understand that network sharing arrangements have occurred in other countries and have assisted in reducing overall costs for example M1 and Star Hub in Singapore. However, in my view the Proposed Transaction is different from what has occurred in other countries.

243. The key difference between what is being proposed under the Proposed Transaction and what has occurred in other countries, is that the Proposed Transaction is the combination of the number one MNO and number three MNO. The Proposed Transaction involves the largest MNO with significant market share of ████ in the regional coverage zone being the operator that will be getting the benefits of scale from the Proposed Transaction.

244. In almost all other cases of network sharing, it is the number two MNO and the number three MNO who are entering into a sharing agreement to build scale and lower the cost of network investment and operation.

245. The Proposed Transaction results in more scale (in terms of spectrum and income) for a significantly dominant number one operator. ██████████████████████

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Signature of witness

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Kanagaratnam Lambotharan
Date: 18 October 2022

Tab 1 of Exhibit LK-1

The Hon. Scott Morrison MP
Treasurer
Acting Minister for Home Affairs

Senator the Hon. Mitch Fifield
Minister for Communications and the Arts

JOINT MEDIA RELEASE

Thursday 23 August 2018

GOVERNMENT PROVIDES 5G SECURITY GUIDANCE TO AUSTRALIAN CARRIERS

Fifth Generation (5G) is the next evolution of mobile technology. It promises the ability to improve the daily lives of Australians, strengthen our connectivity and accelerate our networks.

5G will change the way people use, and rely on, mobile services, driving improvements in a range of ways for businesses and communities.

It will enable a new wave of innovation across our community and be used to connect other critical infrastructure, including electricity and water.

5G will underpin the development of smart cities and Internet of Things (IoT), and connect industrial control and safety of life systems, like remote surgery, and autonomous vehicles.

The Government wants to create an environment that allows Australian businesses to be at the forefront of seizing the benefits of 5G across the economy.

To achieve this, the Government is fostering a policy and regulatory environment to support a more efficient rollout, given its potential benefits to the economy.

The Government has undertaken an extensive review of the national security risks to 5G networks.

5G requires a change in the way the network operates compared to previous mobile generations. These changes will increase the potential for threats to our telecommunications networks, and these threats will increase over time as more services come online.

Acting Minister for Home Affairs Scott Morrison said the Government wants to realise the benefits of 5G but acknowledges that this new technology introduces additional risks.

"The security of 5G networks will have fundamental implications for all Australians, as well as the security of critical infrastructure, over the next decade," Mr Morrison said.

Minister for Communications and the Arts Mitch Fifield said that it is vital that security and integrity underpinned the opportunities opened up by 5G networks.

"The Government is committed to the timely rollout of 5G networks in Australia. 5G will drive substantial economic and social benefits across the economy, through new technologies which will be used in autonomous vehicles, smart cities, and advanced agriculture," Minister Fifield said.

The Government is committed to protecting this vital technology. To fully realise 5G's benefits, Government and industry need to continue to work together to take necessary steps to safeguard the security of Australians' information and communications at all times, and the integrity and availability of the networks themselves.

Last year, the Government introduced the Telecommunications Sector Security Reforms (TSSR) to provide a framework for Australia's security agencies and industry to share sensitive information on threats to telecommunications networks.

TSSR introduces four new measures:

- a security obligation, which requires carriers and carriage service providers to protect their networks and facilities against threats to national security from unauthorised access or interference

- a notification requirement, which requires carriers and nominated carriage service providers to tell Government of any proposed changes to their telecommunications systems or services that are likely to have a material adverse effect on their capacity to comply with their security obligation

- the ability for Government to obtain more detailed information from carriers and carriage service providers in certain circumstances to support the work of the Critical Infrastructure Centre, and

- the ability to intervene and issue directions in cases where there are significant national security concerns that cannot be addressed through other means.

"The Government's Telecommunications Sector Security Reforms, which commence on September 18, place obligations on telecommunications companies to protect Australian networks from unauthorised interference or access that might prejudice our national security," Mr Morrison said.

5G requires a network architecture that is significantly different to previous mobile generations.

Traditionally, network equipment used by telecommunications operators has been categorised into the 'core' network and the 'edge' network.

The core network is where the more sensitive functions occur including access control, authentication, voice and data routing, and billing.

The edge consists of the radios and other equipment used to connect customer equipment (such as handsets, laptops and tablets) to the core network.

Where previous mobile networks featured clear functional divisions between the core and the edge, 5G is designed so that sensitive functions currently performed in the physically and logically separated core will gradually move closer to the edge of the network.

In that way, the distinction between the core and the edge will disappear over time.

This shift introduces new challenges for carriers trying to maintain their customers' security, as sensitive functions move outside of the highly protected core environment.

This new architecture provides a way to circumvent traditional security controls by exploiting equipment in the edge of the network – exploitation which may affect overall network integrity and availability, as well as the confidentiality of customer data. A long history of cyber incidents shows cyber actors target Australia and Australians.

Government has found no combination of technical security controls that sufficiently mitigate the risks.

While we are protected as far as possible by current security controls, the new network, with its increased complexity, would render these current protections ineffective in 5G.

Therefore, Government has expectations of the application of the TSSR obligations with respect to the involvement of third party vendors in 5G networks, including evolution of networks leading to mature 5G networks.

The Government considers that the involvement of vendors who are likely to be subject to extrajudicial directions from a foreign government that conflict with Australian law, may risk failure by the carrier to adequately protect a 5G network from unauthorised access or interference.

This applies equally to all carriers, consistent with government's long-standing commitment to a level playing field in the sector.

Carriers may still need to apply controls regardless of the vendor they choose. These controls would not displace existing cyber security practices or business risk mitigations.

Government is well positioned to address these risks in partnership with industry.

Mr Morrison said the Government has been working closely with telecommunications operators to ensure that they understand their new obligations and are ready to comply when the legislation commences on 18 September 2018.

"The Government has now provided carriers with clear guidance about how their new legal obligations apply to 5G networks."

As 5G and related technologies continue to develop, new risks relating to the technology may emerge and require further Government consideration.

"The Government will continue to engage and support Australians, including the telecommunications industry, to manage national security risks," Mr Morrison said.

"The Government's first priority will always be the safety and security of Australians."

Contacts: Treasurer – Andrew Carswell ░░░░░░░ **, Kate Williams** ░░░░░░░
       Minister Fifield – Geraldine Mitchell ░░░░░░ **, Guy Creighton** ░░░░░░
       The Hon. Scott Morrison MP, Sydney

Tab 2 of Exhibit LK-1

13 August 2020

Office of the Company Secretary

Level 41
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MELBOURNE VIC 3000
AUSTRALIA

The Manager

Market Announcements Office
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SYDNEY NSW 2000

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ELECTRONIC LODGEMENT

Dear Sir or Madam

Telstra delivers FY20 results in line with guidance, maintains dividend, provides guidance for FY21

In accordance with the Listing Rules, I attach a copy of a market release, for immediate release to the market.

This announcement has been released simultaneously to the New Zealand Stock Exchange.

Authorised for lodgement

Sue Laver
Company Secretary

MARKET RELEASE

Telstra delivers FY20 results in line with guidance, maintains dividend, provides guidance for FY21

- **Reported Total Income, NPAT and EBITDA in line with market expectations**
- **Strong growth in numbers of mobile services**
- **Good progress on T22 strategy which is more than halfway through**
- **Final dividend of 8 cents per share, bringing total dividend to 16 cents per share**
- **On track to achieve $2.5 billion net cost reduction target in FY22**

Thursday 13 August 2020 – Telstra today released its full year results for financial year 2020, which were in line with guidance and market expectations.

The Board resolved to pay a fully-franked final dividend of 8 cents per share, comprising a final ordinary dividend of 5 cents per share and a final special dividend of 3 cents per share bringing the total dividend for FY20 to 16 cents per share. This will see $1.9 billion returned to Telstra's shareholders for the year.

Telstra also provided financial guidance including assumptions on a range of metrics for FY21, giving the market clarity on its expectations for the year ahead.

CEO Andrew Penn said the results showed that through a challenging period Telstra continued to deliver for customers, support its people and the community, while generating long-term shareholder value.

"2020 is proving to be an enormously challenging year for everyone – for governments, businesses, communities, and for all of us as individuals. The emotional, mental and economic stresses as a result of the COVID-19 pandemic and necessary restrictions are profound," said Mr Penn.

"Through this extraordinary disruption – both the COVID-19 and bushfire crises, Telstra was challenged to adapt, to find new ways of supporting our customers, our people and the country in a time of need. I am very proud of the way our team responded, while dealing with the implications on themselves personally.

"The COVID-19 period has also highlighted that connectivity has never been more critical. We have witnessed a huge acceleration in the digital economy, an area now critical to a fast economic recovery where Telstra has a key role to play. The reasons we introduced T22 two years ago – a need to rapidly simplify and digitise, to remove customer pain points, to remove legacy systems and processes – have never been more relevant and necessary.

"Importantly, it says a lot about the strength of our business and strategy that through all this we were able to meet guidance, maintain the dividend and provide guidance for the year ahead. We have also retained our strong balance sheet and A-band credit ratings."

On a reported basis Total Income[1] for the year decreased 5.9 per cent to $26.2 billion and NPAT decreased 14.4 per cent to $1.8 billion.

Reported EBITDA was $8.9 billion. After adjusting for lease accounting on a like-for-like basis[2], EBITDA decreased 0.3 per cent to $8.4 billion.

On a guidance basis[3], underlying EBITDA declined 9.7 per cent to $7.4 billion. Excluding the in-year nbn headwind[4] – which gives the clearest view of the long-term business – underlying EBITDA grew by approximately $40 million, with growth in the first half of the year offset by a second half decline.

Telstra continued to grow its customer base in FY20, in spite of a competitive and challenging market. At the end of June, and while reaching approximately one third population coverage with its 5G network, Telstra also announced refreshed plans for mobile customers which included increased data allowances and saw 5G included on most plans.

Telstra's multi-brand strategy continued to deliver subscriber growth, particularly in mobile where it added 240,000 retail postpaid handheld mobile services, including 154,000 from Belong. It also added 171,000 retail prepaid handheld unique users, 347,000 Wholesale services and 652,000 IoT services.

Overall mobile revenue declined $461 million in FY20. Reported postpaid handheld ARPU declined 8.2 per cent, or 6.8 per cent excluding the impact of COVID-19 on international roaming.

In the fixed business, revenue continued to be impacted by nbn migration, alongside the continued decline of voice and legacy services and operational issues. Through a focus on differentiated customer experiences including the Telstra Smart Modem, the company continued to have a market-leading share with 46 per cent of the estimated nbn market (excluding satellite).

"nbn wholesale pricing remains the largest negative impact on our fixed business. Without some sort of long-term change leading to improvement in RSP economics, the risk of retail price increases, reduced customer experience or customers moving onto other networks such as 5G will increase. In Telstra's case the profitability of reselling the nbn is negligible at best – that is not sustainable," said Mr Penn.

"Notwithstanding these comments I do want to acknowledge and applaud nbn's response to COVID. nbn acted swiftly to increase capacity to RSPs during this time at no charge enabling RSPs to support their customers as they moved quickly to work and study from home."

During the year Telstra reduced underlying fixed costs[5] by $615 million, or 9.2 per cent. This brought underlying fixed cost reductions achieved since FY16 to $1.8 billion and put Telstra on track to achieve its $2.5 billion net cost reduction target in FY22.

Telstra has announced 12,000 indirect role reductions and 7,300 direct workforce role reductions since it launched T22 in June 2018. As at the end of June 2020, the direct workforce was around 5,700 lower than two years ago. This figure includes 1,600 new roles recruited like software engineering and cyber security – and some additional roles brought on board in response to COVID-19 to mitigate workforce offshore capacity issues.

"In March we put all job reductions on hold for six months to give our people certainty during this difficult time," said Mr Penn.

"As we approach the end of that pause, it is clear that the impacts of COVID-19 will be with us for some time. We have therefore made the decision to keep our T22 productivity role reductions on hold for permanent Telstra employees in Australia and internationally until February next year. We know many are doing it tough at the moment and we hope this decision will give some certainty to our people in what is a very challenging time for Australia – and many of the countries in which we operate.

"There will be some roles that finish in the interim where projects have come to an end or work is no longer required, volumes have declined, or fixed term contracts end particularly related to our involvement in the construction of the nbn. However, for the majority of our teams this will continue to give them some certainty at least until the new year."

Seeing the benefits of T22

Telstra confirmed that nearly three quarters of the measures used to monitor progress against its T22 strategy were now either completed or on track for delivery.

Digital engagement grew substantially, accelerated by the impacts of the COVID-19 pandemic. By the end of FY20, over 71 per cent of Telstra's service transactions happened via digital channels, up from 53 per cent at the end of FY19.

The new My Telstra app, which replaced the Telstra 24x7 app, was downloaded 3.7 million times, providing customers with a new two way in-app messaging service, the ability to track orders, and new troubleshooting tools.

When the COVID-19 pandemic struck, the progress already made on T22 enabled Telstra to fast-track the digitisation and automation of many of its processes and systems and rapidly shift its office-based employees to working from home.

"This acceleration to digital channels and the workforce capacity challenges we have faced offshore have also provoked our thinking on our customer service model for the future. As a consequence, we will be investing even more in digital including messaging. Under our T22 strategy our aspiration had been to reduce the number of calls to our call centres by two thirds by FY22. We are already very close to that run rate now," said Mr Penn.

"This means that over time we will need a smaller call centre workforce for our consumer and small business customers and our aspiration is that by the end of our T22 program all in-bound calls from these customers will be answered in Australia. Today we are already at more than 60 per cent."

Telstra Plus passed one year of rewarding our customers, with more than 2 million enrolled members – a milestone that was achieved ahead of schedule. 4.3 billion points have now been redeemed by customers.

"T22 remains our biggest focus and the things we set out to achieve when we launched the strategy – radically simplify and digitise, remove customer pain points, remove legacy systems and processes – remain just as relevant as the day they were announced," said Mr Penn.

"We are now past the halfway point in delivering T22 and while we expect to see challenging conditions continue in FY21, our strategy means we're well positioned to respond to whatever lies ahead."

Throughout the year Telstra continued its clear leadership in 5G. More than 10 million people now live, work or pass through the 53 cities and towns in Telstra's 5G footprint every day, and approximately one third of the population is covered with 5G. Telstra has exceeded the company's FY20 target of deploying 5G in 35 cities.

"Telstra has always been a leader in telecommunications technology and we are the clear leader in Australia in 5G, as well as being at the forefront globally," said Mr Penn.

"Earlier this year we decided to bring forward $500 million of capital expenditure planned for the second-half of FY21 into calendar year 2020. This is enabling us to accelerate our 5G rollout further while injecting much needed investment into the economy. As a result, late last month I announced that we have increased our ambition and plan to cover 75 per cent of the population with our 5G network by June next year."

In FY20, Telstra also invested in extending its network to provide coverage to more people in regional and remote places.

"In the five years to end of June this year we have invested $7.5 billion in our mobile network nationally with $3 billion of that invested in regional areas alone. This year we deployed world-first technology that effectively doubled the range of a 4G mobile base station, increasing it by up to 200 kilometres for some IoT solutions increasing that network to nearly four million square kilometres across the country. These are big wins for our regional and remote customers," said Mr Penn.

During the year a new Telstra InfraCo organisational structure and operating model was implemented and a Heads of Agreement between InfraCo and Telstra put in place for commercial, service level and operating arrangements.

Telstra also continued to make progress on the T22 target of monetising up to $2 billion worth of assets to strengthen its balance sheet, recently announcing that it had entered into an agreement to sell and lease back its data centre complex in Clayton, Victoria. Once completed, the agreement will bring the asset monetisation total to over $1.5 billion, and Telstra will continue to pursue opportunities in FY21 with a view to getting closer to $2 billion.

Decisive action on COVID-19

Telstra estimated the financial impact of COVID-19 during FY20 was approximately $200 million in underlying EBITDA.

"The enormous, ongoing disruption and pain caused by the COVID-19 pandemic has made the past few months extraordinarily challenging for everyone," said Mr Penn.

"However, we have been thoughtful about the best ways we can make a difference and taken strong and decisive action to support our employees, our customers, and the community."

In March Telstra provided employees with pandemic leave, shifted office-based work to working from home, and put further job reduction announcements on hold.

The company also put assistance measures in place for customers, helped small businesses shift online or go into hibernation, recruited temporary employees for customer service roles in Australia, and extended all sponsorship agreements that would have expired during 2020.

A leading responsible business

"Earlier this year I commented that as we enter the 2020s there has never been a more important time for business to think deeply about the role it plays in society. This has only been reinforced during COVID-19 and the bushfires," Mr Penn said.

During the bushfires, Telstra provided vital infrastructure for emergency services and community evacuation centres, answered more than 55,000 calls from customers making enquiries and seeking support, and paid the mobile phone bills for around 10,000 fire fighters and SES volunteers over December and January. Telstra also provided free access to its payphone network and Telstra Air Wi-Fi hotspots. Investments in supporting customers and restoring bushfire damage to infrastructure will amount to $44 million across FY20 and FY21.

During the year Telstra became carbon neutral in its operations and its challenger brand Belong became carbon neutral in its products and services. Telstra also made progress on its commitment to sourcing 100 per cent renewable energy by 2025, and reducing overall emissions by 50 per cent by 2030.

"I strongly believe that being a responsible business - supporting our people, customers and the economy – creates long-term value for shareholders," said Mr Penn.

"Central to this is how we live up to our organisational purpose and values, not just what is in our contracts. Despite our aspirations and hard work, we know we don't always get things right. Our practices have also let down some of our customers in Indigenous communities. The lessons we are learning from this are helping us re-define our understanding of what responsible business looks like and we must hold ourselves accountable to these standards."

Telstra is currently cooperating with the Australian Competition and Consumer Commission (ACCC) as they conduct an investigation into Telstra's sales, complaint handling and debt collection practices, to determine whether there has been misleading or deceptive conduct, unconscionable conduct, or false or misleading representations. Having considered all the information available, Telstra has made a provision of $50 million in its FY20 accounts for any penalties.

The year ahead

Telstra provided financial guidance for FY21 on a range of metrics [6]. For FY21 Total Income is expected to be in the range of $23.2 to $25.1 billion, underlying EBITDA in the range of $6.5 to $7.0 billion, net one-off nbn DA receipts (less nbn net cost to connect) in the range of $0.7 to $1.0 billion, capital expenditure of $2.8 to $3.2 billion, and free cashflow after operating lease payments of $2.8 to $3.3 billion. The in-year nbn headwind for FY21 is expected to have a negative impact on underlying EBITDA of approximately $700 million. To achieve growth excluding the in-year nbn headwind in FY21, underlying EBITDA will need to be around the mid-point of the guidance range.

Guidance for FY21 underlying EBITDA assumes an estimated negative impact from the COVID-19 pandemic in FY21 of approximately $400 million.

Telstra also adjusted its T22 target for Return on Invested Capital (ROIC) to be greater than 7 per cent by FY23.

"Several things have changed since we set our ROIC ambition as part of the launch of our T22 strategy. We have experienced deeper competition across products and slower return to growth, especially in mobile. In addition, AASB16 was implemented resulting in a 1 percentage point reduction in ROIC, which previously caused us to push out our target by a year. In this same period our WACC has also reduced by approximately 1.5 percentage points," said Mr Penn.

"We have invested, and will continue to invest, for long-term returns and opportunities, especially in mobile and our T22 strategy, the benefits of which will be realised over time. Our long-term ambition is to grow ROIC."

<div align="center">**-ends-**</div>

Details of the FY20 Financial Results, including copies of the presentations given by the CEO and CFO, are available on the Telstra Investor website www.telstra.com.au/aboutus/investors

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Reference number: 084/2020

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[1] Excluding finance income

[2] Reported lease adjusted EBITDA includes all mobile handset leases as operating expenses, and all rent/other leases below EBITDA.

[3] FY20 guidance assumed wholesale product price stability and no impairments in and to investments or property, plant and equipment and intangible assets, and excluded any proceeds on the sale of businesses, mergers and acquisitions and purchase of spectrum. The guidance also assumed the nbn rollout and migration in FY20 was broadly in accordance with the nbn Corporate Plan 2020. Guidance was provided on the basis of AASB16 Leases and assumed impacts consistent with management estimates. Capex was measured on an accrued basis and excluded expenditure on spectrum and externally funded capex and capitalised leases under AASB16 Leases. Underlying EBITDA excludes net one-off nbn DA receipts less nbn net C2C, one-off restructuring costs and guidance adjustments but includes depreciation of mobile lease right-of-use assets. In-year nbn headwind is defined as the net negative recurring EBITDA impact on our business based on management best estimates including key input of the nbn Corporate Plan 2020.

[4] See note 3. As at 30 June 2020, the in-year nbn headwind was ~$830 million.

[5] Underlying fixed costs excludes one-off nbn DA and nbn net C2C, one-off restructuring costs and guidance adjustments

[6] FY21 guidance assumes no impairments in and to investments or non-current tangible and intangible assets, and excludes any proceeds on the sale of businesses, mergers and acquisitions and purchase of spectrum. The guidance is based on management best estimates of nbn impacts including input from the nbn Corporate Plan currently published at time of issue of this guidance. Total income excludes finance income. Underlying EBITDA excludes net one-off nbn DA receipts less nbn net C2C, one-off restructuring costs and guidance adjustments but includes depreciation of mobile lease right-of-use assets. Guidance for FY21 underlying EBITDA assumes an estimated negative impact from the COVID-19 pandemic in FY21 of approximately $400 million. This estimate is approximately $200 million greater than the estimated negative impact from the COVID-19 pandemic for FY20 underlying EBITDA. In-year nbn headwind is defined as the net negative recurring EBITDA impact on our business. Capex is measured on an accrued basis and excludes spectrum and guidance adjustments, externally funded capex, and capitalised leases. Free cashflow is defined as 'operating cash flows' less 'investing cash flows' less 'payments for operating lease liabilities' and excludes spectrum and guidance adjustments.

Tab 3 of Exhibit LK-1

Media Release

TPG Telecom delivers first results following merger completion

Highlights
- Careful navigation of multiple significant challenges and priorities during 1H20
- Strong start on integration activities following completion of merger
- 5G rollout plan gains momentum
- Strong demand for fixed services with highest market share of NBN net adds in June quarter
- Responsible actions from company in response to pandemic

Friday 21 August – TPG Telecom Limited (ASX: TPG) (TPG Telecom), the company formerly named Vodafone Hutchison Australia Pty Ltd (VHA), today released its first half results for FY20, being for the six months ended 30 June 2020 ('1H20').

Reported results for 1H20 include a full six months of the company formerly known as VHA but only four days' contribution from TPG Corporation Limited (TPG Corporation) (the company formerly named TPG Telecom) post the merger accounting effective date of 26 June 2020.

Reported revenue decreased 11 per cent from 1H19 to $1,540 million (includes four-day contribution of $27 million from TPG Corporation). Excluding the TPG Corporation contribution, revenue decreased 12 per cent to $1,513 million.

Reported EBITDA decreased 9 per cent to $531 million (includes four-day EBITDA contribution of $9 million from TPG Corporation and $24 million of merger transaction costs). Excluding these items, the underlying TPG Telecom standalone EBITDA decreased 8 per cent to $546 million.

Reported NPAT was $83 million, including a one-off, non-cash credit to tax expense of $226 million and one-off merger and other costs of $30 million. Excluding these one-off items and TPG Corporation's contribution of $4 million, underlying TPG Telecom (former VHA) standalone NLAT improved 19 per cent to $117 million.

There were significant COVID-related impacts to revenue and EBITDA in the period:

- Global travel restrictions
  - Approximately 80 per cent decrease in margin from roaming
  - 30 per cent decrease in prepaid connections and 20 per cent decrease in postpaid connections
- Temporarily reduced sales channel operations
  - Retail store closures due to shut-down and precautionary measures
  - Reduced contact centre operations in March and April due to India lockdowns
- Customer financial hardship and support initiatives

TPG Telecom Chief Executive Officer Iñaki Berroeta said 1H20 was an unprecedented and complex period, with the company managing four significant sets of challenges and priorities.

"We simultaneously supported our customers to help keep them connected through COVID, moderated the financial impacts of the pandemic on our own business, completed the merger and commenced our 5G rollout after an 18-month delay due to the vendor restrictions," Mr Berroeta said.

"While our results reflect a negative impact from COVID on the mobile sector, they also demonstrate the relative resilience of the industry and our capacity to continue to deliver the essential services which our customers rely on."

Strong start for merged company

TPG Telecom has made a strong start on merger integration activities, with 445 network upgrades performed since implementation.

More than 1.8 million Australians have benefited from improved network performance following the integration of TPG Corporation spectrum into the Vodafone mobile network at 318 sites in Canberra, Tasmania, Southern Queensland, Darwin, Adelaide, regional Victoria, regional South Australia and parts of NSW.

Network performance has also been boosted in the Melbourne CBD and parts of Sydney where TPG Corporation small cells have been activated and 700 MHz spectrum added to sites.

"Customers began experiencing the benefits of the merger from day one, and over the past six weeks, we have delivered significant boosts to data speeds and performance for customers from these deployments," Mr Berroeta said.

The company has also commenced a program to connect TPG Corporation fibre to an additional 700 sites on the Vodafone mobile network. This builds on the 2015 commercial agreement which saw TPG Corporation fibre connected to more than 3,000 Vodafone mobile sites.

From Monday 24 August, iiNet will begin inviting its existing mobile customers to migrate to the Vodafone mobile network, resulting in savings from third-party network costs.

"By using our own mobile network, we'll be able offer customers more inclusions for less, with new customers to receive 50 per cent off their plans for six months and existing migrating customers to receive two months' free access," Mr Berroeta said.

5G rollout plan gains momentum

TPG Telecom has announced the 5G Vodafone mobile network is planned to reach more than 85 per cent of the population in Australia's top six cities of Sydney, Melbourne, Brisbane, Adelaide, Perth and Canberra by the end of 2021.

The company's 5G rollout, which commenced in March 2020, will enter a new phase in 2H20 with deployments to increase over coming months.

The company has commenced development of its 5G standalone network capability, which will significantly increase 5G coverage when available. The 5G standalone network will utilise 700 MHz spectrum which will significantly increase the coverage available to 5G standalone enabled devices.

"5G is one of our key company priorities, and we have more than 1,200 sites currently in planning," Mr Berroeta said.

"5G device penetration in Australia remains low but as more 5G-enabled devices come into the market, we are increasing the number of sites going live."

High customer demand for fixed services, mobile impacted by COVID-19 restrictions

Customer demand for telecommunications services remains strong, driven by increased customer reliance for remote working and education arrangements.

The Vodafone nbn customer base increased 32 per cent since 31 December 2019 to 150,000. TPG Corporation fixed broadband subscribers increased 2 per cent to 1.971 million.

"In the June 2020 quarter, our Group achieved the highest market share of net NBN growth of any service provider, with one third of new NBN subscribers for that quarter taking a TPG Telecom Group branded service," Mr Berroeta said.

However, the company's ability to connect new mobile customers was significantly impacted by global travel bans, especially in the prepaid segment. International visitors to Australia, including students, is a key segment for the Vodafone and Lebara brands, and these customers' absence from the market is a major reason for the decline in the mobile customer base.

Postpaid mobile customers decreased 2 per cent to 3.354 million and prepaid mobile customers (excluding MVNO) decreased 10 per cent to 1.818 million.

"Australian customers are relying on their telco services more than ever and we have also started work to bolster our brands, including new competitive plans and a bold new brand campaign for Vodafone," Mr Berroeta said.

Responsible company actions in response to pandemic

TPG Telecom recognises the importance of doing business responsibly. The company is taking a customer-centric approach to our COVID response, while helping to ensure the health and wellbeing of employees and the community.

The company acts in line with the principles outlined in the telecommunications industry's joint statement with the Australian Government as well as the relevant provisions in the Telecommunications Consumer Protections (TCP) Code.

Supporting our customers

Customer initiatives included a temporary $10 Stay Connected plan for customers experiencing financial difficulty, additional data allowances, unlimited standard national calls, and paused late payment-fees and collections.

"It was important for us as a customer champion to support our customers during this challenging period, and we worked closely with government and industry on our approach," Mr Berroeta said.

Serving our customers

The company is continually adapting its operations in an ever-evolving situation to serve customers and keep them connected.

As telecommunications is considered an essential service, most Vodafone retail stores are open with social distancing and increased hygiene measures in place. Where appropriate, stores temporarily close in line with government shutdown and precautionary measures.

In line with the Victorian Government's Stage 4 restrictions, most metropolitan Melbourne stores are closed, with 19 stores available for contactless 'Call and Collect' appointments on request for urgent service issues. All airport stores across Australia remain closed.

The company also responded quickly to restore service capacity levels after lockdown measures significantly impacted Vodafone contact centre operations in Mumbai and Pune.

Changes include hiring additional casual employees at its Hobart Contact Centre, enabling agents to work from home and redeploying retail employees to contact centre roles.

"We're serving customers through our normal customer care channels, with customers welcome to contact us via web chat, phone or social media," Mr Berroeta said.

Business as usual for office-based employees

The company moved to remote-working for all office-based employees on 13 March, with flexible working arrangements remaining in place for all TPG Telecom employees.

"This model worked well from day one and our business continues to operate as normal as all office-based employees are fully equipped to work from home," Mr Berroeta said.

Outlook

The TPG Telecom Group will continue to prioritise activities to realise merger synergies, while responding to the ongoing COVID pandemic.

Priorities include accelerating the company's 5G mobile network, growing market share of households by offering converged products, owned infrastructure broadband opportunities, increasing Enterprise market share, organisational integration activities, and efficiencies across the business.

The telecommunications industry is proving to be more resilient than many sectors due to increased customer reliance on services and the company expects demand for fixed line services to remain strong. However, the company expects continued challenging conditions in mobile while global travel restrictions remain in place.

"Through our increased scale and strength as a merged company, we are well-placed to continue to support customer needs, while progressing our plans to deliver the benefits of the merger for customers and shareholders," Mr Berroeta said.

<ends>

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Tab 4 of Exhibit LK-1

Optus secures 'golden GHz' and unlocks ultra-fast 5G future with 26GHz spectrum acquisition

23 April 2021, 09:30 AM

Optus is continuing to build a world-class 5G network which will be made even better with the acquisition of a range of new licences in the 26GHz spectrum band. With the fastest 5G network in Sydney and Melbourne, the additional spectrum will support an even faster network and enable state-of-the-art mmWave technology.

Optus acquired 800MHz of 26GHz spectrum in Sydney, Melbourne, Brisbane, Perth, Adelaide, Canberra and a range of regional areas, and 600MHz in Hobart and Margaret River in WA for a total of A$226.2 million.

These new spectrum assets will support a wide range of new 5G use cases and continue to drive innovation opportunities to deliver leading 5G speeds and the expansion of Optus' 5G network in metropolitan and regional Australia.

The improved capacity and speed of mmWave will be critical in delivering enhanced video experiences such as AR/VR as well as next generation cloud gaming services. It will also support massive simultaneous usage at transport hubs and major events.

Importantly, Optus have secured the best and most highly valued position at the top of the spectrum band in most of the capital cities and regions, which include "golden GHz" segment supported by both the 28GHz range enabled in US and the 26GHz range to be enabled in Australia.

This allows early access to compatible smart phone devices which are already available more widely in the world. In addition, Optus' customers can benefit from synergies with Singtel's similar spectrum holdings to drive the user equipment ecosystem for this spectrum band across Singtel Group.

Optus Networks Managing Director Lambo Kanagaratnam said, "We understand how important our role is in connecting people. What is truly exciting about this spectrum is the ability to really deliver on the future potential of 5G and ultra-fast speeds."

"Imagine you are at a major sporting event or concert with tens of thousands of connected spectators enjoying HD content or video - streamed to your device or an AR/VR/XR headset - and viewing real time stats and updates, profiles and video without interruption or lag. Or enjoying connectivity at home in a multi-dwelling high-rise apartment tower close to the CBD wirelessly and at scale. This is what this spectrum technology allows."

"For enterprise, this spectrum could support remote controlled automation for example robotics in a warehouse or factory, or the creation of a secured private network at a university campus to support thousands of students and academics."

"In short, we are armed with the ability to build and expand our 5G network and deliver on the future of 5G in the home, office or on-the-go."

Mr Kanagaratnam said that Optus would continue to focus on delivering the best network experience for customers and raise the bar on value and service.

"The world-class Optus network is our biggest and best yet and we will continue to invest to ensure wherever our customers live, work and play they get a fantastic network experience without paying a premium."

The Optus 4G mobile network reaches 98.3 per cent of the Australian population.

Licences won at auction will come into force later this year, for a 15-year term ending in 2036.

Learn more about what the roll out of mmWave could mean for you:
https://www.optus.com.au/5g/5g-news/5g-articles/mmwave-spectrum (https://www.optus.com.au/5g/5g-news/5g-articles/mmwave-spectrum).

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Tab 5 of Exhibit LK-1

Optus acquisition of new 900 MHz spectrum lays the foundation for strong national competition in the mobile market

08 December 2021, 08:40 AM

Optus has acquired 2 x 25 MHz of 900 MHz spectrum

900 MHz boost will help Optus deliver **a significant uplift of 5G coverage nation-wide**, in addition to its fastest 5G network as recognised by independent benchmarks

Optus customers will receive a huge boost with the ACMA announcing the outcome of the 900 MHz spectrum auction, where Optus has been awarded 2 x 25 MHz of 900 MHz spectrum nation-wide for a total of $1.476 billion.

Optus CEO, Kelly Bayer Rosmarin, said:

"The auction result is a fantastic outcome for Australian consumers and businesses. Optus is building the network of the future for our customers and 900 MHz spectrum is its foundational layer. With this additional spectrum, and our existing mid and high band spectrum, we can continue to deliver great coverage and bring the benefits of our technology leadership to more Australians.

"We applaud the Government for prioritising competition and consumer interests in ensuring a competitive auction process that has also delivered more equitable holdings of this critical low band spectrum."

The 900 MHz spectrum, known as low band, carries mobile signals further than higher bands, so fewer base stations are needed to service a broad area. It is critical to providing wide signal coverage for 4G and 5G technologies. This characteristic is particularly important in regional areas as it lowers the infrastructure investment required to service customers over a wide area. It also provides superior in-building coverage as it can penetrate deeper than mid and high band spectrum.

"We are steadily advancing the rollout of Australia's fastest 5G, and combining it with value and innovation, like our suite of Living Networks features. This spectrum means we can offer a significant uplift of 5G coverage nation-wide, to even more Australians," said

Lambo Kanagaratnam, Optus Vice President Networks. "Optus aims to power optimism with options, and options have just become a whole lot better for Australians."

Economic modelling by PwC shows that competitive national deployment of 5G could boost the national economy, with cumulative benefits over the decade of $130 billion – equal to 1.2% of GDP – and the creation of 205,000 net new jobs.

The same modelling shows that the benefits of 5G deployment in regional Australia over the decade would be $38 billion – equal to 1.4% of GDP – with 45,000 net new jobs created.

The spectrum licences have been awarded for a 20-year term commencing 1 July 2024, with early access expected.

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