NERA
ECONOMICS. EXPERTS. EXPERIENCE.

One NZ/Dense Air – Review of the Statement of Issues

5 March 2024

Public Version

Project Team

Will Taylor, PhD
Richard Marsden
Kevin Counsell

NERA
Level 11
15 Customs Street West
Auckland 1010, New Zealand
www.nera.com

Contents

List of Tables

List of Figures

1. Introduction and summary

1. One New Zealand Group Limited (**One NZ**) is seeking clearance from the New Zealand Commerce Commission (**NZCC**) to acquire 100% of the shares in Dense Air New Zealand Limited (**Dense Air**). The NZCC has released a Statement of Issues (**SoI**), dated 2 February 2024, in respect of the proposed acquisition.
2. As a result of the proposed acquisition, One NZ would acquire Dense Air's 2 x 35 MHz blocks of 2600 MHz spectrum. In the SoI, the NZCC states that it is testing a theory of harm related to spectrum asymmetries – specifically that the proposed acquisition would increase One NZ's spectrum holdings and increase the asymmetry of these holdings relative to Two Degrees Mobile Limited (**2degrees**).[1] In contrast, the NZCC states that in a counterfactual where 2degrees acquires Dense Air's spectrum, there would be no spectrum asymmetry between One NZ and 2degrees.
3. We have been asked by Bell Gully, counsel to One NZ, to review this spectrum asymmetry theory of harm set out in the SoI.
4. In summary, our findings are as follows:
    a. Competition is telecommunications markets is multidimensional and a function of more than just network capacity, as demonstrated by mobile network operators (**MNOs**) with absolute spectrum disadvantages successfully gaining market share and in some cases displacing the market leader.
    b. Asymmetric spectrum allocations can be pro-competitive and encourage innovation, and this has been explicitly recognised by regulators and policy makers.
    c. When considering spectrum holdings in a relative sense, One NZ is currently in a worse position than 2degrees and Spark. The proposed acquisition allows One NZ to catch up to Spark, which should enable to it better compete against Spark.
    d. Relative to international peers, One NZ appears to be underweight, and 2degrees is overweight, on a spectrum per market share basis.
    e. The question before the NZCC relates to harm to the competitive process, not whether 2degrees is worse off relative to a world where it can acquire the spectrum cheaply.
    f. In terms of the specific competition concerns identified in the SoI:
        i. **Fibre broadband areas:** The presence of Chorus as a regulated wholesale fibre provider that faces competition from both Spark and One NZ's fixed wireless access (**FWA**) products means that 2degrees' ability or otherwise to offer FWA services is not a key competitive driver of outcomes.
        ii. **Non-fibre broadband areas:** the key concern appears to be in relation to 2degrees' ability to offer 4G FWA services. Given 2degrees does not currently have 2.6 GHz spectrum, we understand that to offer 4G FWA services, 2degrees would need to roll out new equipment. It is not clear why 2degrees would invest in legacy technology when the transition to 5G has already begun and it already has excellent 3.5 GHz

[1] See, e.g., SoI at [8] and [11].

spectrum holdings. 2degrees also appears to have options to expand 4G capacity in the interim (deploying more of its spectrum, refarming 3G spectrum, acquiring other spectrum).

iii. **Mobile markets:** the mobile market is competitive, implying that 2degrees has been able to compete with a similar relative spectrum position to what it would have in the factual. 2degrees is also sufficiently well-placed in its spectrum position to be able to expand into 5G, which is the key area for future competition. [If it were the case that the Dense Air spectrum was as competitively important to 2degrees as claimed, then we would expect 2degrees to have [REDACTED]. Analysis of international evidence shows that the amount of money [REDACTED] and One NZ is modest by international standards, even allowing for the limited size of the New Zealand market.

5. The remainder of our report is structured as follows:
   a. In section 2 we discuss the nature of competition in telecommunications markets;
   b. In section 3 we illustrate the current, factual and counterfactual spectrum holdings positions of Spark, One NZ and 2degrees;
   c. In section 4 we analyse international evidence on spectrum holdings; and
   d. In section 5 we set out our views on the competitive effects of the proposed acquisition in the retail broadband and mobile markets.
6. Confidential information in this report is redacted.

2. The nature of competition in mobile telecommunications

2.1. Competition in telecommunications is multi-dimensional

7. The NZCC's spectrum asymmetry theory of harm is based on a premise that spectrum holdings influence competition in telecommunications markets. For example, the NZCC states (at [132.1]) that the type and amount of spectrum held can affect capacity and the service an MNO provides. The NZCC also states (at [8]):

   > *Significant disparities in spectrum holdings may influence relative capacity of MNOs, which may affect competition between MNOs or influence competition in telecommunications markets.*

8. It is important to note, however, that competition in mobile telecommunications works across a number of dimensions and is not solely influenced by the amount of spectrum MNOs hold. Spectrum, and the extent to which it influences coverage and capacity, is but one of a range of dimensions of competition. Indeed, MNOs can utilize a variety of techniques to gain a competitive advantage, including through their pricing propositions, branding and marketing, and customer acquisition and service. As examples of this, 2degrees entered with a spectrum disadvantage and focused on prepay users and has been successful in gaining market share. Similarly, O2 in the UK has had a spectrum disadvantage throughout the 4G and 5G eras but focused on marketing and branding and is now the number one player (we discuss this more in the next section).

9. Furthermore, MNOs have a range of options for how they achieve coverage and capacity on their networks, such as through deployment of additional cell sites and network upgrades. We note the NZCC's view (at [160] of the SoI) that alternatives (to spectrum) to adding more capacity can be second best in terms of costs and timeframes, and in some cases may not be commercially viable or practical. We cannot comment on the commercial viability point, but in respect of the NZCC's "second best" point, the relevant question is not whether alternative means of adding capacity are more costly or time consuming; rather, it is whether these mechanisms are sufficient to allow MNOs to act as a competitive constraint. Indeed, we note that despite there being an existing spectrum asymmetry (see Figure 1 of the SoI), site numbers show that 2degrees has [REDACTED] and One NZ has [REDACTED] sites. Furthermore, the mobile market was viewed by the NZCC in its 2019 Mobile Market Study as being "increasingly competitive".[2]

10. Some degree of asymmetry in business models and inputs can also assist competitive tension, and consumers can benefit from a diversity of business strategies. Indeed, symmetry in firm size and cost structure is considered by the NZCC to be one of the factors that can facilitate anti-competitive outcomes through coordinated conduct.[3] In this regard, it's not clear that spectrum parity is desirable. Having heterogeneous inputs can also force more innovation as firms attempt to compensate for what they might be missing. To the extent that acquiring the Dense Air spectrum gives One NZ a competitive edge, it creates an incentive for Spark and

[2] NZCC (2019), "Mobile Market Study – Findings", 26 September, at Table X5.

[3] NZCC (2022), "Mergers and acquisitions Guidelines", May, at [3.89.4].

2degrees to either attempt to replicate this level of service by building more cell sites, or establishing other points of difference.

2.2. Competition policy is not intended to protect competitors

11. Despite the above discussion, it may be that the NZCC considers capacity to be a (or *the*) key dimension for competition. Even if this were the case, the question remains how "significant disparities" in spectrum influence relative capacity (and competition) in practice? Even with a spectrum asymmetry, competition will only be at risk if an MNO falls below critical mass, such that it is at risk of not being able to support its customer base in the future and with no realistic options to expand capacity.

12. This is of particular relevance when considering that the goal of competition policy is not to protect any individual competitor, but rather to protect the competitive process. As the NZCC states in its *Merger and acquisition Guidelines*:[4]

> *[t]he substantial lessening of competition test exists to protect the competitive process. It is not focused on protecting individual firms.*

13. Thus, consideration should not be given to whether a particular competitor is harmed *per se*, but rather whether any harm is sufficient to undermine the competitive process.

14. In this regard, a 2012 Ofcom report on spectrum awards in the 800 MHz, 1800 MHz and 2.6 GHz bands in the UK found that competition would only be weakened if an MNO had a very small share of spectrum across a wide range of spectrum bands, with that small share assessed as around 10-15% of total paired spectrum.[5] More recently, in its 2020 assessment of the spectrum award for the 700 MHz and 3.6-3.8 GHz bands, Ofcom found that the player with the lowest share of spectrum, O2, would remain a credible operator at a share of 15% of overall spectrum.[6]

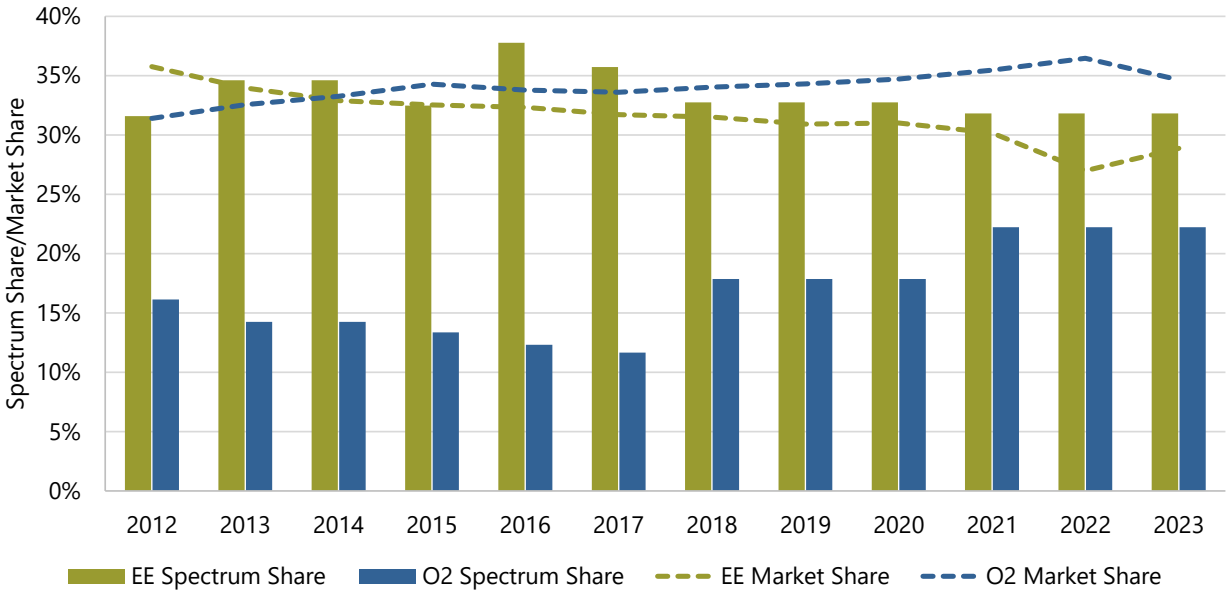
15. Subsequent developments have proved Ofcom right. As illustrated in Figure 1, O2 grew its market share from about 31% in 2012 to a peak of 36.5% in 2022, despite having the lowest spectrum share in a highly competitive market. Much of this market share has come at the expense of EE (owned by BT), which was the market leader with 36% of subscribers in 2012 but fell back to a low of 27% in 2022. O2 and EE swapped positions as market leader despite O2 having the lowest spectrum share of the four UK MNOs throughout this period (falling as low as 11.7% in 2017) and EE having the highest spectrum share, peaking at 37.8% in 2016.

[4] NZCC (2022), "Mergers and acquisitions Guidelines", May, at [2.19].

[5] Ofcom (2012), "Assessment of future mobile competition and award of 800 MHz and 2.6 GHz", Statement, 24 July, at [4.71].

[6] Ofcom (2020), "Award of the 700 MHz and 3.6-3.8 GHz spectrum bands", 13 March, at [4.65].

Figure 1: Evolution of UK mobile market shares and spectrum shares for O2 and EE



Source: Market share data is from TeleGeography's GlobalComms database. Spectrum share data is constructed using NERA's internal spectrum awards database.

16. In the factual, with One NZ acquiring Dense Air's spectrum, 2degrees share of total spectrum would be 22% (compared to its current share of 24%). On the Ofcom analysis, this share would be consistent with 2degrees having sufficient spectrum to remain a credible competitive threat. It is relevant to note that O2 grew its market share with substantially smaller percentage spectrum holdings than 2degrees. Today, after acquiring new spectrum at auction and through spectrum trades, O2's share of spectrum in the UK has climbed to 22%, the same level that 2degrees would be in the factual. With this level of spectrum share, O2 sustains a market-leading subscriber base of 30.5 million subscribers, a 34.6% market share (in 2023). Two of its competitors, Vodafone UK and Three UK, are currently attempting to merge on the basis that they are struggling to compete individually, despite each having the same or higher volumes of spectrum. We show also in section 4 of this report that 2degrees has sufficient critical mass when assessed more generally against spectrum holdings in other overseas mobile markets.

17. More generally, Ofcom's 2020 report also assesses the risk to competition from asymmetric spectrum holdings, and (consistent with the discussion set out above) finds asymmetries in spectrum holdings do not necessarily have a negative impact on competition, and can in fact be beneficial to competition by promoting innovation.[7] For example, Ofcom (at [4.31]) states:

> *Asymmetries in spectrum holdings are not negative* per se *– either in terms of overall spectrum or sub-groups of different frequencies. Such asymmetries can, in certain instances, be positive for competition and give rise to consumer benefits; they may also reflect differences in operators' commercial strategies and expectations about the future.*

18. This is because, as already discussed above at paragraph 8, MNOs can compete via other areas (e.g., customer service) or through adding capacity in other ways.

[7] Ofcom (2020), "Award of the 700 MHz and 3.6-3.8 GHz spectrum bands", 13 March, at [4.31] and [4.32].

19. MNOs do not need to have parity in their spectrum shares for there to be strong competition. As we show in section 4, it is common worldwide for there to be significant asymmetry in the holdings of the largest and smallest MNOs in a market, indicating that many regulators do not consider lack of symmetry to be a concern for competition. Furthermore, based on our experience in spectrum acquisitions, it is usual practice for acquisitions of spectrum to be approved if they would not result in one MNO exceeding the total spectrum already held by a rival MNO, as is the case with this transaction, where One NZ would be matching Spark. For example, in the UK, Ofcom considered this issue in the context of a spectrum trade involving 1500 MHz spectrum. In this sale, the spectrum was acquired by the 2nd and 3rd largest holders of spectrum, Vodafone and Three, with no spectrum going to the 4th largest, O2. In approving the transfer, Ofcom noted "*as a result of the transfer of this spectrum, Vodafone's total spectrum holdings would increase to 176 MHz and H3G's to 89.5 MHz. These new holdings would still be below the existing holdings of EE (of 210 MHz). We therefore consider that there are no competition issues caused by the trade in terms of asymmetries in overall mobile spectrum holdings.*"[8]

20. From the above analysis, it is apparent that, in the factual, 2degrees will retain a total volume and share of spectrum sufficient to be competitive. It is also relevant to consider the structure of 2degrees' spectrum holdings, as an operator ideally requires a varied portfolio of spectrum, with some low-band (sub-1 GHz) spectrum for coverage, lower mid-band spectrum (c. 1.5 – 2.3 GHz) for wide-area capacity, and higher mid band (c. 2.3 – 4.0 GHz) for capacity. 2degrees has a good portfolio, with significant holdings in all these ranges. In fact, when compared to other operators worldwide (see section 4.3), 2degrees' only material gap in its holdings is that it does not have any holdings at 2300 or 2600 MHz. However, as we will show in Section 4, these are the least important of the major mobile bands, as other bands provide better options for both wide area coverage and network capacity.

2.3. Distinguishing factors in assessing mobile and broadband competition

21. By way of final comments on the nature of competition in telecommunications markets, it is also helpful to outline some distinguishing factors in respect of mobile and broadband markets. This discussion is relevant to our analysis in section 5 of this report, where we assess the implications of the proposed spectrum acquisition for competition in mobile and broadband telecommunications markets.

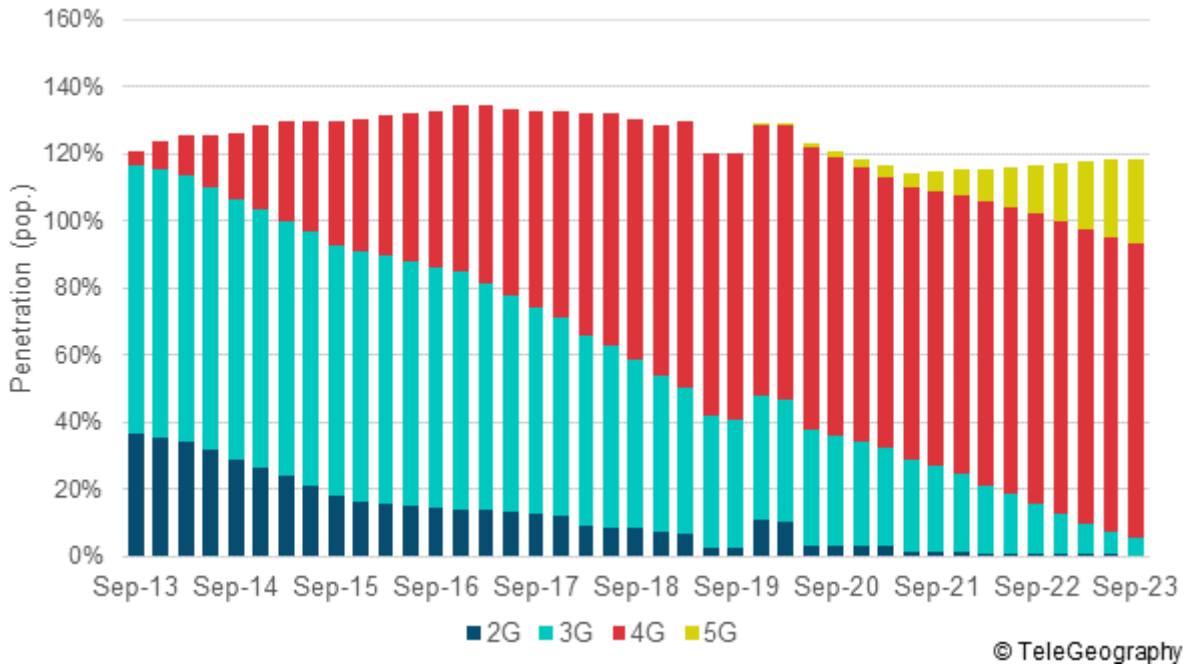
22. First, regarding mobile telecommunications markets, the NZCC does not come to a view as to whether there are discrete markets for the provision of 4G and 5G mobile services (SoI [56]). However, the NZCC does note that 2degrees' concerns with the proposed acquisition relate to its ability to compete in respect of 4G (SoI [165.10]). In this regard, the substitutability between 4G and 5G is relevant.

23. From the demand-side, consumers are purchasing a mobile telecommunications service and are therefore likely to be indifferent towards whether the technology underlying the service is 4G or 5G, so long as it meets the quality levels they desire. The shift from 4G to 5G (like the

[8] Ofcom, 22 September 2015, Trade of frequencies in the 1452-1492 MHz band from Qualcomm UK Spectrum Ltd to Vodafone Limited and Hutchison 3G UK Limited, Statement.

shift from 3G to 4G that preceded it) reflects new technology replacing older technology. The progression from 2G through to 5G services is shown in Figure 2, which shows mobile penetration for each of 2G, 3G, 4G and 5G from 2013 to 2023. It can be seen that as penetration of 3G falls, substitution to 4G occurs, such that overall penetration remains largely unchanged. A similar phenomenon is occurring with substitution from 3G/4G to 5G. What is occurring now with 5G is a repeat of the pattern that has historically occurred where a new technology is introduced which overtime cannibalizes the preceding technologies.

Figure 2: Penetration by network service type, 2013-2023



Source: TeleGeography New Zealand report, downloaded February 2024

24. The transition from 4G to 5G will be driven primarily by a combination of turnover of handsets and 5G network rollout. Going forward, almost all new handsets will support 5G and, on average, consumers upgrade their handsets every 2-4 years.[9] Therefore, within a few years, simply based on normal handset turnover, most consumers will have phones capable of connecting to a 5G network. For example, we are advised that [REDACTED] of One NZ's consumer base already have 5G capable phones, rising to [REDACTED] of subscribers on unlimited plans. And these phones will prioritize connections to 5G networks wherever these have been rolled out. Consumers may notice some quality-of-service improvement (lower latency, higher speeds) as they spend more and more time on 5G rather than 4G networks. However, as they will generally be performing the same tasks (playing videos and games, surfing the web etc..), this will not feel revolutionary.

25. The co-existence of 4G and 5G is thus part of the transition between technologies providing the same underlying product, rather than two separate products. Therefore, the transition to a newer technology does not imply that consumers would substitute across the underlying technologies. Indeed, from the consumer's perspective, 5G reflects a quality upgrade to an existing product.

9 https://www.sellcell.com/blog/how-often-do-people-upgrade-their-phone-2023-statistics/

26. A similar point has been made by the Australian Competition and Consumer Commission (**ACCC**), where in its assessment of allocation limits for a proposed auction in the 3.6GHz band, the ACCC did not identify a separate 5G market, and stated:[10]

> *In using 5G services, like 4G/LTE services, consumers are purchasing [fixed wireless and mobile] broadband services. Services using new technologies do not constitute a separate market, but represent an aspect of quality of the service.*

27. On the supply-side, all of One NZ, Spark and 2degrees have both 4G and 5G spectrum, and are in the process of rolling out 5G. When a new generation of mobile technology is rolled out in a new spectrum band, it is to be expected that equipment costs will initially be higher than those associated with rolling out the previous technology in a legacy band. This is owing to global economies of scale in equipment manufacturing, with prices falling as more operators in more countries adopt the new standard. 2degrees alleges in its submission (at [4.7(b)]) that [REDACTED]. However, the existing price gap between 4G and 5G CPE is a temporary effect that is expected to soon disappear. For example, according to a survey of 5G FWA CPE vendors by the GSA (Global Mobile Supplier Association), "*most vendors predict the prices of 5G CPE will reach parity with those of 4G CPE by 2025*".[11] Similarly, Analysys Mason, writing in 2021, forecast that "*The cost of 5G FWA CPE, particularly for that using mid-band spectrum, will fall significantly, which will act as an important incentive for mid-band 5G FWA deployments*."[12]

28. Mobile FWA is a means of providing a fixed broadband service. Given spectrum is a scarce resource, it is natural for companies to compete for spectrum holdings to position themselves to make different market plays. In particular, companies that want to offer or expand mass market mobile FWA solutions may need more capacity, so it is natural for them to bid for more spectrum. As we have alluded to in section 2.2 above, the relevant question regarding FWA is not whether 2degrees is prevented from offering an FWA service, but instead whether 2degrees' providing more FWA services would materially improve competition in the retail broadband market. This involves considering, amongst other things, the presence of Chorus (and the other LFCs) as a wholesaler of regulated fibre products and the overall scarcity of spectrum, which determines the number of MNOs that can offer an FWA service at a quality that competes with fibre. We return to this issue in section 5.2, but note at this point that we understand that [REDACTED], and thus [REDACTED] for Dense Air suggests has made capital allocation and spend decisions that enable it to pursue this particular market strategy of providing FWA services.

[10] ACCC (2018), "Allocation limits advice for the 3.6 GHz spectrum allocation", Public version, July, at p.2.

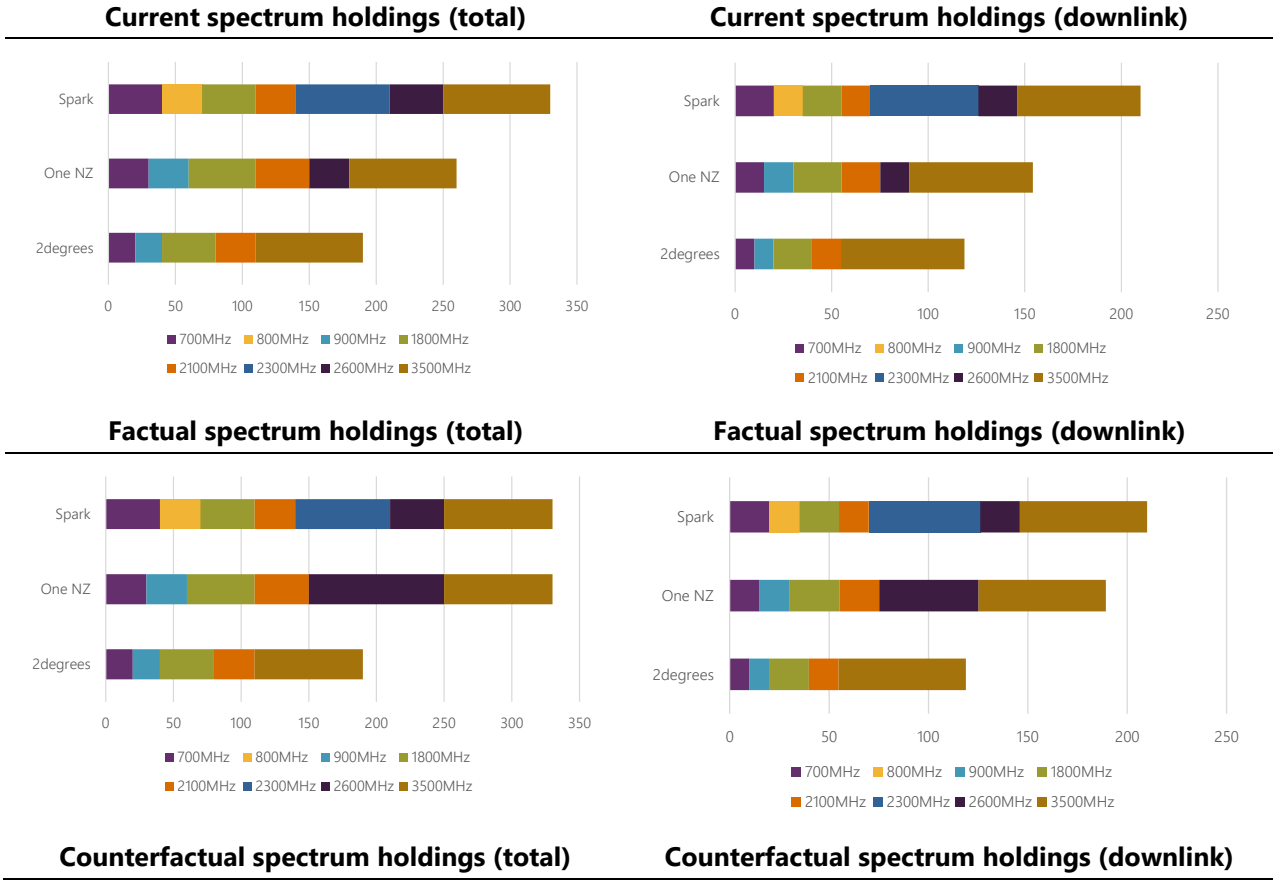
[11] GSA, September 2023, Fixed Wireless Access CPE Vendor Survey 2023.

[12] https://www.analysysmason.com/research/content/articles/5g-fwa-cpe-rdmb0/

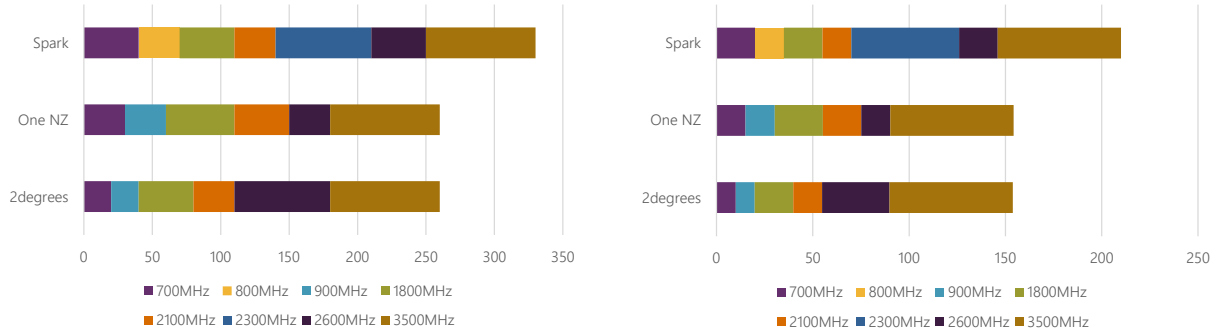
3. Spectrum holdings in New Zealand

29. In this section we consider current spectrum holdings in New Zealand and how they will be changed by the proposed acquisition. We illustrate both total spectrum holdings, and downlink holdings.[13] Figure 3 below shows total spectrum holdings in the left-hand panels, and downlink spectrum holdings in the right-hand panels. It also shows the current spectrum holdings of each of One NZ, 2degrees and Spark (the top panel), the factual spectrum holdings of each MNO (the middle panel), and the counterfactual spectrum holdings, under a counterfactual where 2degrees obtains the Dense Air spectrum (the bottom panel). 2degrees' total spectrum holdings are 190 MHz (currently and in the factual), and the proposed acquisition allows One NZ to increase its spectrum holdings from its current 260 MHz to 330 MHz, which would align with Spark's 330 MHz total spectrum holdings. A similar pattern emerges if just focussing on downlink spectrum only, albeit that One NZ's downlink spectrum holdings will not quite match those of Spark in the counterfactual (189 MHz for One NZ versus 210 for Spark).

Figure 3: Current, factual and counterfactual spectrum holdings of MNOs, total (LHS) and downlink (RHS)



[13] We recognise that FWA has a disproportionate load burden relative to mobile, and we have not accounted for this in the graphs in this section.

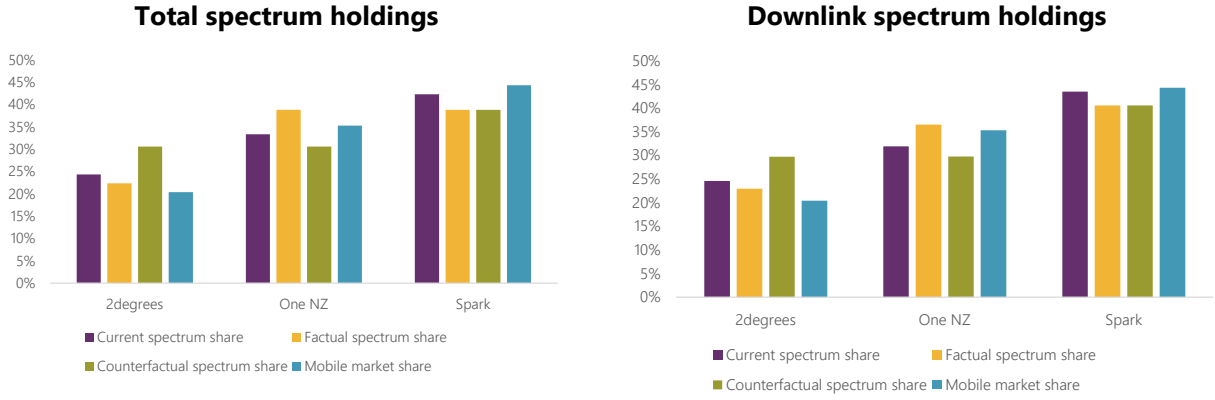


Source: NERA analysis of spectrum holdings

30. This demonstrates that a key impact of the proposed acquisition on total and downlink spectrum holdings is to allow One NZ to "catch up" with Spark.

31. While this leaves both Spark and One NZ with more spectrum in absolute terms, we consider it is helpful to consider measures of spectrum relative to each MNOs customer base. In Figure 4 we compare each MNO's mobile market share and total spectrum share (left-hand panel) and downlink spectrum share (right-hand panel). The current share of spectrum of each of 2degrees, One NZ and Spark (total/downlink: 24%/25%, 33%/32% and 42%/43% respectively) is of a similar magnitude to each MNOs mobile market share (20%, 35% and 44% respectively).[14] However, in contrast to Spark and One NZ, 2degrees share of spectrum exceeds its market share (on both a total and downlink basis). This suggests that in relative, very high level, terms, 2degrees is currently "overweight" on spectrum while Spark and One NZ are "underweight". In a counterfactual where 2degrees obtains the Dense Air spectrum, 2degrees spectrum share would increase and it would be even more "overweight" on spectrum.

Figure 4: Current, factual and counterfactual spectrum share, and mobile market share, by MNO, total (LHS) and downlink (RHS)



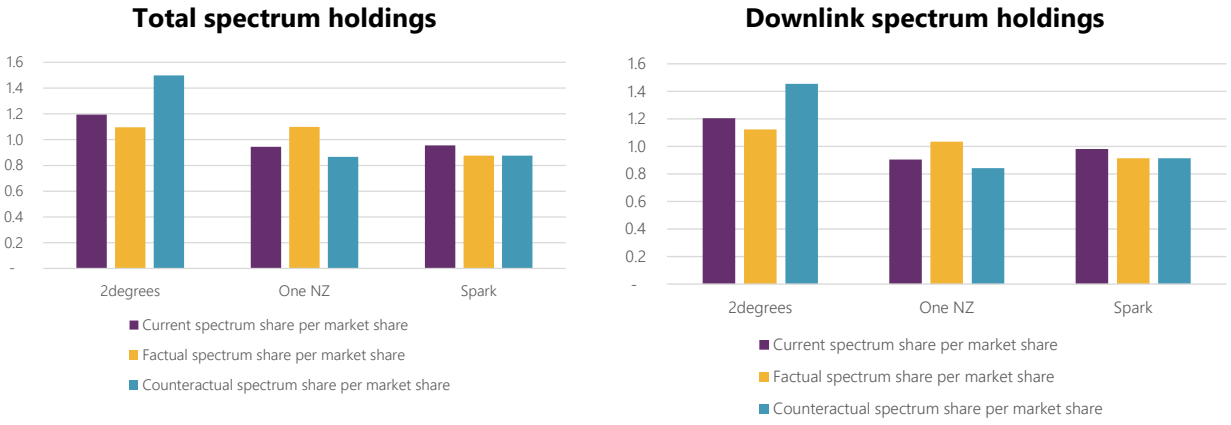
Source: NERA analysis, of spectrum holdings and mobile market share data sourced from TeleGeography New Zealand report, downloaded February 2024

32. A related measure is the ratio of spectrum share to market share, which is calculated by taking spectrum share (currently and in the factual) and dividing by mobile market share – see Figure

[14] Mobile market share data is sourced from TeleGeography New Zealand report. Shares are calculated by number of subscribers, and are broadly consistent with those shown in the NZCC's (2022), "Telecommunications Monitoring Report" (at p.121).

5, again showing total spectrum on the left and downlink spectrum on the right. On this basis, 2degrees' spectrum share per market share (in both total and downlink) is currently the highest of the three MNOs (and would be even higher in the counterfactual). The proposed merger will result in a slight decrease in that metric for 2degrees, but only to the point where the spectrum share per market share will be aligned with that of One NZ.

Figure 5: Current, factual and counterfactual ratio of spectrum and market shares, by MNO, total (LHS) and downlink (RHS)



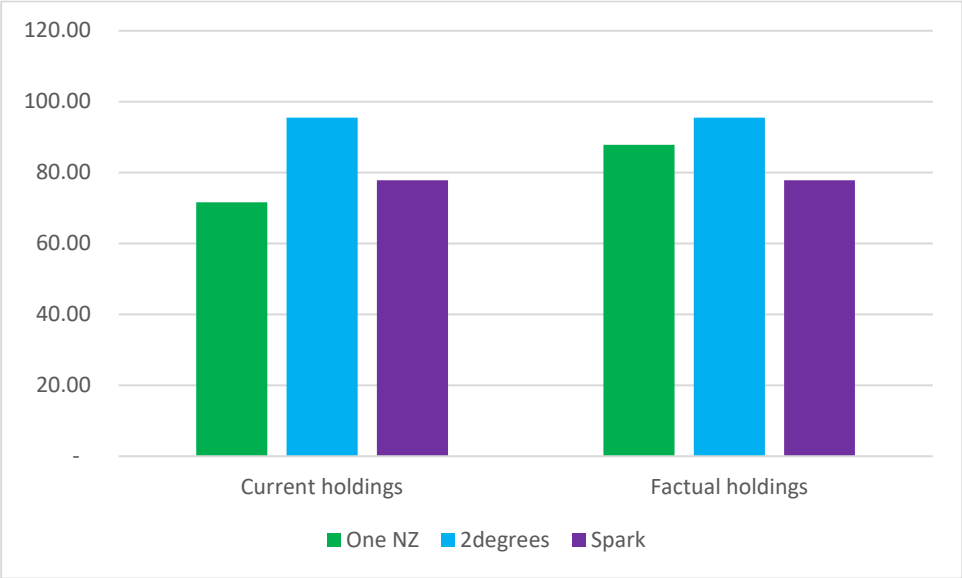
Source: NERA analysis, of spectrum holdings and mobile market share data sourced from TeleGeography New Zealand report, downloaded February 2024

33. Another, perhaps more direct measure of an MNO's spectrum holdings relative to its customer base is spectrum per customer. Figure 6 below plots downlink Hz per customer[15] and demonstrates that One NZ currently has the lowest spectrum per customer and that in the factual it will catch up to 2degrees and overtake Spark. 2degrees has argued that downlink Hz/customer is a static measure and that [REDACTED]. The transition to 5G is already underway (as discussed later, [REDACTED] of One NZ's customers already have 5G capable handsets). As already discussed above, new technologies cannibalise old technologies in waves and as a result spectrum that is currently used with one technology will in the future be used with another.

34. In any event, the fact that 2degrees has a higher ratio of spectrum per customer than One NZ, suggests it is currently better placed to expand than One NZ. It is the ability to expand which is the relevant point for a competition analysis, not whether 2degrees has enough spectrum to replicate the current business model and customer base of Spark and One NZ.

[15] Customer number data is September 2023 data sourced from the TeleGeography New Zealand report. These customer numbers differ slightly from those reported in the Clearance Application (at Table 1), which are dated March 2023. We use the Telegeography data for consistency with the international analysis in the remainder of this report. Using the data in the Clearance Application would not change the substantive point that we determine from this analysis.

Figure 6: Downlink Hz/customer: current vs factual



Source: NERA analysis of downlink spectrum and Telegeography subscriber numbers, September 2023.

35. [REDACTED]

4. Overseas evidence on spectrum allocations

4.1. Introduction

36. In this section we analyse data showing spectrum asymmetries in overseas mobile markets: both in terms of absolute spectrum holdings and spectrum/market share ratios. This analysis shows that:

    a. One NZ and Spark's factual spectrum holdings are not unusual for the first and second operators by international standards;

    b. However, in both the status quo and the counterfactual, One NZ's spectrum holdings would be considered at the low-end for a number two operator;

    c. 2degrees' factual spectrum holdings appear to be more than adequate, as indicated by better than average results relative to international peers in two metrics: the ratio of spectrum share to market share; and the total holdings per percentage of market share; and

    d. The structure of 2degrees' spectrum portfolio is equal to or ahead of that of its international peers.

37. The analysis in this section is based on total spectrum holdings. However, in Appendix B we also present the various tables and graphs shown in this section using downlink spectrum holdings.

4.2. Analysis of total spectrum holdings relative to international benchmarks

38. In the factual, One NZ will increase its total spectrum holdings to ~330 MHz, putting it level with Spark, the market leader. It is not unusual for a mobile operator to have a spectrum portfolio of this size. As illustrated in Table 1 there are many examples of number one and number two operators in OECD markets having holdings at or above this level: the two largest MNOs by market share in Austria, Greece and Ireland all have similar or larger holdings relative to One NZ (in the factual) and Spark. Notably, A1 Austria has 435 MHz, which is 40% of all mobile spectrum awarded in Austria. Other operators with larger holdings than Spark and One NZ (post-acquisition) include Telstra in Australia (412 MHz), BT in the United Kingdom (360 MHz) and Proximus in Belgium (345 MHz).

Table 1: Bandwidth held by the two largest MNOs in 15 OECD markets

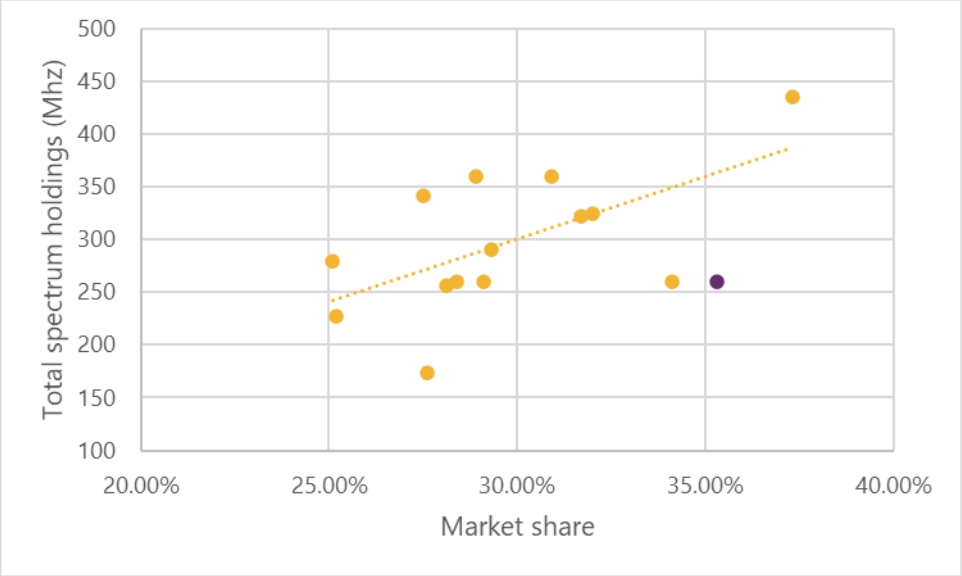
Rank	Country	Operator	Market share rank in country	Bandwidth held (MHz)
1	Austria	A1 Telekom Austria	2	435
2	Australia	Telstra	1	412
3	Greece	Cosmote	1	400

4	Greece	Vodafone Greece	2	360
5	United Kingdom	BT Group	2	360
6	Ireland	Three Ireland	1	350
7	Belgium	Proximus	1	345
8	Ireland	Vodafone Ireland	2	342
9	Austria	T-Mobile Austria	1	340
10	New Zealand	Spark	1	330
11	New Zealand	One NZ (factual)	2	330
12	Germany	Vodafone Germany	2	325
13	Australia	Optus	2	322
14	Canada	Rogers	1	315
15	Sweden	Telia Sweden	1	310
16	Belgium	Orange	2	290
17	Spain	Telefonica Espana	1	290
18	Spain	Orange Espana	2	280
19	Portugal	Nos	1	280
20	Germany	Telefonica Deutschland (O2)	1	270
21	Netherlands**	Odido Netherlands	2	260
22	Italy	Telecom Italia (TIM)	2	260
23	Portugal	PT Portugal (MEO)	2	260
24	Italy	Vodafone Italy	1	259
25	Canada	TELUS	2	257
26	France	Orange France	1	257
27	United Kingdom	O2 UK	1	251
28	France	SFR Group	2	227
29	Sweden	Tele2 Sweden*	2	214
30	Netherlands**	KPN	1	205

Notes: Survey of 15 OCED countries. * In Sweden, Tele2 holds 80 MHz jointly in a Netco with Telenor – only 40 MHz of that is included here. ** Netherlands 3500 MHz spectrum scheduled for 2024, so these holdings will increase significantly once that process is concluded.

39. In the counterfactual, where One NZ does not acquire additional 2.6 GHz spectrum, it would continue to hold usable holdings of ~260 MHz. While this is a competitive portfolio, it is a modest one for a second player with a substantial market share. Figure 7 compares the spectrum holdings of No.2 operators across 15 OECD markets (each dot represents a mobile operator). As can be seen, One NZ's existing portfolio places it at the bottom right of the graph (the purple dot), indicating that it has unusually low spectrum holdings relative to market share. It is therefore to be expected that One NZ would have a solid business case, which we understand is based on a desire to bridge its spectrum gap with Spark, allowing it to significantly increase capacity on its mobile network in the most efficient way. Indeed, we understand that One NZ's commercial rationale for the acquisition is related to [REDACTED].

Figure 7: Bandwidth held by No. 2 operators in 15 OECD markets



Source: NERA analysis of market share data from TeleGeography and spectrum holdings data from NERA's internal spectrum holdings database.

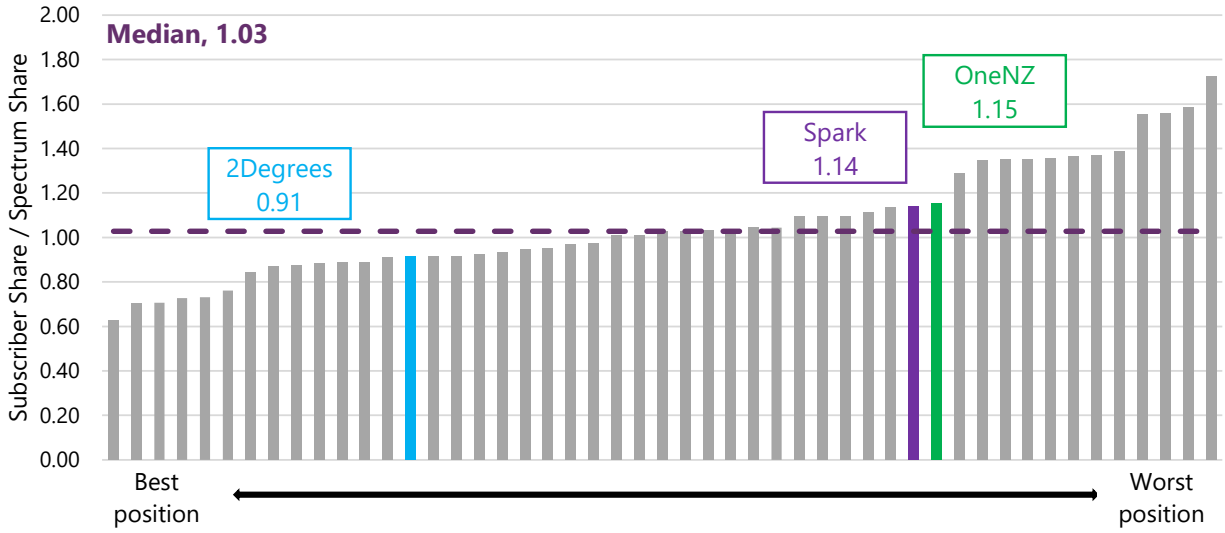
40. In the factual, 2degrees' total holdings would remain at ~190 MHz. This is a substantial spectrum portfolio, albeit not a large one when compared to other mobile operators in OECD countries. There are operators in OECD countries with similar or lower holdings, such as Citymesh in Belgium with ~180 MHz, Free Mobile in France with 205 MHz, Wind Tre in Italy with 205 MHz and Iliad in Italy with 110 MHz. There are also aspiring entrants with much lower holdings hoping to break into the German market (1&1 with 70 MHz) and Portuguese market (Digi and NOWO with 55 MHz and 50 MHz respectively).

41. Importantly, when compared to international peers, it is evident that 2degrees' spectrum portfolio is more than adequate from a capacity perspective. In Figure 8 and Figure 9, we provide two alternative metrics for exploring whether a company has adequate spectrum capacity to support its customer base. On both metrics, 2degrees performs better than the median MNO. This implies it has sufficient spectrum and room to expand its market share. Notably, it is currently in a much stronger position than both Spark and One NZ with respect to available capacity per subscriber.

42. Figure 8 ranks MNOs by their ratio of market share to spectrum share. A company with a ratio significantly below 100% might be considered "overweight" in spectrum, whereas a company

with a ratio well above 100% might be considered "underweight". 2degrees ranks 14th out of 49 with a ratio of 0.91, which is superior to the average across the sample. Notably, whereas 2degrees is modestly overweight in spectrum vs market share, both Spark and One NZ are currently underweight. 2degrees has room to grow its market share by 4 percentage points (taking equally from its rivals) before these shares would be equalized.

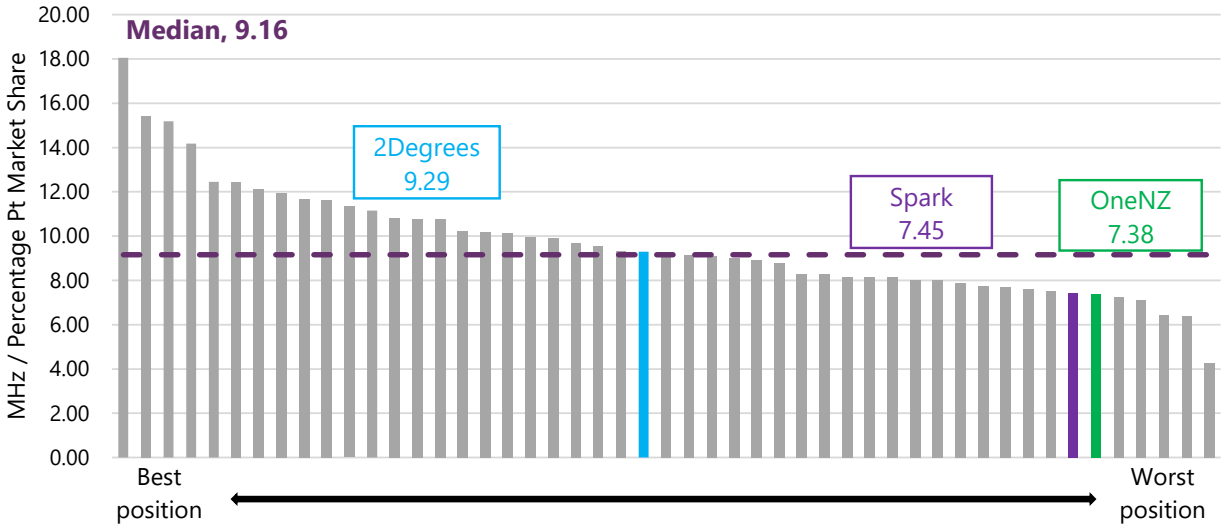
Figure 8: Ratio of subscriber share to spectrum share for MNOs in OECD markets



Source: NERA analysis of 49 mobile operators across 15 OECD markets. Each grey bar represents the ratio of an operator's subscriber share to its spectrum share. New Zealand operators highlighted.

43. Figure 9 ranks MNOs by their total spectrum holdings per percentage point of market share. This alternative approach takes into consideration the differences in volume of mobile spectrum released in different countries. Again, 2degrees is currently the best positioned operator in New Zealand, with 9.3 MHz / percentage point of market share, well ahead of both Spark and One NZ, which each have 7.4 MHz. Figure 9 also shows that 2degrees is well positioned when compared against mobile operators in other OECD markets, placing above the median value of 9.16 MHz / percentage point of market share.

Figure 9: Bandwidth held per percentage point of market share for MNOs in OECD markets



Source: NERA analysis of 49 mobile operators across 15 OECD markets. Each grey bar represents the MHz of bandwidth owned by an operator per percentage point subscriber share. New Zealand operators highlighted.

44. It is relevant to also consider the impact of either One NZ or 2degrees acquiring the additional 70 MHz of 2.6 GHz spectrum from Dense Air:

    a. In the factual, this would reduce One NZ's ratio of market share to spectrum share to 0.91 and increase its MHz per point of market share to 9.4 MHz. This would put One NZ level with 2degrees' current position; and

    b. In the counterfactual, 2degrees' ratio would drop to 0.67 and its MHz per point of market share would rise to 12.7 MHz. This would significantly extend 2degrees' capacity per user advantage over its rivals. 2degrees would also enjoy an exceptionally strong position relative to its international peers, placing 2nd of 49 for the ratio, and 5th of 49 for MHz per percentage point of market share.

45. We also observe that asymmetry in spectrum holdings is the norm in many countries worldwide. Table 2 compares the spectrum holdings of the largest and smallest operators in 14 OCED markets, including New Zealand. The situation varies greatly, with some countries having larger spectrum gaps and others lower spectrum gaps between the largest and smallest players, when compared to New Zealand. This evidence strongly suggests that many regulators do not consider spectrum parity to be a necessary condition to support competition.

Table 2: Comparison of spectrum shares of largest and smallest MNOs in 14 OCED countries

		Spectrum shares		
Country	**# MNOs**	**Largest operator**	**Smallest operator**	**Delta**
Germany	4	33%	7%	26%
Portugal	5	28%	5%	24%
Australia	3	39%	18%	21%

Italy	4	31%	13%	18%
New Zealand	3	39%	22%	17%
Spain	4	29%	14%	15%
Belgium	4	32%	17%	15%
Greece	3	39%	26%	13%
Austria	3	40%	29%	11%
United Kingdom	4	32%	22%	10%
Sweden	4	31%	21%	10%
Netherlands	3	38%	30%	8%
Ireland	3	32%	25%	7%
France	4	28%	23%	6%

Source: NERA analysis of spectrum shares from NERA's internal spectrum holdings database

4.3. Analysis of 2degrees' spectrum portfolio relative to international benchmarks

46. The structure of 2degree's existing spectrum portfolio, relative to international peers, is also attractive:

    a. 2degrees has 110 MHz in the prime mobile bands, including 40 MHz of low-band spectrum (700 & 900 MHz) and 70 MHz is the two leading mid-bands (1800 & 2100 MHz). Being at lower frequencies, these bands have the best propagation characteristics, enabling an operator to establish an urban network with excellent indoor penetration and a wide-area network outside urban areas that can offer good coverage at the cell edge. 2degrees' holdings in these bands are equal to or ahead of many major OECD operators including Hutchison Drei Austria (110 MHz), Free Mobile France (95 MHz), Hi3G Sweden (80 MHz), Tele2 Sweden (84 MHz), Telenor Sweden (96 MHz), O2 UK (106 MHz), and Vodafone UK (96 MHz);

    b. 2degrees has 80 MHz in the prime 5G capacity band, 3500 MHz, which is a typical holding for an MNO. Coupled with its excellent holdings in the lower frequency bands, this means it is well positioned to roll-out its 5G network on its existing cell network and offer the highest speeds. 2degrees' 3500 MHz holdings equal or exceed many leading OCED operators, such as Bouygues Telecom (70 MHz) and SFR (80 MHz) in France, Telefonica (70 MHz) in Germany, Telecom Italia (80 MHz), Vodafone Italy (80 MHz), Wind Tre (20 MHz) and Iliad (20 MHz) in Italy, and BT (80 MHz) and O2 (80 MHz) in the UK; and

    c. 2degrees' portfolio is limited in only one respect: it has no holdings at 2300 MHz or 2600 MHz. However, as we will explain, these frequencies are considered the least important

amongst all the major mobile bands. They are generally the last choice band for deploying 4G capacity. In the future, holdings in these bands are likely to be converted to additional capacity bands for 5G (as is reflected in One NZ's strategy for the use of the Dense Air 2600 MHz spectrum), but these will be incremental to 3500 MHz deployment. Accordingly, many OECD countries have not even allocated 2300 MHz, and many operators have not actually rolled out their 2600 MHz holdings.

47. In its submission, 2degrees calculates the notional capacity of each operator as the number of towers multiplied by spectrum holdings. In practice, because MNOs do not roll out all spectrum to all sites (only to the towers that need the capacity) this metric has limited real world use. Nevertheless, this calculation divided by the number of subscribers does provide a metric for comparing the scope for an operator to expand without suffering capacity constraints. In Table 3, we perform this calculation for the three MNOs, as a means of improving 2degrees' calculation. We note, however, that this does not account for various other factors influencing capacity, which we understand are covered in One NZ's submission on the SoI. Consistent with our prior analysis of capacity in Figure 8 and Figure 9, this shows that 2degrees [REDACTED] has higher capacity than One NZ [REDACTED]. Furthermore, if 2degrees was to expand its number of towers to match One NZ, it could significantly increase this lead.

48. Also, in Table 3, we compare notional capacity of the three New Zealand MNOs to the three Australian MNOs. All three operators are behind Telstra and Optus, but 2degrees is well ahead of Australia's third operator, TPG. In the factual, One NZ will increase its capacity / subs ratio to [REDACTED], a similar level to the leading Australian operators.

Table 3: Capacity / subscriber for Australia and New Zealand operators

	New Zealand		**Australia**		
	One NZ	**2degrees**	**Telstra**	**Optus**	**TPG**
Bandwidth held (MHz)	260	190	412	322	194
# Towers	[REDACTED]	[REDACTED]	11,302	8,821	5,769
Capacity	[REDACTED]	[REDACTED]	4,656,424	2,840,362	1,119,186
# Subscribers	2,155,000	1,245,000	17,370,000	10,519,000	5,312,000
Capacity / Subscriber	[REDACTED]	[REDACTED]	**0.27**	**0.27**	**0.21**

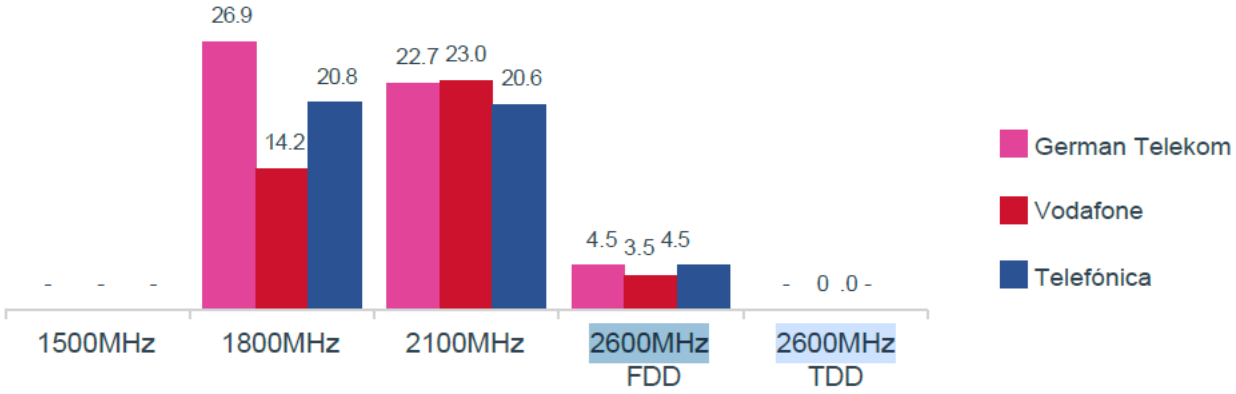
Source: Subscriber data from Telegeography, Sept 2023. Tower data are estimates based on data provided by One NZ and data in 2degrees' submission.

49. To make a case that 2degrees is at a competitive disadvantage, it would therefore be necessary to develop a case that there is something important about holding significant spectrum at 2300 MHz and 2600 MHz that cannot be replicated with 2degrees' holdings in other bands. However, this does not accord with the way that these bands are being used internationally, which is as marginal 4G capacity (and in the future 5G) when other capacity is exhausted.

50. For example, consider the situation in Germany where the three leading MNOs all hold spectrum in the 1800, 2100 and 2600 MHz bands. In a recent report, Aetha investigated the

extent to which operators had deployed each of these bands to provide 4G services. As illustrated in Figure 10, all three operators have deployed 4G extensively at 1800 MHz and 2100 MHz, but they have only deployed 2.6 GHz FDD at a modest proportion of towers, and operators do not appear to have rolled out their 2.5 GHz TDD spectrum at all. The three leading German MNOs are however active in rolling out 5G at 3500 MHz: with 5G services available in 90% of Germany's territory.[16]

Figure 10: Deployment of mid-band spectrum at German towers, 2023



Source: Aetha, The frequency situation in Germany ahead of the upcoming 2024/25 frequency allocation, November 2023, using data from Ookla and Aetha

51. When compared to New Zealand, it is apparent that there is proportionately less use of 2600 MHz in Germany but greater deployment of 5G bands. There is likely a substitution effect here. German operators were earlier to roll-out 3.5 GHz spectrum, which they secured at auction in March 2019, whereas New Zealand operators received this spectrum on a temporary basis (related to the covid emergency) in May 2020 and permanently in May 2023. Once operators have 3500 MHz available, rolling out 2600 MHz for incremental 4G capacity becomes less attractive because operators can instead roll out 5G capacity at 3500 MHz. Thus, the roll out of 2600 MHz has evolved from a marginal 4G capacity band to a marginal 5G capacity band. Looking forward, further deployments of 2600 MHz FDD by operators in most countries, including New Zealand, are likely to be focused on 5G not 4G, will follow 3500 MHz deployment, and will likely be limited to high traffic sites where network congestion is anticipated.

[16] As of October 2023. https://www.rcrwireless.com/20231220/5g/5g-networks-cover-90-germany-territory

5. Competitive effects of the proposed acquisition

5.1. Introduction

52. In this section we assess the competitive effects of the proposed acquisition in respect of broadband and mobile telecommunications markets. We have not undertaken a detailed assessment of market definition; rather, our starting point is the relevant markets identified by the NZCC in the SoI (at [43]). In particular, the key markets we consider are:

    a. The markets for the retail supply of broadband services (including wireless broadband services), separately in fibre and non-fibre areas; and

    b. The national market for the retail supply of mobile services.

5.2. Competitive effects in retail broadband markets

53. In respect of competition in retail broadband markets, the NZCC's key concern appears to be that the proposed acquisition will constrain 2degrees' ability to grow its customer base and the propositions it can offer to customers (SoI, [185]).

54. However, as outlined earlier, the key consideration is not whether 2degrees is harmed *per se*, but rather whether there will be an adverse impact on competition in the factual relative to the counterfactual. In our view, there will continue to be strong competition for retail broadband customers in the factual relative to the counterfactual, in both fibre and non-fibre areas. We explain why in the following paragraphs.

5.2.1. Fibre areas

55. In fibre areas, any impact on 2degrees' ability to provide 4G FWA must be considered in the broader context that aside from 2degrees, Spark and One NZ are competing with their mobile networks against Chorus' fibre regulated network. At a high level, the following factors suggest 2degrees' ability to offer FWA services is not the key competitive constraint in fibre areas:

    a. Chorus' wholesale broadband products are available on regulated terms to all access seekers on a non-discriminatory basis;

    b. Chorus faces stranding risk and is therefore incentivized to not lose customers to FWA (as we discuss shortly, the introduction of the "Home Fibre Starter" plan is likely to be a direct response to FWA plans); and

    c. MNOs are incentivized to have broadband customers on their mobile network (which is largely a fixed cost)[17] as opposed to on the fibre network (which is variable cost). So we would expect Spark and One NZ to already be competing aggressively to lure customers away from Chorus' network.

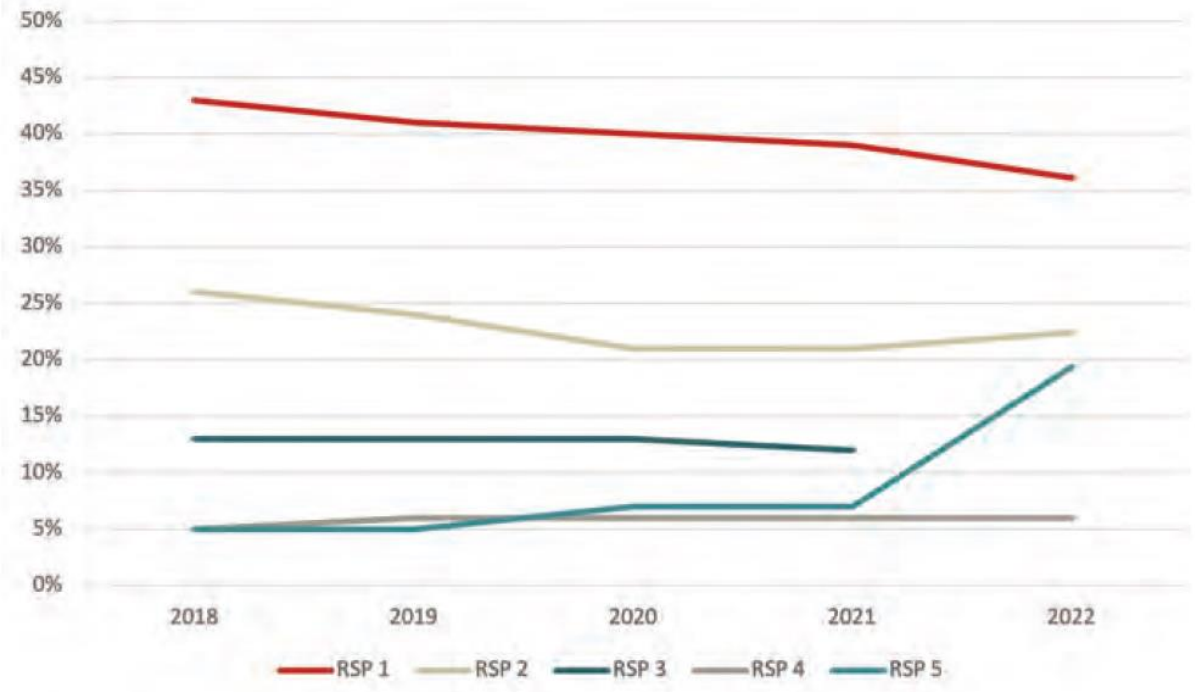
56. To be more specific, the evidence set out in the following paragraphs shows that competition for retail broadband customers is currently strong and we consider that this competition is likely to continue in the factual. This evidence of strong competition is also occurring at a time

[17] I.e. Before an MNO's network has reached capacity, and after an investment to expand capacity is made (which are lumpy capacity increments) then there is essentially zero marginal cost of taking on another FWA customer.

when, on 2degrees' arguments, its "*lack of spectrum is limiting our ability to compete with Spark and One NZ*" (2degrees submission, [1.2(b)]), implying that 2degrees' claims are not consistent with market outcomes.

57. First, the NZCC's 2022 *Annual Telecommunications Monitoring Report* showed that there were changes in market shares for broadband providers, and a gradual erosion of share for the largest provider - see Figure 11 below. The key conclusion the NZCC drew from this was that it "indicates competitive tension and consumer switching in the market and the potential for further shifts in the coming years".[18] We understand that RSP2 in the below graph is One NZ and RSP5 is 2degrees, with these RSPs having very similar shares. This is consistent with [REDACTED].

Figure 11: NZCC graph of RSP broadband market shares, 2018-2022



Source: Figure 4 of NZCC (2022), "2022 Telecommunications Monitoring Report".

58. Second, One NZ's FWA connection data evidences strong competition in both fibre and non-fibre areas. In particular, [REDACTED].

Figure 12: One NZ FWA connections, fibre and non-fibre areas and Chorus Home Fibre Starter connections

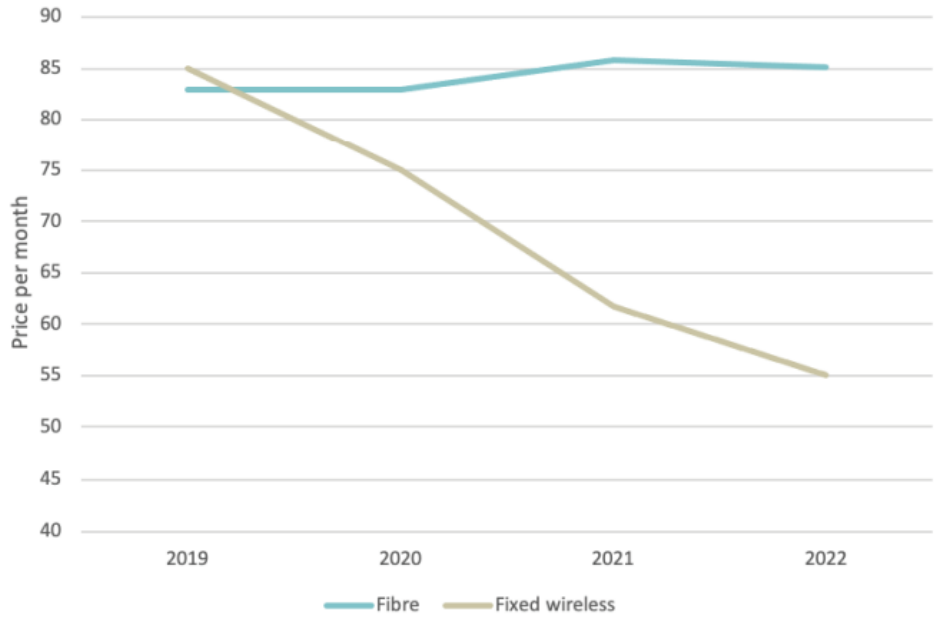
[REDACTED]

59. Third, the NZCC's 2022 *Annual Telecommunications Monitoring Report* also showed that fixed wireless broadband prices had been trending down over the last four years, as shown in Figure 13. The prices shown are in nominal (not inflation-adjusted) terms, so the real price decrease

[18] NZCC (2022), "2022 Telecommunications Monitoring Report", at p.32

will be even larger. We note that where real prices are falling, it is indicative of strong competition placing downwards pressure on prices and/or costs.

Figure 13: NZCC graph of fibre and fixed wireless broadband prices, 2019-2022



Source: Figure 18 of NZCC (2022), "2022 Telecommunications Monitoring Report".

60. Fourth, Chorus' "Home Fibre Starter" plan (50/10Mbps speeds) is a wholesale open access product that is available at a price that allows for matching with FWA prices, and will therefore act as a competitive constraint on fixed wireless broadband pricing. We note that the NZCC is still considering the extent to which this plan is comparable to wireless broadband (SoI, [193]). Chorus promotional material notes that this offer is targeted at "price sensitive customers".[19] In Table 4 we have compared pricing of Home Fibre Starter with FWA 4G and 5G prices. At least for 4G FWA plans, the pricing of the Home Fibre Starter plan is broadly comparable.

Table 4: Home Fibre Starter and Fixed Wireless plan pricing comparison

Plan	2degrees price	Spark price	One NZ price
Home Fibre Starter	$60/month	Does not offer Fibre Starter, but offers a 50/10 plan for $60/month (with a 120GB cap)	$60/month
FWA 4G capped	$55/month (capped at 300GB)	$45/month (capped at 40GB) or $55/month (capped at 120GB)	$55/month (capped at 300GB)
FWA 4G unlimited	$60/month	$60/month	$65/month

[19] See Chorus' product page for Home Fibre Starter, which begins with the heading "Calling all price sensitive consumers!". Source: https://sp.chorus.co.nz/product-offer/home-fibre-starter, accessed: 28/02/24.

FWA 5G unlimited	$79/month	$85/month (with Netflix add-on)	$79/month

Source: NERA analysis of MNO websites. Prices exclude any discounts for being a mobile customer.

61. On the above evidence, we consider that competition for retail broadband customers in fibre areas will not be substantially lessened as a result of the proposed acquisition. If anything, the transaction would likely be pro-competitive, because [REDACTED].

5.2.2. Non-fibre areas

62. Some of the above considerations in respect of fibre areas also apply to non-fibre areas. However, a key distinction is that, in non-fibre areas (that are not RCG areas), a difference between the factual and a counterfactual where 2degrees obtains the Dense Air spectrum is [REDACTED].

63. However, 4G is a legacy technology, and therefore 2degrees' proposed use of the spectrum is a short-term case. 5G is already being rolled out and has increasing penetration (see Figure 2 above) and 2degrees has significant holdings of spectrum identified for 5G (as noted earlier in our report). This therefore begs the question: if 2degrees believes it is constrained in 4G capacity to support FWA, why does it not instead prioritise developing 5G FWA, which is a more efficient technology and will enable 2degrees to provide a higher quality of service to its customers? The NZCC has already noted at [190] of the SOI that [REDACTED].

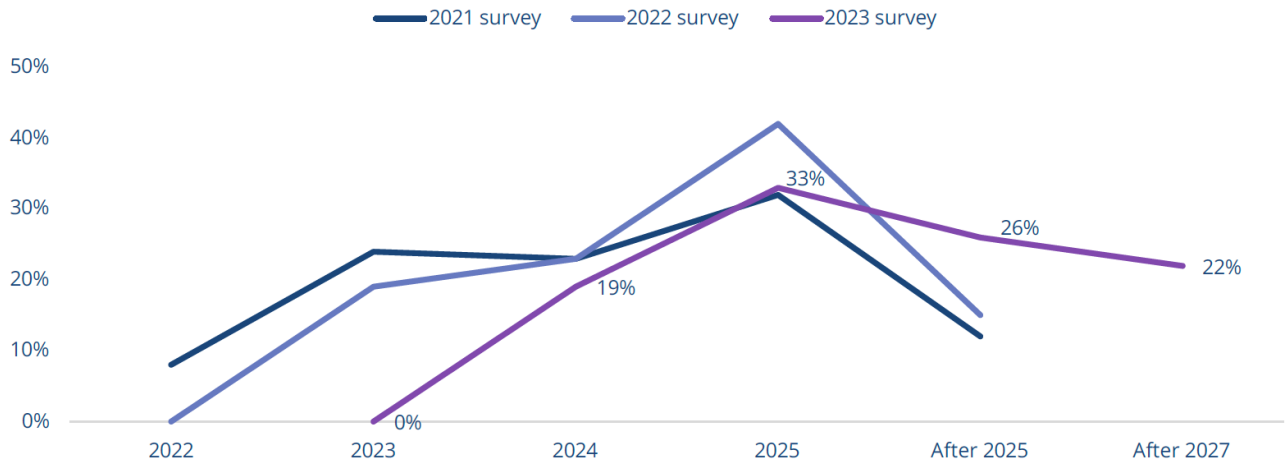
64. In its 8 December 2023 submission on the proposed merger, 2degrees gives two reasons why it requires 4G spectrum, not 5G spectrum, to be competitive in FWA provision, but neither seems very credible:

    a. [REDACTED]

    b. [REDACTED]

65. Operators around the world are accelerating their 5G FWA deployment, with shipping of devices and unit costs for 5G equipment falling rapidly as a result. According to the GSA, global shipments of 5G-enabled FWA devices increased from 1.4 million in 2020 to 13.8 million in 2023, whereas shipments of 4G devices declined over the same period from 28.8 million to 18.2 million. As illustrated in Figure 14, owing to the growth in the size of the FWA market, the GSA reports that a majority of vendors expect prices for 5G CPE to converge to the current price of 4G CPE by 2025.

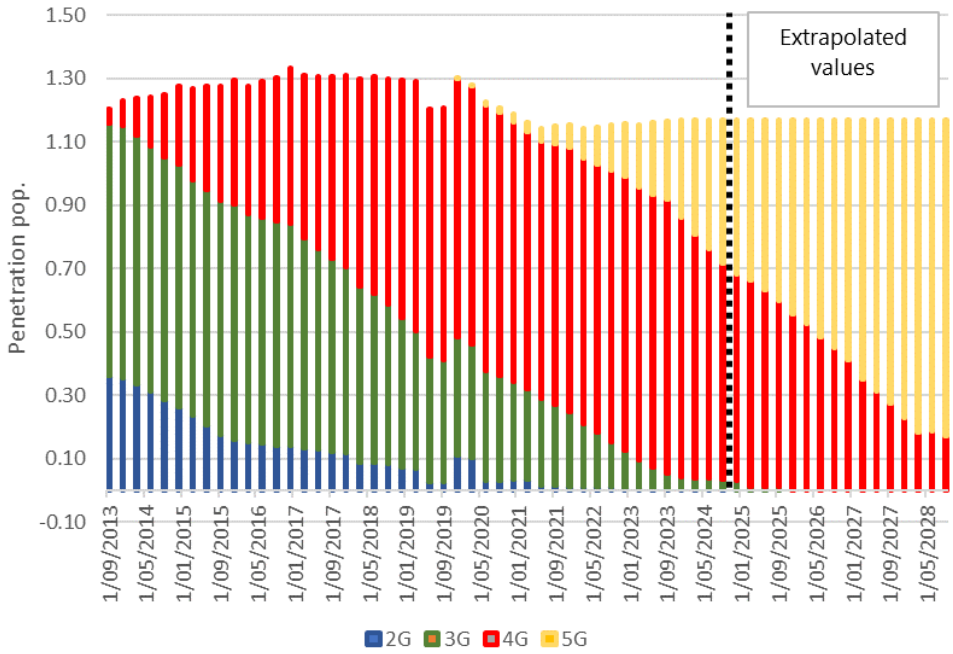
Figure 14: Vendor expectations for when prices of 5G CPE will reach the current levels of 4G CPE.



Source: GSA, September 2023, Fixed Wireless Access CPE Vendor Survey 2023.
Notes: Sample of 25 respondents in 2021, 26 in 2022 and 27 in 2023.

66. The reality is the network transition from 4G to 5G is already well underway. As illustrated in Figure 2 earlier in our report, as of September 2023, 5G penetration had already exceeded 20% of the New Zealand market. If, as seems likely, 5G adoption follows a similar profile to 4G, this will rise to over 50% by September 2025. This is demonstrated by Figure 15 below which extrapolates forward the trends in Figure 2 Given this rate of adoption, it would not make sense for any operator to invest significantly in rolling out new 4G capacity when it could spend the money instead rolling out new 5G capacity.

Figure 15: Extrapolation of 5G penetration based on growth in 4G penetration



Source: NERA analysis of Telegeography data.
Notes: Extrapolated values are based on the following assumptions: New Zealand's population grows at 0.6% per year; the take-up of 5G technology follows the same trajectory as 4G; 2G and 3G decline to zero by end-2025; and 6G technology is not introduced during this period.

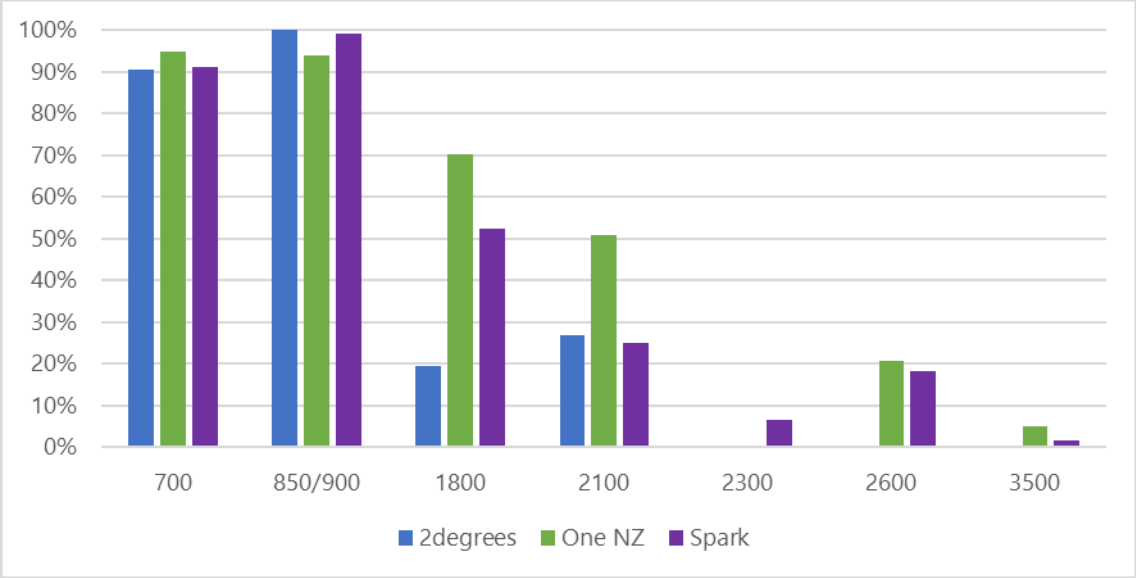
67. It is relevant that 2degrees does not currently have any 2.6 GHz spectrum. Therefore, to deploy 4G capacity in this band, we understand from One NZ that 2degrees would have to install new radios capable of supporting the band. It is not obvious why 2degrees would want to invest meaningfully in deploying legacy 4G technology when it could instead spend the money on accelerating its deployment of 5G capacity using 3.5 MHz. This raises questions about 2degrees' claims [REDACTED], given this also appears to be the case with respect to deploying 2.6GHz spectrum.

68. In this regard, the business strategy proposed by One NZ seems more orthodox and plausible. It proposes to [REDACTED], to give it extra capacity, including to handle new FWA accounts. [REDACTED] owing to One NZ's much larger subscriber base (across broadband and mobile).

69. Given the pace of transition from 4G to 5G, any concerns regarding potentially increased competition from 2degrees in the counterfactual appear to be narrowly focused on an interim period of a few years before 5G fully takes off. During this period, 2degrees has a number of alternatives available to deploying 2.6 GHz:

    a. **Deploy more existing spectrum.** As illustrated in Figure 16, 2degrees does not appear to have deployed all its spectrum at many of its existing towers in non-fibre areas. This figure is based on data provided by One NZ based on the RSM database. Looking at 1800Mhz and 2100Mhz spectrum, 2degrees has respectively only deployed this spectrum at 19% and 27% of its non-fibre area towers. Wherever it is the case that 2degrees has not deployed all of its spectrum, 2degrees has options to expand capacity using its existing spectrum.

Figure 16: Percentage of each MNO's sites in non-fibre areas where they have deployed each spectrum band



Source: NERA analysis of RSM data provided by One NZ.

b. **Refarm 3G spectrum.** 2degrees indicates (at [5.1] of its submission) that it is planning to turn off its 3G network, which will free up 2x5 MHz of 900 MHz and 2x5 MHz of 2100 MHz. 2degrees already has 4G deployed in these same bands, so this spectrum presumably would be immediately available to expand its 4G capacity using existing equipment (or otherwise expand its 5G offering using new equipment). This represents a ~25% increase in its 4G capacity. [REDACTED].

c. **Deploy at more towers**. In areas where it has deployed all its spectrum and still faces congestion, 2degrees could consider selective rollout to additional tower sites. In its submission (at [7.3]), 2degrees indicates that it currently uses [REDACTED] towers whereas One NZ advises us that it has deployed at [REDACTED] towers, so it appears that 2degrees has room to grow its network without taking on greater costs than its rivals. As identified at paragraph 47, in the factual, 2degrees could match One NZ's notional capacity/subscriber with no additional spectrum by rolling out to the same number of towers.

d. **Acquire alternative spectrum**. There are significant quantities of spectrum in major mobile bands not currently held by the three largest operators. This includes 20MHz @ 1800 MHz, 20MHz @ 2100 MHz, 25MHz @ 2300 MHz, 45 MHz TDD @ 2600 MHz and 160 MHz @ 3500 MHz. 2degrees could attempt to buy access to these bands. This is a factual issue which we understand that One NZ is submitting on. However, we understand that [REDACTED].

5.3. Competitive effects in the mobile market

70. In mobile market, the NZCC's concern is that 2degrees may be constrained in its ability to grow its customer base, and in the propositions it can offer retail mobile customers (SoI, [180]).

71. We note, however, that 2degrees does not appear to be *currently* constrained in the mobile market, with the international benchmarking in section 4 of our report showing that 2degrees has a good spectrum position, and the mobile market being relatively competitive. Regarding the latter, the NZCC notes in the SoI (at [179]):

> *…competition in the supply of retail mobile services has strengthened since the arrival of 2degrees in 2009. The retail mobile market has become less concentrated as 2degrees has gained market share, particularly in prepaid mobile services, but also more recently in the on-account residential mobile services segment. The emergence of 2degrees has been important in the development of an increasingly competitive retail mobile market.*

72. Since 2degrees' relative spectrum position in the factual is similar to what it currently has, it is not clear to us how this would adversely impact competition, when no such adverse impacts on competition have been apparent in the status quo. Indeed, we discussed earlier how competition is multi-dimensional, with MNOs able to utilize a variety of techniques to gain a competitive advantage. 2degrees' growth through a focus on prepay users is an example of this, showing how it has been able to compete in the status quo despite a spectrum asymmetry.

73. Furthermore, an important consideration for competitive effects in the factual is the ability for 2degrees to expand, particularly in 5G as the key area for future competition. As we have previously discussed, 2degrees has 3.5GHz spectrum, making it well positioned to roll-out its 5G network on its existing cell network and offer the highest speeds. More generally, at a high level, the international benchmarking earlier in our report showed that 2degrees has a good spectrum position.

74. 2degrees has submitted that it would be difficult to expand by building more sites, as it would need to build [REDACTED] more towers to reach near equivalence with One NZ's network capacity (2degrees submission at [2.13(a)]). However, the calculations that 2degrees has used to generate this number are not reflective of real-world decisions on when and whether to deploy new sites, for three reasons:

    a. First, 2degrees' calculations assume [REDACTED]. However, we understand from One NZ that 2degrees has rolled out both its 1800 MHz and 2100 MHz bands at less than 70% of its sites;

    b. Second, 2degrees is ignoring the impact of deploying 5G at 3500 MHz, which will increase capacity for all operators;

    c. Third, 2degrees does not necessarily need to replicate its rivals' capacity; rather, it only needs to ensure that individual sites have sufficient capacity to adequately serve its customer base. As 2degrees has a much smaller customer base and traffic load than its rivals, it can provide equivalent capacity per user with a much lower spectrum base; and

    d. Fourth, 2degrees will need to build new towers regardless, as it has a minimum build commitment with Connexa to build 450 sites over 10 years.[20]

[20] See NERA's report in respect of the proposed acquisition of 2degrees' tower assets by Connexa, 16 December 2022, available at: https://comcom.govt.nz/__data/assets/pdf_file/0021/302385/Proposed-Acquistion-of-2degrees-Tower-Assets-by-Connexa-16-December-2022.pdf

75. If the 2.6 GHz spectrum were competitively important to 2degrees, then we would have expected 2degrees [REDACTED] to acquire the frequencies. In particular, it is difficult from an economics perspective to reconcile:
    a. 2degrees stated cost of replicating the capacity offered by the spectrum of [REDACTED];
    b. [REDACTED]; and
    c. The claimed harm to 2degrees ability to compete if it does not get this spectrum.
76. 2degrees states that [REDACTED]. However, the amount of money [REDACTED] One NZ are modest by international standards, even allowing for the limited size of the New Zealand market. The international evidence suggests that 2degrees, contrary to its claims, [REDACTED].
77. We have analysed data on the prices paid for spectrum worldwide across a wide sample of major economies (over 60 countries). Prices can vary significantly between countries. However, since 2017, the price paid across countries for upper mid-band spectrum (defined as 2.3 GHz, 2.6 GHz and 3.5 GHz) has remained fairly stable, averaging about US$ 20 cents (NZ$ 33 cents) per MHz / pop on a purchasing power parity basis, normalized for a 20-year licence. This is equivalent to a price of US$ 11 cents (NZ$ 18 cents) when adjusted for a 6-year duration, which is the outstanding term rounded up to the nearest year for the Dense Air spectrum at the time when offers were solicited. [REDACTED].
78. In the 5G award era from 2017-2023, most transactions of upper mid-band spectrum have involved 3.5 GHz spectrum, as this is the new capacity band aimed at 5G. There have been fewer awards involving 2.6 GHz spectrum, as most countries allocated this in the 4G era. Nevertheless, we have identified seven awards of 2.6 GHz FDD, the same spectrum as owned by Dense Air in New Zealand. As shown in Figure 17, One NZ's winning bid lies at the bottom end of the range of international benchmarks, [REDACTED] (all prices have been converted to NZ$ at average FX rates for the relevant year and adjusted for an equivalent licence term of 6 years). Notably, four of these countries (Croatia, Romania, Mexico and Portugal) have much lower GDP per capita than New Zealand and two (Croatia and Norway) have similar populations, so there is no reason to adjust for the limited size and wealth of the New Zealand market.
79. The highest 5G-era price paid for 2.6 GHz FDD spectrum (normalised for a 6 year term) of NZ$ 19 cents, some [REDACTED], was in Portugal in 2021. This price was set by robust competition in the auction between an incumbent MNO and two aspiring new entrants, the latter competing to become the country's 4th MNO. Ultimately, an entrant won the spectrum. This outcome was achieved in a country that has a GDP/capita half that of New Zealand (US$25K vs US$49K in 2021) and, like New Zealand, has modest market size (10 million vs 5 million population). [REDACTED].

Figure 17: Price offers for New Zealand 2.6 GHz spectrum compared to relevant international benchmarks

[REDACTED]

80. The NZCC note at [181] 2degrees' argument that it is currently constrained in the retail plans that it offers by giving the example that, unlike Spark and One NZ, it has moved away from offering an unlimited plan and instead now offers an 100Gb "endless" plan that offers max speeds for 100GB and then throttled speeds thereafter (One NZ offers similar 5 and 15GB endless data plans, under which maximum speeds are reduced after the specified full speed data allowance is exceeded). It is not clear that in practice 2degrees 100GB endless data plan is that different than Spark and One NZ's unlimited plans, which have a fair use policy to assure quality of service for all users (i.e., usage that materially exceeds usual patterns or that undermines the operation of the network may be restricted).[21] For example the average usage for customers on One NZ's unlimited plan is [REDACTED] per month, far less than the 100GB cap on 2degrees' endless plan. We note also that 2degrees does continue to offer unlimited FWA plans.

81. 2degrees also argues at [8.3(g)] that [REDACTED] We note, however, that 2degrees has an excellent portfolio of 5G spectrum, including 80 MHz at 3500 MHz. Accordingly, in the short-medium term, it faces no constraints in deploying high 5G speeds and capacity, especially as it starts with a much lower subscriber base than its rivals, and therefore less network traffic.

82. In addition, in the long term, if 2degrees' 5G network does become congested, this will almost certainly be an industry wide issue, affecting all mobile operators in New Zealand and developed markets worldwide. The industry is already working on defining additional bands to support 6G and in the meantime there is spectrum in existing mobile bands in New Zealand that could be transitioned to mobile operators facing congestion.

[21] See One NZ's Fair Use Policy, available at: https://one.nz/legal/policy/fair-use/

Appendix A. Alternative set of spectrum graphs

83. [REDACTED]

Figure 18: Current, factual and counterfactual spectrum holdings of MNOs, total (LHS) and downlink (RHS)

[REDACTED]

Figure 19: Current, factual and counterfactual spectrum share, and mobile market share, by MNO, total (LHS) and downlink (RHS)

[REDACTED]

Figure 20: Current, factual and counterfactual ratio of spectrum and market shares, by MNO, total (LHS) and downlink (RHS)

[REDACTED]

Figure 21: Downlink Hz/customer: current vs factual

[REDACTED]

Appendix B. Overseas evidence of downlink spectrum allocations

84. The tables and graphs in this Appendix are those in section 4 of our report, but using downlink spectrum rather than total spectrum.

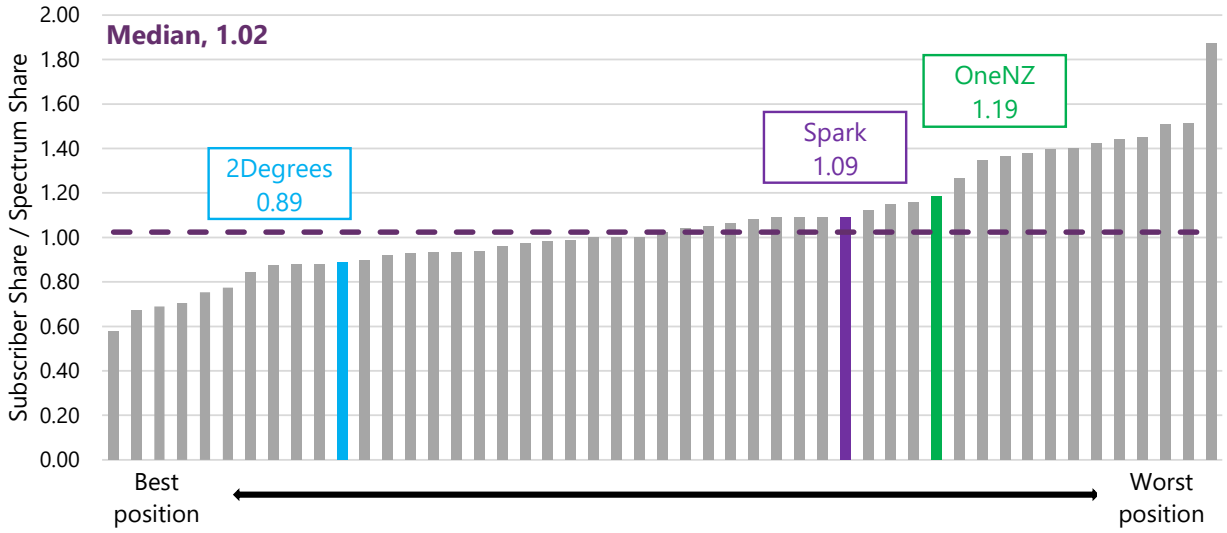
Table 5: Bandwidth held by the two largest MNOs in 15 OECD markets

Rank	Country	Operator	Market share rank in country	Bandwidth held (MHz)
1	Austria	A1 Telekom Austria	2	282
2	Austria	T-Mobile Austria	1	218
3	Australia	Optus	2	203
4	Australia	Telstra	1	252
5	Belgium	Proximus	1	225
6	Belgium	Orange	2	190
7	France	Orange France	1	156
8	France	SFR Group	2	138
9	Germany	Telefonica Deutschland Holding (O2)	1	162
10	Germany	Vodafone Germany	2	207
11	Greece	Cosmote	1	251
12	Greece	Vodafone Greece (incl. Hellas Online)	2	228
13	United Kingdom	BT Group (incl. EE)	2	214
14	United Kingdom	O2 UK	1	169
15	Ireland	Hutchison 3G Ireland (Three Ireland)	1	205
16	Ireland	Vodafone Ireland	2	208
17	Italy	Telecom Italia (TIM)	2	164
18	Italy	Vodafone Italy	1	164
19	Netherlands	KPN	1	119

20	Netherlands	Odido Netherlands	2	141
21	New Zealand	Spark	1	210
22	New Zealand	OneNZ	2	154
23	Portugal	Nos (formerly Zon Optimus)	1	170
24	Portugal	PT Portugal (MEO, formerly PTC, TMN)	2	157
25	Spain	Orange Espana (incl. Jazztel)	2	173
26	Spain	Telefonica Espana (Movistar)	1	178
27	Sweden	Tele2 Sweden	2	142
28	Sweden	Telia Sweden	1	191
29	Canada	Rogers	1	192
30	Canada	TELUS	2	162

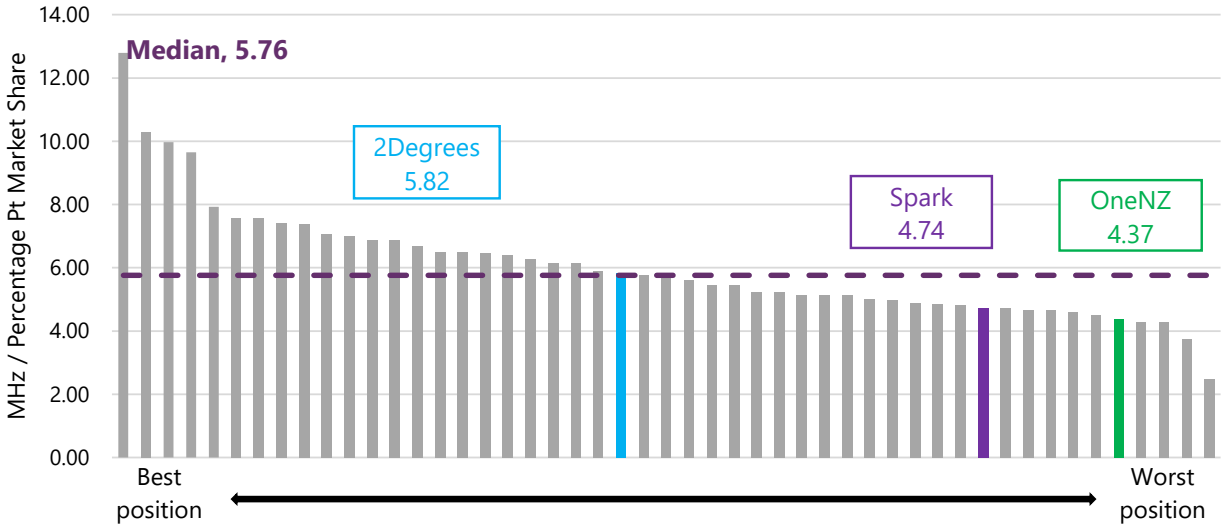
Notes: Survey of 15 OCED countries. * In Sweden, Tele2 holds 80 MHz jointly in a Netco with Telenor – only 40 MHz of that is included here. ** Netherlands 3500 MHz spectrum scheduled for 2024, so these holdings will increase significantly once that process is concluded.

Figure 22: Ratio of subscriber share to spectrum share for MNOs in OECD markets



Source: NERA analysis of 49 mobile operators across 15 OECD markets. Each grey bar represents the ratio of an operator's subscriber share to its spectrum share. New Zealand operators highlighted.

Figure 23: Bandwidth held per percentage point of market share for MNOs in OECD markets



Source: NERA analysis of 49 mobile operators across 15 OECD markets. Each grey bar represents the MHz of bandwidth owned by an operator per percentage point subscriber share. New Zealand operators highlighted.

NERA
Level 11
15 Customs Street West
Auckland 1010, New Zealand
www.nera.com