
Three's Response to the CMA's Provisional Findings of 28 October 2015

Non-confidential

4 December 2015

1. INTRODUCTION - EXECUTIVE SUMMARY

- (1) The CMA's provisional findings on [MNOs'] capacity challenges are incorrect. More specifically, CMA is of the provisional view that:

11.79 Moreover, as set out in Appendix G, the nature of any capacity constraints appears to be time limited. Additionally, there are a range of non-spectrum investments that operators can make to improve their networks over time.

11.80 From the evidence provided to us, our provisional view is that the capacity challenges potentially facing some MNOs [] are not insurmountable, because any spectrum constraints are limited over time, as more spectrum becomes available, and there are a range of other non-spectrum investments operators can make. In combination with the [] uncertainty attached to BT's forecast growth, this leads us to conclude that changes in the strength of MNOs in the counterfactual would not lead BT to become a unique or an important competitive constraint such that its loss would amount to an SLC.

- (2) These conclusions are not properly substantiated. Three would like to amplify its previous submissions and provide additional observations to further demonstrate that [X]:

- Contrary to the submission of the parties, Three's recent non-MNO agreements are not probative of Three's current and future capacity expectations (see para 125 of Appendix G)
- [X]
- Three's recent acquisition of [X] 1400 MHz spectrum [X] (para 132 of Appendix G)
- Contrary to certain submissions, speed is of significant competitive importance; (see paras 104 et seq. and 112 of Appendix G)

- (3) [X].

2. CONTRARY TO THE SUBMISSION OF THE PARTIES, THREE'S RECENT NON-MNO AGREEMENTS ARE NOT PROBATIVE OF THREE'S CURRENT AND FUTURE CAPACITY EXPECTATIONS

- (4) [X].¹
- (5) [X].²

¹ [X].

² [X].

- (6) It is worth clarifying that reports in relation Three having recently agreed to host the American MVNO Freedom Pop on its network are not factually correct. Freedom Pop is not a direct customer of Three's wholesale business, but rather a customer of one of Three's MVNA partners (X-Mobility). X-Mobility buys network services from Three, aggregates them and resells them. [REDACTED].³

3. [REDACTED]

- (7) [REDACTED].⁴ The CMA has [REDACTED] concluded that MNOs can deploy a range of options to increase capacity, such as purchasing more spectrum, deploying existing spectrum at more sites, re-farming spectrum to 4G, densification of sites and cell sectorisation.⁵

- (8) However, Three has previously explained to the CMA that these options will not adequately address [MNOs'] capacity and speed challenges. [REDACTED] Three's rivals have a multiple of revenues and operating profits to Three, as well as significantly larger scale, which allows them to monetise the investment across many more customers. There is also an incentive for Three's rivals to bid strategically to exclude Three in spectrum auctions.

- (9) [REDACTED].

- (10) [REDACTED].

- (11) Three notes that sectorisation is a limited and costly solution. 6-sector technology has material short-comings including spectral interference issues and the inability to precisely target the source of congestion. Three also notes that it is impossible to rely on additional sites [REDACTED] where actually needed because of strict planning rules, physical restrictions and very high rents/rates in high traffic areas.

- (12) Finally, Three notes the difficulties and minimal impact on congestion of small cell deployment. As Three has previously explained to the CMA, developing a small cell solution requires spectrum to be reserved, [REDACTED].

- (13) [REDACTED].⁶

- (14) [REDACTED]. These practical challenges include:

- finding a sufficient number of suitable locations – in particular in dense urban areas – to allow Three to target congestion hotspots effectively; and
- practical deployment and coordination issues, such as spectral interference issues as a result of small cells re-using existing spectrum currently used in the macro layer (unlike, for example, deployments in Korea and Japan, which use dedicated spectrum carriers for the small cell capacity layer).

³ [REDACTED].

⁴ [REDACTED].

⁵ Appendix G, para 39.

⁶ [REDACTED].

(15) [REDACTED].

4. THREE’S RECENT ACQUISITION OF [REDACTED] 1400 MHZ SPECTRUM [REDACTED]

(16) The CMA appears to incorrectly overplay the significance of Three’s recent acquisition of 1400 MHz spectrum [REDACTED].

(17) [REDACTED]⁷:

- Devices supporting 1400 MHz spectrum will not become available for as long as three years and Three expects that 1400 MHz is likely to remain a ‘niche’ band which will not initially be supported by all the available devices, resulting in further delay in penetration rates. 1400 MHz-enabled devices are only expected to be introduced gradually, [REDACTED].⁸
- As supplementary down-link capacity, 1400 MHz will also need to be combined with existing spectrum. [REDACTED].
- [REDACTED].

(18) [REDACTED].

(19) [REDACTED].

(20) [REDACTED].

(21) [REDACTED].

5. SPEED IS OF SIGNIFICANT COMPETITIVE IMPORTANCE

(22) The CMA’s Provisional Findings focus “on the extent to which consumers may face speeds that drop below operators’ minimum targets, because we understand that these targets reflect thresholds which are likely to matter to a significant proportion of customers”.⁹ The CMA has discounted the competitive importance of speeds above that threshold, suggesting that it is not clear that higher speeds are needed or are even valuable to consumers.¹⁰

(23) Separate and apart from issues arising from mobile network congestion, average download speeds across the network are an increasingly important competitive element in their own right. In order to attract and retain subscribers, MNOs compete on both minimum and average speeds. The speed requirements needed to deliver an acceptable

⁷ [REDACTED].

⁸ [REDACTED].

⁹ Appendix G , para 16

¹⁰ Appendix G, para 40.

(and competitive) customer experience are growing [X]. As UK consumers continue to demand greater functionality from mobile devices and applications, MNOs lagging in data speeds will become less competitively relevant. [X].

- (24) As noted in the past, the importance of speed is evident from the current MNO marketing strategies. For example, EE's website currently boasts its historical and current top-rankings for network speed and promotes its determination to maintain the leading position.¹¹ Additionally, Vodafone's website explains that *"Our ultrafast 4G is more reliable and up to six times faster than 3G. It can even be faster than Wi-Fi"*.¹²
- (25) In addition to marketing actively their current speed differentiation, both EE and Vodafone have repeatedly discussed future consumer speed demands and are investing heavily in speed enhancements. EE has championed its recent trial of 400 Mbps speeds at London's Wembley stadium, with its CEO explaining that *"[i]t is really important to continue driving drive capacity into the network as people use their mobile phones and tablets more and more for video and TV . . . There are applications, particular when we move to 4K TV content for both consumer and business, where there will be a real requirement for these types of speed in the long run"*.¹³ In turn, Vodafone has recently confirmed that it plans to conduct trials of 1 Gbps speeds during the first half of 2016.¹⁴
- (26) Customers demanding the most popular mobile data applications and using their device to run multiple parallel applications require download speeds capable of executing those features. If an MNO cannot offer average speeds commensurate to supporting the most popular mobile applications, significant customer churn is inevitable.
- (27) Observations of international markets provide further indicators of the future speed demands of UK consumers. For example in 2014 the Asia Pacific region's average 4G speed was 10.9 Mbps and it is forecast that in 2019, the average 4G speed will be 16.9 Mbps.¹⁵ Specifically, South Korea's mobile market is widely viewed as one of the most advanced in the world with high mobile adoption and high peak/average speeds, while Sweden is typically viewed as the leading European mobile market. MNOs in South

¹¹ *"We're determined to keep our network #1 for speed. Since launching we've doubled the speed of 4G and we've even launched our fastest 4G+ speeds in London"*. See <http://ee.co.uk/ee-and-me/network/why-ee>

¹² See <http://www.vodafone.co.uk/explore/benefits/pay-monthly-4g/>.

¹³ <http://www.mobileworldlive.com/featured-content/top-three/ee-boss-claims-bt-merger-will-spur-5g/> (24 March 2015); see also EE Chief Executive Olaf Swantee explaining that *"our competitors can't position double speed 4G as a big benefit because they don't have it, so to have 50 per cent of contract customers using this product is really great."* Reporting on the 400Mbps test, Engadget noted *"EE was the first 4G network operator in the UK, and it's now hell-bent on staying the fastest"*. <http://www.engadget.com/2015/02/27/ee-400-mbps-4g/>.

¹⁴ See, e.g., *"Earlier this week, Vodafone UK rival and mobile market leader EE confirmed that it would conduct trials of 1Gbit/s 4G services in the first half of 2016."* <http://www.lightreading.com/mobile/4g-lte/vodafone-uk-looking-into-1gbit-s-4g/d/d-id/719027> (30 October 2015).

¹⁵ Cisco, "VNI Mobile Forecast Highlights, 2014 – 2019", available at http://www.cisco.com/c/dam/assets/sol/sp/vni/forecast_highlights_mobile/index.html. Note: the countries with the fastest speeds for internet have the fastest fixed and fastest mobile networks, consistent with Three's view that consumers increasingly demand access to the same services and therefore require the same speeds, regardless of their location.

Korea (Figure 5) and Sweden (Figure 6) offer significantly faster download speeds (including a higher proportion of time covered by 4G) [X] (Figure 7). As developed commercial economies, South Korea and Sweden provide good indicators of future customer demand and expectations in the UK.

Figure 5: South Korea mobile speeds vs time on 4G (Source: Open Signal)

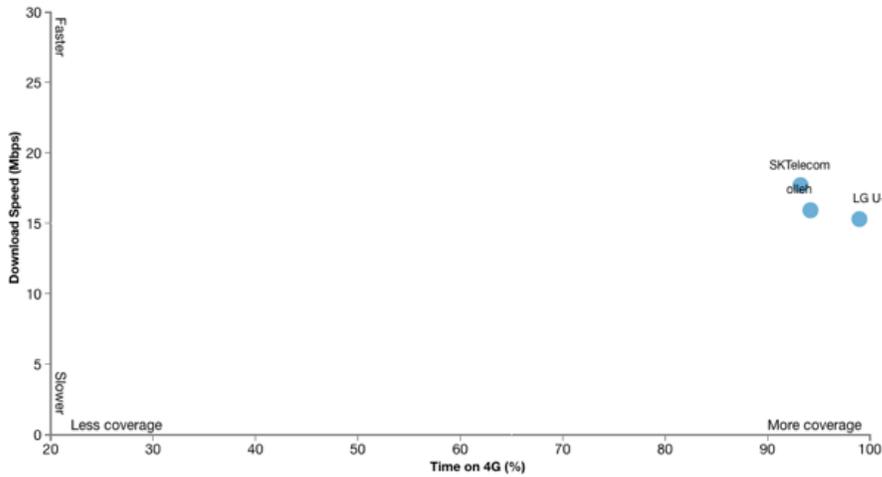


Figure 6: Sweden mobile speeds vs time on 4G (Source: Open Signal)

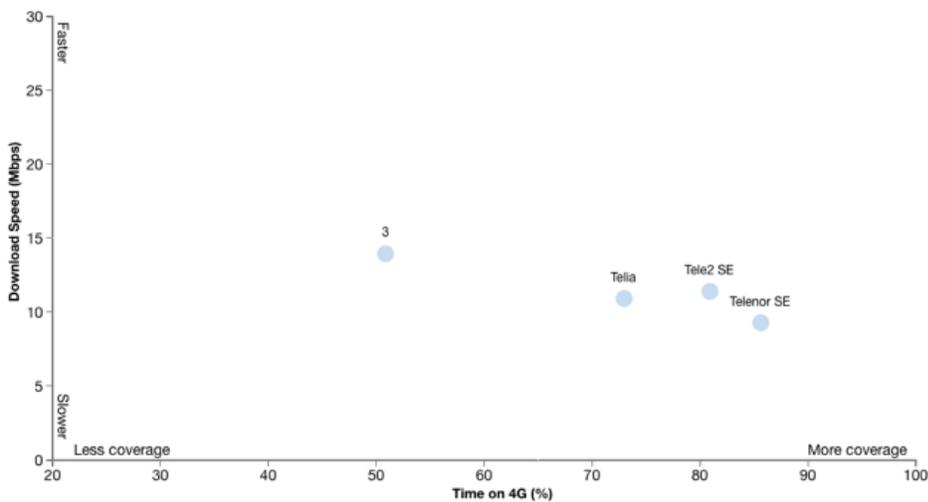
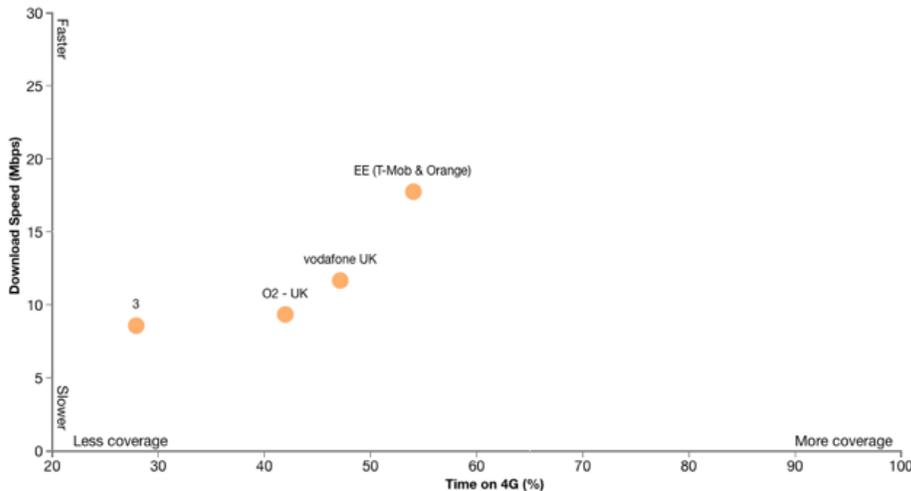


Figure 7: UK mobile speeds vs time on 4G (Source: Open Signal)



- (28) The importance of speed can also be observed in the evolution of fixed broadband. Technological innovation has led to fixed speeds evolving from ~56 Kbps (1990s) to greater than 100 Mbps (2015) – a 1800x speed increase in less than 25 years. The fixed broadband industry is currently developing a roadmap to 1 Gbit/s speeds, commonly referred to as “ultrafast broadband” delivered by “G.Fast” technology and cable networks.
- (29) Fast internet access is increasingly becoming a fundamental consumer good. Demonstrating the importance of speed, Prime Minister Cameron recently announced a government policy to ensure superfast connectivity nationwide (95% of UK households with >24 Mbps).¹⁶ In response to this announcement, commentators noted that “[g]oing faster ... is a genuine necessity if the network is to deal with rapidly escalating demand. Like other advanced economies, Britain is expecting a fast increase in data usage as consumers download more bandwidth-munching video”.¹⁷ Statistics from Ofcom demonstrate a clear trend towards customers switching away from slower ADSL

¹⁶ UK Government, “Government plans to make sure no-one is left behind on broadband access”, 7 November 2015, available at <https://www.gov.uk/government/news/government-plans-to-make-sure-no-one-is-left-behind-on-broadband-access>. Prime Minister David Cameron said that “[a]ccess to the Internet shouldn’t be a luxury; it should be a right – absolutely fundamental to life in 21st century Britain. That is why I’m announcing a giant leap in my digital mission for Britain. Just as our forebears effectively brought gas, electricity and water to all, we’re going to bring fast broadband to every home and business that wants it. That’s right: we’re getting Britain – all of Britain – online, and on the way to becoming the most prosperous economy in the whole of Europe”.

¹⁷ Financial Times, “Revolution in UK is paramount to deliver broadband consensus”, 15 November 2015, available at <http://www.ft.com/cms/s/0/66f98a78-8b89-11e5-8be4-3506bf20cc2b.html#axzz3rrqyu2cr>.

technology to the much higher speed fibre broadband with fibre connections growing by 67% between Q3 2013 and Q3 2014 alone.¹⁸ This provides strong evidence that customers will switch to higher speed services if available and that a similar evolution can be expected to occur in the mobile market.¹⁹

- (30) The evolution of fixed internet speeds is a useful indicator for the likely trajectory of future mobile speed demand – which is already trending upward significantly. In addition, consumers increasingly do not distinguish between fixed and mobile internet access or services – as usage mix converges and smart phone applications enhance the mobile user experience – resulting in tighter coupling of the speed demands in fixed and mobile services.

[3].²⁰

- (31) Accordingly, any modelling based on [3] thresholds is a legacy of customer expectations from 2011 based on small mobile web page browsing and low definition video streaming. It does not adequately reflect current services and expectations, given web pages are now larger and HD video is the norm. As noted at para 112 of Appendix G, these thresholds materially underestimate the network speeds required to be competitive in the UK market now and going forward, especially considering the increasing demand for data heavy applications. Current expectations across the industry of the forward-looking requirements are that 2 Mbps should be considered the absolute minimum.
- (32) The increase in speed and capacity following the roll-out of 4G networks has changed the expectations of UK mobile consumers, who are demanding improved download speeds, in particular due to the growing prevalence of mobile video streaming.
- (33) Utilising less than a 2 Mbps threshold to assess congestion would not appropriately account for this current surge of mobile data applications, whose functionality requires notably higher average speeds. In April 2015, Ofcom itself utilised 2 Mbps as a minimum acceptable speed threshold, noting that download speeds below 2 Mbps would likely impact users utilising video services.²¹
- (34) While 2 Mbps reflects current expectations, customers' expectations can be expected to increase further in the future, as MNOs with current spare capacity due to their comparatively large spectrum holdings, such as BT/EE and Vodafone, seek to exploit this

¹⁸ Ofcom, "Telecommunications Market Data Updated Q3 2014", 12 February 2015", available at <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/tables/q3-2014/> and ISP Preview, "Fibre Cannibalises ADSL as UK Fixed Line Broadband ISP Lines Hit 23.4m", 3 March 2015, available at <http://www.ispreview.co.uk/index.php/2015/03/fibre-cannibalises-adsl-as-uk-fixed-line-broadband-isp-lines-hit-23-4m.html>.

¹⁹ Three's response to Question 20(c) of the Commission's RFI 34 dated 18 September 2015.

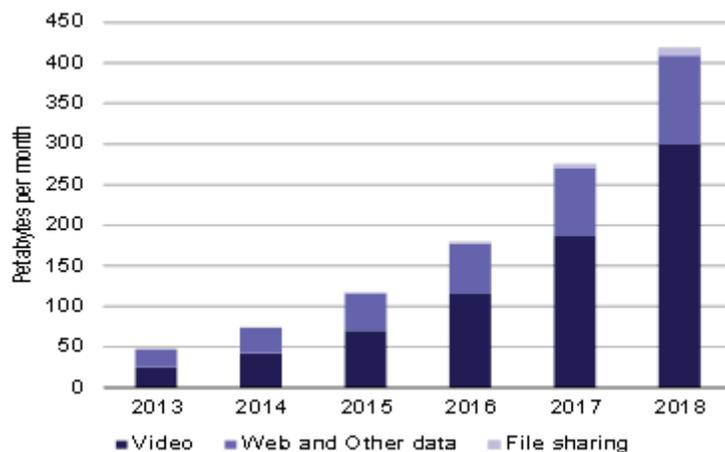
²⁰ [3].

²¹ Ofcom Research Document, "Measuring mobile broadband performance in the UK, 4G and 3G network performance", 2 April 2015, available at <http://stakeholders.ofcom.org.uk/market-data-research/other/telecoms-research/broadband-speeds/mobile-bb-april-15/>.

imbalance by offering subscribers larger bundles of data. This trend will be accentuated as additional capacity becomes available with the deployment of additional 4G spectrum (both new spectrum awards and refarmed 2G and 3G spectrum).

- (35) This expectation of a significant increase in speeds and hence usage, is supported by third-party forecasts of demand. For instance, Cisco estimates that UK mobile video traffic will grow 11-fold between 2014 and 2019, with a 9-fold increase in overall mobile traffic over the same period. Additionally, Ofcom has forecast a 45-fold increase in traffic between 2012 and 2030.²² Such large increases in data consumption cannot be solely the result of increased penetration or time-using data services, but must implicitly assume increased usage of higher bandwidth services. Figure 11 below demonstrates the broader trend that while UK data traffic overall is expected to increase significantly over the next three years, data traffic for video applications is expected to increase most dramatically.

Figure 11: UK Data traffic by application (Source: Cisco VNI, June 2014)



Over and above 2 Mbps, speeds in excess of 4 Mbps are increasingly required as many of the most popular mobile data services can only be adequately supported at speeds of 4-10 Mbps.²³ Furthermore, 4-10 Mbps typically allows consumers to support simultaneous use of multiple parallel applications – a common smartphone usage feature.

- (36) User speeds below 4 Mbps will require customers to accept significant quality degradation. As download speeds fall below 4 Mbps, customers will observe deteriorating performance of many popular services (e.g. in the case of video streaming, where the video “buffers”). For example, streaming video quality will degrade (as Figure 12 demonstrates, the recommended data rate for YouTube 1080p HD is 4.5 Mbps) and browsing the web and file downloads will become notably slower.

²² Ofcom, “Decision to make the 700 MHz band available for mobile data – statement”, 19 November 2014.

²³ Many popular applications (e.g. Facebook) and webpages have incorporated automated video streams including advertisements, which depend on higher speeds to deliver an acceptable level of performance.

Figure 12: YouTube recommended data rate requirements²⁴ (Source: Google)

Quality	Data rate requirement (Kbps)		
	Min	Max	Recommended
240p	300	700	400
360p	400	1000	750
480p ²⁵	500	2000	1000
720p	1500	4000	2500
720p@60fps	2250	6000	3800
1080p	3000	6000	4500
1080@60fps	4500	9000	6800

- (37) The increase in speeds and demand in the future can be expected to also be driven by competitive dynamics, with operators with large spectrum holdings in both absolute and relative terms such as BT/EE and Vodafone having a competitive advantage if they stimulate users to demand higher speed services.

²⁴ See <https://support.google.com/youtube/answer/2853702?hl=en-GB>.

²⁵ "Standard definition" (SD) video.