Measuring Broadband New Zealand Programme

Technical Frequently Asked Questions (FAQ)

Last updated May 2024

Purpose

1. This technical FAQ document seeks to record concerns raised by Retail Service Providers (RSPs) since the first SamKnows industry workshop in June 2018. It addresses a number of the questions about the Measuring Broadband New Zealand programme which we have received and will be updated as further questions arise.

2. For any further questions, please email market.regulation@comcom.govt.nz. If your question is of a technical nature, we will forward it on to SamKnows, provide you with their response and then add it to this document. However, we will respond to RSP-specific questions on an individual and confidential basis, when necessary.

Table of Contents

REANNZ provides the server locations

3. Research and Education Advanced Network New Zealand (REANNZ) provides the servers that the tests will run to in New Zealand, which are located in Wellington, Auckland, and Christchurch.

4. The Wellington, Auckland, and Christchurch servers that are used for testing are online and belong to AS38022 (REANNZ) and inside the block 163.7.129.0/24.

5. All three REANNZ servers have a 10 Gbps uplink. This is to avoid possible bottleneck issues for testing.

6. There are seven international test servers as part of the programme.

7. The locations of the servers testing connectivity and Download and Upload tests are:

Location	**Hosting Provider**	**Hostname**
Wellington, NZ	REANNZ	http://n1-wellington-nz.samknows.com/
Auckland, NZ	REANNZ	http://n1-auckland-nz.samknows.com/
Christchurch, NZ	REANNZ	http://n1-christchurch-nz.samknows.com/
Sydney, AU	Limelight	http://llnw3-sydney-au.samknows.com/

8. Servers testing connectivity but not subject to Download or Upload tests are:

Location	Hosting Provider	Hostname
Sao Paulo, BR	StackPath	http://sp1-vm-saopaulo-br.samknows.com/
Bengaluru (Bangalore), IN	DigitalOcean	http://n1-bangalore-in.samknows.com/
Johannesburg, RSA	Cloud ZA	http://n1-johannesburg-za.samknows.com/
Tokyo, JP	Linode	http://n1-tokyo-jp.samknows.com/
London, GB	HSO	http://n7-the1.samknows.com/
Fremont, US	Linode	http://n1-fremont-us.samknows.com/

RSPs may augment connections to test servers

9. We understand that RSPs may wish to ensure connections to REANNZ servers are appropriately sized and optimised.

10. We are comfortable that RSPs can choose to improve their connection to the REANNZ servers, on the following basis:

    10.1 RSPs improve their connection to all of REANNZ services, and not just the servers for testing. All the RSP's customers (not just volunteers for the MBNZ programme) should receive the benefit of improved connectivity for all aspects of the REANNZ network. SamKnows will perform testing to confirm this.

    10.2 RSPs notify the Commission that they are taking such action, to ensure transparency, and warrant that their improvements will apply to all their traffic to REANNZ.

RSPs will confirm volunteers' details for data validation

11. RSPs will be asked to confirm volunteers' plan, technologies, data allowance, and expected synch rates (or attenuation speeds), so we can validate and normalise the test results to ensure they are accurate and meaningful for consumers.

12. All providers are subject to a Code of Conduct to ensure that they act in good faith and will not provide an increased level of service quality to volunteers that they do not provide to their other customers.

13. Volunteers acknowledge that we can share data about their technologies/plan, address etc. with their RSP as part of the End-user Licence Agreement, which they were required to agree to when signing up.

Historical testing data is available

14. All data for reporting periods until August 2021 is published on the Commerce Commission website: https://comcom.govt.nz/regulated-industries/telecommunications/monitoring-the-telecommunications-market/monitoring-new-zealands-broadband/Reports-from-Measuring-Broadband-New-Zealand

15. All data for reporting periods after August 2021 is available upon request from the Commission. To request the data please email market.regulation@comcom.govt.nz

16. The anonymised testing data used to prepare the reports will be made available for public access.

Sample plan

17. We want to test and report on as many plans and providers as possible. The Table below represents an indication of the some of the breakdowns we will be looking to include in the programme. Our initial goals will be to be able to include results at a national level by technology first, then rural and urban breakdowns, followed by RSPs level breakdowns. Not all plans/technologies from all RSPs will be reported at an RSP level, and we expect the programme to evolve over time. This represents over 95% of all broadband residential consumers.

18. RSPs who are not listed on the Table are also able to be part of the programme, particularly for tech results, however we do require a minimum sample size before we will include results in our reports.

19. We test eight plans on different access technologies including copper (ADSL/VDSL), fibre (Fibre 50, Fibre 300, Fibre Max), HFC, fixed wireless and satellite. We aim to include as many RSPs splits across these technologies, excluding copper, as possible.

20. Some of the RSPs tested include: 2degrees, Contact, Farmside, Gravity, Inspire, Lightwire, Mercury, One NZ, Orcon, Skinny, Sky, Slingshot, Spark, Starlink.

21. SamKnows will not report on any metric, technology, or plan without sufficient data points in the relevant testing period. Note that ADSL covers both ADSL1 and ADSL2 connections and VDSL will cover all VDSL variants.

22. We intend to provide a high-level geographical breakdown of the technologies/plans. To the extent we are able to we will report technology breakdowns into the following geographical regions, and potentially add to this over time:

    22.1 Urban - defined as areas where Fibre is available, using the Specified Fibre Area (SFA's) assessment and its definitions for availability

22.2 Rural - defined as areas where Fibre is not available, as per SFA's

22.3 Northland

22.4 Auckland

22.5 Waikato

22.6 Bay of Plenty

22.7 Central North

22.8 Wellington

22.9 Upper South

22.10 Canterbury

22.11 Lower South

Test schedule

23. The Table below shows the confirmed tests and testing frequencies that the Whiteboxes perform. More information on how the tests work can be found here.

Test Name	Standard Schedule (frequency)	Lightweight Test Schedule (frequency)	Test Targets	Server Location
Social Media Test	Hourly, 7pm-11pm; Once every 6 hours, midnight-6pm	Hourly	Instagram, Instagram Messenger, WhatsApp, Snapchat, Twitter, Facebook, Facebook Messenger	Various
Games Store Test	Once every 6 hours	N/A		Various
Web browsing	Once every 3 hours	Once every 3 hours	1https://www.google.co.nz 2https://www.facebook.com/policies/ 3https://www.youtube.com 4https://www.trademe.co.nz 5https://nz.yahoo.com 6https://www.stuff.co.nz 7https://www.nzherald.co.nz 8https://www.amazon.com 9https://www.wikipedia.org 10https://www.twitter.com	Various
Video Conferencing Test	Hourly, 7pm-11pm; Once every 6 hours, midnight-6pm	Hourly	Cisco Webex, Google Meet, LogMeIn GoToMeeting, Microsoft Teams, Skype, Zoom	Various

Test Name	Standard Schedule (frequency)	Lightweight Test Schedule (frequency)	Test Targets	Server Location
DNS Test	Hourly	Hourly	1www.google.co.nz 2www.facebook.com 3www.youtube.com 4www.trademe.co.nz 5nz.yahoo.com 6www.stuff.co.nz 7www.nzherald.co.nz 8www.amazon.com 9www.wikipedia.org 10www.twitter.com	Various
Traceroute	Once every 12 hours	N/A		Various New Zealand locations
Netflix	Once every 6 hours	Once every 12 hours		Netflix OCA Caches
YouTube	Once every 6 hours	Once every 12 hours		YouTube Google Global Caches (if available), or YouTube directly
UDP latency	Permanent	Permanent		Various New Zealand locations, London, San Francisco, Tokyo, Johannesburg, Bengaluru (Bangalore), Sao Paulo, Sydney
UDP packet loss / Jitter / VoIP	Permanent	Permanent		Various New Zealand locations, London, San Francisco, Tokyo, Johannesburg, Bengaluru (Bangalore), Sao Paulo, Sydney
Disconnections	Permanent	Permanent		Various New Zealand locations, London, San Francisco, Tokyo, Johannesburg, Bengaluru (Bangalore), Sao Paulo, Sydney
UDP Jitter	Hourly	Hourly		Various New Zealand locations, London, San Francisco, Tokyo, Johannesburg, Bengaluru (Bangalore), Sao Paulo, Sydney
Download speed test (MT)	Hourly, 7pm-11pm; Once every 6 hours, midnight-6pm	Once every 12 hours		Various New Zealand locations
Upload speed test (MT)	Hourly, 7pm-11pm; Once every 6 hours, midnight-6pm	Once every 12 hours		Various New Zealand locations
Upload speed test (MT)	Once every 6 hours	Once every 12 hours		Sydney

Test Name	Standard Schedule (frequency)	Lightweight Test Schedule (frequency)	Test Targets	Server Location
Download speed test (MT)	Once every 6 hours	Once every 12 hours		Sydney
Upload speed test (MT)	Once every 6 hours	Once every 12 hours		San Francisco
Download speed test (MT)	Once every 6 hours	Once every 12 hours		San Francisco
Upload speed test (MT)	Once every 6 hours	Once every 12 hours		London
Download speed test (MT)	Once every 6 hours	Once every 12 hours		London

24. Each test runs for designated durations, rather than fixed file sizes, so that we get an accurate measure of the faster technologies/plans. This means that, in general, the faster the technology/plan, the more monthly volunteer data will be used. Information on the expected monthly data usage has been emailed to current volunteers and the FAQ page has been amended to inform new volunteers of these amounts. All volunteers are given the opportunity to opt out of the programme (or choose the lightweight testing schedule for fixed wireless or satellite technologies) if they do not want to use this much of their own data.

25. Netflix, YouTube, video conferencing, web browsing, DNS, social media, and gaming tests in the schedule will run to the servers hosted by the application providers in each case. Each of the other tests in the schedules will run to the three domestic servers in Auckland, Christchurch, and Wellington. Latency, packet loss, download, upload, and jitter tests will also run to an international server hosted in Sydney. Additionally, latency, packet loss, and jitter tests will run to international servers hosted in the United Kingdom, the United States, Japan, South Africa, India, and Brazil.

Impact of testing on the lightweight vs standard test schedule

26. The lightweight testing schedule has been created for fixed wireless and satellite volunteers because it runs tests less frequently, and therefore uses less data than the standard test schedule. It will still run the same tests as the standard schedule, so the results will remain comparable as long as enough data points are recorded.

The Whiteboxes do not all run tests at the same time

27. The Whiteboxes do not all run their testing at the same times, and the testing is fairly randomly distributed during the test periods (a given hour or so). This avoids having a thousand or more Whiteboxes all trying to run the same test at the same time in the network.

Tests of note

Gaming tests

28. The gaming test automatically identifies the most appropriate server to run the latency test to for that specific game. The test focuses on latency measurements and distance to the server, when more than one server is available the test performs server selection.

29. Games included in the new tests:

- Apex Legends
- DOTA2
- Counter Strike: Global Offensive
- FIFA 2022
- Fortnite
- League of Legends
- PlayerUnknown's Battlegrounds
- Diablo 3
- Heroes of the Storm
- Hearthstone
- Overwatch
- StarCraft 2
- World of Warcraft
- Among Us
- Tom Clancy's Rainbow Six Siege
- Rocket League
- Valorant
- Roblox
- PUBG Mobile
- Call of Duty Warzone/Vanguard
- Gears of War 5
- Halo Infinite
- Battlefield V

Latency under Load Test

30. This is the same as the usual latency test however it is run at the same time as a download or upload test. This is because some broadband connections suffer from excessive latency and packet loss when the connection is being heavily utilised to download or upload data. In normal operation, the SamKnows UDP latency & packet loss test is paused during other tests, to ensure that the latency and loss statistics are not adversely impacted by these tests.

31. When configured to report the latency under load metric, the UDP latency & loss test sends and receives packets during download and upload speed tests, reporting latency and loss statistics (as "latency under load") after each test as a separate metric depending on the direction of the test.

RealSpeed

32. SamKnows RealSpeed is a tool that can offer both useful data to Commission and also a diagnostic tool to consumers. Any volunteer with a Whitebox can use this tool to help diagnose in home issues with their connection. This empowers consumers by providing them information about what could be limiting in home performance and how they might make improvements, rather than immediately calling a RSP.

Embedded Agent Testing

33. Embedded agent testing involves a testing provider embedding its software into a customer's router. This means customers do not need to volunteer or plug in a Whitebox; any customer with a router with the embedded software can become part of the RSP's test population.

34. The following sections provides answers to Frequently Asked Questions on the topics of how embedded agent testing should be conducted, how test populations are collected, and how results are combined into the MBNZ quarterly reports.

35. RSPs may contact SamKnows directly for information about setting up embedded agent testing within the RSP's customer base.

Embedded Agent testing must use off-net test servers

36. RSPs must use off-net test servers for MBNZ embedded agent testing to ensure fairness for all RSPs.

37. RSPs may not use on-net test servers for MBNZ testing even where they feel that the location of the servers will result in functionally equivalent test results.

38. For RSPs own testing, which will not form part of its data sample for the Quarterly MBNZ Reports, RSPs may use their choice of server, on-net or off-net.

RSPs should use the same testing as for MBNZ testing

39. RSPs should aim for server locations to match the MBNZ project. Given the nature of RSP routing in New Zealand, having only Wellington locations or only Auckland locations is acceptable. An increase in latency may reflect poorly on the RSP providing the data, so the RSP should ensure it uses appropriately situated servers.

40. Where RSPs are using SamKnows embedded agents, SamKnows has off-net servers available within REANNZ infrastructure as part of their embedded agent testing agreements with RSPs. RSPs may contact SamKnows directly for more information about these servers. Other off-net server options are acceptable to the Commission if they are a third party provider, connected at major peering points, and with enough bandwidth to run the tests.

The Commission will inspect for data comparability

41. Before any embedded agent data is included in the MBNZ report for the first time, including data from non-SamKnows embedded agents, the Commission will work with SamKnows to inspect the data to ensure it is comparable between different embedded agents and Whiteboxes.

42. SamKnows will periodically run the MBNZ test schedule concurrently on households with both Whiteboxes and embedded agents and compare the results to ensure there are no statistical differences between the Whitebox and embedded agent results for a given RSP, modem, and/or plan.

43. The Commission must ensure that the data is comparable between embedded agents and Whiteboxes, and between different embedded agent devices where there is a difference in standards, hardware, and/or operating systems.

Contact the Commission if a required test cannot be run on embedded agent devices

44. If a required metric cannot be run, RSPs should contact the Commission to discuss. The Commission appreciates that a level of flexibility may be required between RSPs, SamKnows, and the Commerce Commission for different technologies when it comes to determining a comparable test schedule. SamKnows can provide the expertise to determine whether any deviation from the recommended methodology is acceptable, and if so, what alternative would be suitable to fit the needs of the report.

Contact the Commission for advice on alternative standards

45. RSPs should contact the Commission for advice on whether alternative standards are acceptable.

Selecting the sample

46. The inclusion of embedded agent data within MBNZ will follow the same high level sampling principles as Whitebox data, and any filtering of the data will follow the same rules currently implemented, including the inclusion/exclusion of poorly performing customers which happens after the measurement period has ended (not during sample selection).

47. The Commission and SamKnows will select a random sample from an RSP's embedded agent population. We prefer to select a sample large enough to sufficiently cover the different reporting splits and ensure a representative geographic spread across the RSP's customer base and across New Zealand. The minimum number of units selected will depend on the reporting splits for each plan within the MBNZ report. The more devices conducting tests, the more data collected, decreasing the chances that sample bias is to occur.

48. If the Commission cannot select the sample, RSPs should engage with the Commission to propose alternative approaches.

49. Once selected, the sample of units will move to a test schedule for inclusion in the MBNZ report for the duration of the measurement month.

50. The RSP will provide the postcode and Specified Fibre Area (SFA) information for each customer, and an overall distribution of the different geographical and SFA areas for the customer base and plan. This is because embedded agent panellists are unlikely to be volunteers and have not signed an EULA to agree to share their address. If the RSP provides the SFA and postcode and not the address, this protects the customers' privacy.

Selecting a control group

51. The selected sample may be audited against a control group of Whitebox units to ensure it is representative. The control group will include the entire Whitebox sample for which the RSPs can provide an address. It is important to maintain a control group for the life of the project to be able to consistently audit the data.

52. If an RSP has no Whitebox customers to audit the embedded agent data, SamKnows and the Commerce Commission may explore options with the RSP, such as recruiting Whitebox volunteers on the plan, or benchmarking against a plan with similar characteristics and embedded agent router type.

The Commission supports transparency to mitigate bias

53. We can run comparison tests on older and newer modems to see what impact this has on results. Modem selection and the impact of different CPE's may affect test performance.

54. If embedded agent testing is only available on a subset of modems used by the RSPs customer base, we may seek to know what proportion of customers are being excluded so we can ensure that older and/or non-capable modems are still represented, where this influences performance. We may ask RSPs to provide a breakdown of modem types and distributions across their customer bases.

55. When the embedded agent sample is not representative it will be combined with the Whitebox sample to ensure it is overall representative of the distribution of all CPEs used by the RSPs customers.

56. This transparency will cover other concerns raised in feedback about skewed results, such as targeting newer and high-performing modems and/or turning off embedding testing on older, but still capable, CPEs.

The Commission will test for device exclusion

57. If RSPs choose to run MBNZ embedded agent testing on a subset of capable embedded agent modems, this sample must be fair and representative of all customers capable of running testing, including those with poor performance.

58. Deliberately not running embedded agent testing on poorly performing units goes against the Code of Conduct signed by RSPs. Where RSPs are selecting their own sample, SamKnows will benchmark the embedded agent data sample against a sample of Whitebox data for a given population to test for the exclusion of poor performing CPEs.