



12 September 2005

Osmond Borthwick
Manager
Network Access
Commerce Commission
44-52 The Terrace
Wellington
New Zealand

By EMAIL

Dear Osmond,

TelstraClear Wholesale Bitstream – Comments on Proposed Technical Specification

1. This letter sets out TelstraClear's comments on the proposed technical specification for the bitstream access service, set out in the Commission's request for comment document of 30 August and subsequent clarification of 5 September. It also comments on the related technical matters addressed in Telecom's 16 August information request response.

Introduction

2. While TelstraClear has been willing to explore options for a compromise technical solution, we do not believe that Telecom has, despite many opportunities over the 9 months of these proceedings, substantiated its allegations that a high speed bitstream service will cause interference at a level that would be unmanageable by a prudent operator.
3. Accordingly, TelstraClear continues to believe that there is no basis for the Commission to move away from its recommendation in the Draft Determination for unconstrained service, except to address the technical need to specify a PIR defined at the theoretical maximum line speed. TelstraClear sought in its Application and persists in its view that a properly transparent and equivalent wholesale market requires that access seekers ought to be enabled to innovate to the maximum extent possible to best maximise the long-term benefits to end-users.
4. Further, even if it is accepted that there is a material risk of incremental interference, the Commission's proposed technical specification risks elevating the exception to be the rule. Any risk of interference arises only in relation to a small minority of lines, even on Telecom's own arguments. TelstraClear believes that, in the absence of bright line tests and an efficient line checking process,

Telecom will have the opportunity and incentive to make it so complex, time consuming and expensive in practice to successfully request higher speeds that 3.5 Mbps will become the effective maximum.

5. TelstraClear proposes below a more targeted approach that, in effect, reverses the “speed presumption” in the Commission’s approach. We believe that the technical specification should start with a presumption of a service with a PIR defined at the theoretical maximum line speed to reflect the fact that the overwhelming majority of lines can support higher speeds. The specification should then provide for the identification of lines where it may be necessary to fall back from the theoretical maximum PIR to 3.5 Mbps by applying transparent, objective criteria using a database that makes Telecom’s existing cable reporting data more accessible. This approach strikes a fairer, more justifiable balance between TelstraClear’s request for an unconstrained service and Telecom’s technical concerns.

Revised Technical Specification

Downstream Peak Information Rate (PIR)

6. In our view, the downstream PIR should be set to the theoretical maximum line speed considered technically feasible based on the technology in place at the time of the service request. We consider that, for pragmatic network management reasons in response to Telecom’s explanations as to how they manage their network, this should initially be set to a discreet maximum value of 7.6 Mbps (excluding allowance for overheads), but that this should be increased as and when the capability of Telecom’s DSL network is improved (for example, when ADSL2+ is rolled out).
7. As set out in our proposals put at the technical workshop, TelstraClear does not consider that a PIR constrained below the theoretical maximum (such as 3.5 Mbps in the Commission’s 30 August proposal) is necessary for the following reasons:¹
 - (a) the service qualification should not have any dependence on whether the proposed PIR requested by TelstraClear (7.6 Mbps) is likely to be sustainable on a line of a given length (or loss). TelstraClear takes that risk; and
 - (b) a constrained PIR will not materially assist in minimising the power spectral density in the cable network to maximise reach, as we consider that it is difficult to reduce Far-end Cross-talk (FEXT) for long lines by controlling the rate. Reach is likely to be impacted more by other interference (such as radio frequency interference and customer premises wiring). Dr Garth’s modeling of expected network coverage impacts at different PIR levels did not take into account other forms of interference.² In any event, as we will outline below, we consider that Dr Garth’s modeling approach may significantly overestimate the impact of FEXT on the systems and hence may

¹ As set out by TelstraClear at the technical workshop (see page 66 of the transcript).

² Confirmed by Telecom at the technical workshop (see page 46 of the transcript).

overestimate the impact that power reduction might have on the ADSL coverage.

8. Therefore, TelstraClear proposes that the PIR should, today, be set to a speed of 7.6 Mbps and, in future, to above 7.6 Mbps either where Telecom introduces a new best efforts service with a downstream PIR in excess of 7.6 Mbps on a common route,³ or where Telecom improves its technical capability (e.g. with the roll out of ADSL2+) such that the theoretical maximum achievable on a common route increases. TelstraClear should receive the same notice of any increase in PIR as Telecom “networks” provides Telecom’s internal “retail product development group”. As the bitstream service is an input to the development of downstream products, it is appropriate that the relevant internal benchmark for application of the Standard Access Principles should be at an earlier point in the chain of internal supply than supply of resale services to Telecom’s retail sales and customer support, as proposed in the recent draft Private Office Networking Determination.
9. The PIR level should only be constrained below 7.6 Mbps for the Commission’s proposed exception for the Conklin DSLAMs – i.e., where Telecom has limited capacity between the ATM switch and the DSLAM – but should not be constrained below that PIR which Telecom provisions for itself.
10. If, notwithstanding TelstraClear’s views, the Commission considers that Telecom has put forward sufficient evidence to demonstrate that there is a material risk of potential interference with a standard PIR above 3.5 Mbps, then TelstraClear considers that the Commission should require Telecom to develop a line qualification tool that would allow an access seeker to objectively check whether a line could have a PIR above 3.5 Mbps without adversely impacting on other lines within the same binder. Therefore, we agree with the Commission’s approach to require a line qualification process to be developed, but we are concerned with the practical effect of how the Commission has constructed its approach.
11. We understand from Telecom’s statements at the technical workshop that its concerns around interference relate to binders with long pairs in them.⁴ Telecom acknowledged that it had the information about which binders had long pairs. However, Telecom said that this information was not in a readily accessible form to allow an assessment to be made quickly enough within the usual or expected order processing timeframes.⁵ TelstraClear notes that Telecom has sold and appears to be still selling full speed services itself, which suggests that Telecom must be able to access the binder information or some other substitute, at least on an exceptions basis, to determine whether the full speed service can be provided without affecting other existing services in the same binder.⁶ The issue is then ensuring that the existing information can be made available in a manner that will support mass-market offerings.

³ TelstraClear considers that the term ‘Internet-grade’ is redundant and should be removed. The term ‘best efforts’ adequately describes the service.

⁴ Workshop transcript page 45.

⁵ Workshop transcript page 62.

⁶ Workshop transcript page 64. See <http://www.telecom.co.nz/chm/0,5123,204848-203868,00.html>

12. Telecom itself outlined the problem that the development of such a database would address. In response to a question from the Commission's technical expert about whether there was a less blunt approach than the 3.5 Mbps constraint, Dr Milner stated⁷:

*"... I think that there is room for flexibility. The issue is just how to actually get there. We obviously do have cables with short binders and within those there is the potential to run with higher speeds. We are not denying that at all. There will always be that case. The problem is when you actually get a request from a customer or an access seeker to provide a service to house X or business Y, how do we know - **getting the information at that instant to be able to determine whether that house is in a short binder or a long binder is the trouble that we have.** So that's why the instrument is so much more blunt than we would like. ..." [emphasis added]*

13. TelstraClear, therefore, proposes a two stage approach:

- (a) Initially, recognising the practical difficulties in Telecom accessing its existing information, the Commission's approach of a speed of 3.5 Mbps would apply to all lines. TelstraClear would have the right to request Telecom to investigate the feasibility of a higher PIR for a particular line. Telecom would provide this facility on a non-discriminatory basis, and Telecom should maintain auditable records of time to completion of such studies for retail and wholesale services. Given the practical difficulties with extracting the information, TelstraClear expects that requests for speeds above 3.5 Mbps will initially be limited; and
- (b) Telecom should be required to develop an efficient, online line qualification tool using a database that presents Telecom's current cable data in a more accessible and relevant form. As Telecom notes, this will benefit its own retail business. TelstraClear proposes that Telecom have six months from the date of the final determination to make the online line qualification tool available. Once it is available, the standard PIR of the bitstream service would become 7.6 Mbps, unless the line qualification tool showed that the line could only support a lower speed without causing unreasonable interference to other lines. The access seeker would bear the risk of a lower PIR if it did not use the line qualification tool to check the line speed.

14. With Telecom's existing information in a more accessible form, the issue then becomes the rule that should be applied on the basis of the line data. TelstraClear is concerned that if the Commission's final determination frames the standard in a general way, such as "if technically feasible", the parties will become mired in a debate over the meaning of technical feasibility. In effect, we will fall back into the complex and extended technical debate that has characterised these proceedings. Therefore, it is important that the Commission's determination specify bright line rules that can be simply and objectively applied.

⁷ Workshop transcript page 62. See also comment by Dr Milner on page 63 where he discusses the current limitations on Telecom's cable planning record database to readily identify interferers and states that "[Telecom] would love it to be that way [i.e. be able to identify interferers] because we would like to do exactly the same thing."

15. TelstraClear proposes that the rule specifying a PIR limited to 3.5 Mbps should apply only in instances where there are lines of different lengths within the same binder. Telecom acknowledged at the workshop that this was the only scenario where interference concerns arose.⁸ When both the requested line and potentially impacted lines are the same length there is no opportunity for power reduction and therefore no advantage in rate limiting.
16. We suggest a 3.5 Mbps constraint scenario such as: when the requested line is within a binder that contains a line with a line attenuation in excess of 120 dB (at 1024 kHz), and the line for which TelstraClear is requesting a PIR greater than 3.5 Mbps (i.e., 7.6 Mbps) has a range of at least 2km or 60 dB shorter than the line that might potentially be interfered with. The rule needs to be externally auditable.
17. Finally, TelstraClear does not consider that the PIR constraint or average SIR constraint should apply to the Network-to-Network Interface (NNI) to the L2TP Access Concentrator (LAC) – this should be a full STM-1.

Downstream Sustained Information Rate (SIR)

18. TelstraClear agrees that the SIR should be set to the weighted average SIR allocated per end-user by Telecom for best efforts services provided by Telecom.⁹
19. A single SIR should be set across the network, with the exception of the Conklin DSLAMs where a lower SIR is likely to be set due to backhaul constraints.

Upstream Speed

20. TelstraClear accepts that the designated service constrains the upstream throughput rate to 128 kbps.

Sharing of a best efforts Virtual Path

21. TelstraClear agrees that Telecom and TelstraClear should share a single Virtual Path from the LAC to the DSLAM currently used by Telecom's best efforts traffic – Unspecified Bit Rate (UBR) services.¹⁰

Operational Support Systems (OSS)

22. TelstraClear considers that the only impact on OSS would be the development of the line qualification tool mentioned above. We consider that this should not delay the launch of the regulated service, but that rather the Commission should specify a period (less than 6 months) within which Telecom must develop the line qualification tool required. Telecom should bear the costs of developing the database as an onset cost and, as Telecom itself acknowledges, it is likely to

⁸ Workshop transcript pages 45 and 62.

⁹ TelstraClear considers that the term 'Internet-grade' is redundant and should be removed. The term 'best efforts' adequately describes the service.

¹⁰ Again, TelstraClear considers that the term 'Internet-grade' in the description of the Virtual Path is redundant and should be removed. The term 'best efforts' adequately describes the service.

use the database in its own downstream business. Once developed, the line qualification tool should be able to be used directly by access seekers at no charge. This is the case in Australia, where there is no fee for using Telstra's online service qualification tool other than a small fee where Telstra conducts a fuller service qualification and the results are positive but no order is placed.

Revised Technical Specification

23. TelstraClear's suggested revised wording for the technical specification of the wholesale bitstream service is set out in Annex A.

Comments on Technical Information in Telecom's 16 August Response

24. TelstraClear has three main concerns with Dr Garth's technical modeling description contained in Annex A of Telecom's 16 August response:
 - (a) the Annex indicated that Dr Garth's model applies the 1% worst case crosstalk for every single pair combination in the model to calculate the actual bit allocations and power backoffs of the systems in the cable unit;
 - (b) the algorithm for calculating the reduction in the power of the modem is not included. As Telecom's current systems appear to have a maximum margin of 24 dB, that reduction may not be very significant. However it appears Dr Garth assumed a lower max margin; and
 - (c) the Annex does not clarify how the comparative coverages with interference from 3.5 Mbps and 7.6 Mbps ADSL services are calculated based on the model.
25. Concern (a) above is the most significant. In TelstraClear's view, Dr Garth's model may significantly overestimate the impact of the FEXT on the system and hence may overestimate the impact that power reduction might have on ADSL coverage.
26. FEXT has a statistical distribution with 1% worst case typically 45 dB as suggested by Dr Garth and a fairly large standard deviation of perhaps 10 dB for samples from 25 or 50 pair units, corresponding to a mean of about 68 dB. To make a realistic FEXT model for the purposes of iterative water filling, each individual FEXT path should be drawn as a random sample from that statistical distribution.
27. However, Annex A seems to indicate that Dr Garth has used the 1% worst-case crosstalk for every single pair combination in his model. In TelstraClear's view, this is an excessive burden of FEXT when in reality the pair to pair couplings should be random samples from the statistical distribution of pair to pair FEXT. In that more realistic case, instead of systems seeing all disturbers at the 1% worst-case interference level, the individual disturbers would have widely varying FEXT coupling levels over a range of about 40 dB. With such a wide variance, only a small number of FEXT disturbers would make significant contributions, with most contributing less than the assumed background noise. With a proper representation of the small number of significant disturbers, the

reciprocal FEXT concept that Dr Potter explained at the workshop should become more apparent, even for the case where the disturber and disturbed system are 2km and 4km respectively (the net Signal to Noise Ratio (SNR) impact of halving the FEXT coupling length is only 3 dB).

28. Telstra Clear does understand that the FSAN model correctly predicts the 1% worst case of the FEXT noise sum based on the 1% worst case of each crosstalk disturber or class. However, based on the limited information supplied by Dr Garth, TelstraClear considers that Dr Garth's use of the 1% worst case for every disturber in the iterative water filling may result in an overstatement of the impact of FEXT on systems and of power reduction on coverage.

Conclusion

29. TelstraClear would be happy to provide any further detail on the above that the Commission considers necessary. We look forward to receiving the final determination.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Grant Forsyth', with a horizontal line underneath it.

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cc: Vanessa Oakley, Telecom

Annex A – Revised Technical Specification

1. As we do not consider that a material risk of interference from a PIR above 3.5 Mbps has been established, TelstraClear’s suggested revised technical specification is set out below:

Downstream Peak Information Rate (PIR) for data traffic sent to the end-user	<p>The PIR (excluding allowance for overheads) should be set to either:</p> <ul style="list-style-type: none"> (a) 7.6 Mbps; or (b) any speed above 7.6 Mbps where Telecom introduces a best efforts service with a downstream PIR in excess of 7.6 Mbps; or (c) the maximum feasible PIR where the capability of Telecom’s DSL network is improved for best efforts services (for example, when ADSL2+ is rolled out). <p>The following exception applies to the above PIR setting rule:</p> <ul style="list-style-type: none"> (i) where Telecom has limited capacity between the ATM switch and the DSLAM, the PIR is set to the maximum capacity available for dimensioning between the ATM switch and the DSLAM but should not be constrained below that PIR that Telecom provisions for itself.
Downstream Sustained Information Rate (SIR) for data traffic sent to the end-user	<p>The SIR allocated per end-user is calculated as the weighted average SIR allocated per end-user by Telecom for best efforts services provided by Telecom at DSLAMs not subject to the PIR exception rules above.</p> <p>A separate SIR should be allocated per end-user connected to DSLAMs where Telecom has limited capacity between the ATM switch and the DSLAM and allocates a lower SIR per end-user.</p>
Upstream Speed	<p>The service requires a maximum upstream throughput rate of 128 kbps for data traffic sent from the end-user.</p>
Sharing of a best efforts Virtual Path	<p>Telecom and TelstraClear to share a</p>

	single Virtual Path from the L2TP Access Concentrator (LAC) to the DSLAM currently used by Telecom's best efforts traffic - Unspecified Bit Rate (UBR) services.
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2. If the Commission considers that Telecom has provided sufficient evidence to substantiate its claim that material interference will result in some instances from a downstream PIR being set at 7.6 Mbps in most instances, then TelstraClear recommends the following modification to the PIR specification:

Downstream Peak Information Rate (PIR) for data traffic sent to the end-user	<p>Until Telecom has developed the required line qualification tool (see below), the PIR (excluding allowance for overheads) should be set to either:</p> <ul style="list-style-type: none"> (a) 3.5 Mbps; or (b) any speed above 3.5 Mbps where Telecom introduces a best efforts service with a downstream PIR in excess of 3.5 Mbps. <p>Once Telecom has developed the required line qualification tool, the PIR (excluding allowances for overheads) should be set at 7.6 Mbps (or the maximum feasible PIR that Telecom's DSL network is capable of) for best efforts services <u>except where</u> the requested line is within a binder that contains a line with a line attenuation in excess of 120dB (at 1024kHz) and the line TelstraClear is requesting a PIR of 7.6 Mbps (or the maximum feasible PIR Telecom's DSL network is capable of) on has a range of at least 2km or 60dB shorter than the line that might potentially be interfered with.¹¹ This rule needs to be externally auditable.</p> <p>The following exception applies to both of the above PIR setting rules:</p> <ul style="list-style-type: none"> (i) where Telecom has limited capacity between the ATM switch and the DSLAM, the PIR is set to the maximum capacity available for dimensioning between the ATM switch and the DSLAM but
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¹¹ Within 6 months of the final determination Telecom should develop a line qualification tool that would allow an operator to independently check whether a line could have a PIR above 3.5 Mbps without adversely impacting on other lines within the same binder.

	<p>should not be constrained below that PIR that Telecom provisions for itself.</p>
<p>Line qualification tool</p>	<p>Telecom is to develop and make available within 6 months of this determination an online line qualification tool which, using Telecom cable reporting information, provides the following information in respect of a line for which TelstraClear has requested or is proposing to request supply of a bitstream service:</p> <ul style="list-style-type: none"> (a) information regarding the binder the line is in (to demonstrate any potential risk of interference); and (b) information regarding the line itself, such as length or loss (to demonstrate likely line performance). <p>The parties should agree the exact contents and appearance of the line qualification tool as part of the OSS consultation process.</p> <p>Pending the development of the online tool, Telecom is to undertake on request from TelstraClear a line qualification process to determine if a particular line can support a PIR in excess of 3.5 Mbps. Telecom is to undertake this line qualification study on a non-discriminatory basis compared with similar studies undertaken to determine if it can offer higher speed retail services. Telecom will maintain auditable records of the number, the time to completion and outcomes of such studies undertaken in respect of wholesale services and retail services and will provide a monthly tabulation to TelstraClear of the comparative results.</p>