



5 August 2005

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By EMAIL

Dear Rachel,

**TelstraClear Wholesale Bitstream Application – Further New Material Provided by Telecom**

1. We refer to Telecom's letter to the Commission dated 1 August 2005. In that letter, Telecom seeks to:
  - (a) Introduce the following new material (**New Material**):
    - (i) A revised claim that 73,114 of Telecom's customers will be affected if the Commission's draft determination is adopted (Telecom letter paragraph 13, Annex A and C); and
    - (ii) The methodology behind the affected customers claim (Annex C); and
  - (b) Persuade the Commission to issue a further draft determination in advance of the final determination and then allow opportunity for a further round of submissions and new evidence.
2. TelstraClear objects to both requests on the following grounds:
  - (a) The statutory timeframes for the Commission to make this determination expired some months ago. Telecom's latest attempt to introduce the New Material and its requests for a further draft determination and a further round of submissions, will cause significant additional delay and further usurp the statutory time limits and the policy behind them;

- (b) Telecom has had ample opportunity before now to produce all evidence and submissions that it considers relevant to this determination;
- (c) There is no need or justification for the Commission to re-start its consultation process on the basis of the proposals put by TelstraClear either during the Conference or the workshop. TelstraClear has modified its proposals solely for the purpose of constructively addressing Telecom's concerns. It has done so by proposing compromise solutions. The core service sought in the application and the core issues under consideration have not changed;
- (d) TelstraClear and Internet NZ will be prejudiced by the late introduction of the New Material and any additional delay to the issuance of the final Initial Determination; and
- (e) The New Material is incomplete, inaccurate and has major shortcomings.

### **Telecom usurping the time limits under the Telecommunications Act 2001**

3. The Telecommunications Act 2001 (**Act**) imposes strict time limits for section 27 determinations (**Initial Determinations**). Once the Commission has given written notice under section 25(1)(b) of the Act, it must make reasonable efforts to prepare an Initial Determination (including price) within 50 working days from the date the Commission gave written notice.

4. The Commission will be familiar with the comments of Harrison J in *Telecom v Commerce Commission*, (HC Auckland, 16 February 2005, CIV-2004-404-005417) on this point (at paragraph 16):

*"...the initial determination process allows an access seeker to gain access to a designated access service within a comparatively short timeframe. It provides a fast track for the Commission to determine price and non price terms in accordance with fixed methodologies. It avoids the delays associated with application of the more complex, although presumably more reliable and authoritative, pricing principles invoked at the later stage of the pricing review determination. As Messrs Robert Dobson QC and Jason McHerron for the Commission pointed out, that second exercise requires careful analysis and modelling of the service provider's efficient costs. The two stage process on price accords with the spirit of the recommendations made by both investigating committees."*

5. In *Vodafone New Zealand Limited v Commerce Commission* (unreported HC AK CIV 2004 404 911 28 April 2004), Williams J also referred to the need to avoid delays of even modest duration, when he refused Vodafone's application to appeal out of time.

6. The Commission gave written notice of its decision to investigate TelstraClear's Application on 25 November 2004. The Initial Determination is now overdue.

### **Extensive opportunities to provide relevant material**

7. During the determination process Telecom received a number of requests from the Commission, TelstraClear and Internet NZ for it to produce the data and analysis that supports its assertion that a large number of customers will be potentially affected by the supply of an unconstrained (or high PIR constrained) wholesale bitstream service to access seekers. Telecom has repeatedly failed to substantiate, with detailed analysis, its claim

that 49,000<sup>1</sup>, 69,000<sup>2</sup> and now 73,114<sup>3</sup> customers will be potentially affected if the Commission adopts its draft determination. As noted in our letter to the Commission dated 29 July 2005, Telecom has had extensive and repeated opportunities to provide all relevant evidence and submissions to corroborate these claims.

8. Following the workshop, the parties were given an opportunity to make submissions on the admissibility of the new evidence introduced by Telecom at the workshop. This was not an opportunity to produce further evidence. Yet, Telecom took the opportunity to introduce the New Material and to update its estimate of the number of customers potentially affected by the services sought in the application. Significantly, Annex C describes for the first time the method Telecom says it used to calculate the number of affected customers.
9. Telecom is engaging in strategic behaviour and is thereby abusing the determination process:
  - (a) Telecom has made bare assertions as to the impact on a number of customers;
  - (b) TelstraClear has laboured under the limited knowledge of Telecom's network and its inability to access, scrutinise and comment on the underlying data and analysis that were generated by Telecom to support the bare assertions made to the Commission. Nonetheless, during the conference and workshop, the technical experts called by TelstraClear gave evidence that seriously damaged the plausibility of Telecom's assertions;
  - (c) Furthermore, both Telecom and Internet NZ have been critical of Telecom's failure to provide any corroborative data and analysis in support of its assertions. The Commission at the Conference put Telecom on notice that it required Telecom to substantiate its bare assertions if it wanted the Commission to give them weight. It provided Telecom with ample opportunity to do so during the conference and called a further workshop to allow for such material to be scrutinised and tested. Telecom did not take up this opportunity, either at the conference or the workshop; and
  - (d) Telecom now seems to appreciate that, having failed to take up the further opportunity to provide the Commission with the substantiating data and analysis, its assertions will be given little, if any weight. It has now made a belated attempt to provide that data and analysis, but outside a forum in which TelstraClear's experts would have a proper opportunity to scrutinise and test the New Material with Telecom's witnesses.
10. Telecom should not be rewarded for adopting this strategic approach to the determination process. It must now bare the risks of not providing the data and analysis when it was given fair and repeated opportunities to do so.

### **No justification for re-starting the draft determination and consultation process**

11. Telecom's letter claims (at paragraphs 4, 6, and 8) that:

- (a) The Commission should issue a "*further draft determination*" or in the alternative allow the "*parties to make lengthy submissions on the whole range of issues now before the Commission*", (paragraphs 4 and 6); and

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<sup>1</sup> Telecom cross-submission on draft.

<sup>2</sup> Telecom opening and closing submissions, Commission Conference.

<sup>3</sup> Telecom Submission paragraph 13, Annex A and C.

- (b) “it would be a breach of natural justice for the Commission to deny itself the ability to consider relevant information” (paragraph 8).

12. At paragraph 12 of its letter, Telecom claims that it was concerned “by a number of statements at the July workshop that evidence should be excluded because it relates to real facts about the actual network at hand rather than relating to theory. The Commission is required to take into account the facts and technical issues in relation to telecom’s network in New Zealand given this is highly relevant”. This is not a fair representation of the facts. The point TelstraClear made in respect of new material relating to alleged factual descriptions of Telecom’s network, was that TelstraClear was “not in a position to question, challenge, or refute or comment” at the workshop.<sup>4</sup> At this point in the workshop, the admissibility of new material was a live issue.
13. However, it was suggested by Telecom and accepted by Commission staff that new material would be canvassed and discussed at the workshop and parties would have an opportunity later to pursue their objections to its admissibility after the conference.<sup>5</sup> TelstraClear took that opportunity in its 29 July 2005 letter to respond in a summary fashion to the new material introduced by Telecom at the workshop and to withdraw its objections to its admissibility.
14. The Commission’s process has been detailed and comprehensive. Telecom has had more than sufficient opportunity to put its case to the Commission.
15. Against this background, Telecom’s claim that the Commission would be in breach of natural justice if it failed to admit Telecom’s insufficiently founded New Material and to circulate a new draft determination for comment, represents an improper attempt to pressure the Commission into allowing Telecom further opportunities to produce evidence and argument in the event that it has not persuaded the Commission of the merits of its objections to the service sought in the application. TelstraClear remains confident that Telecom’s criticisms of the Commission’s processes have no merit.
16. The relevant principles of law are:
- (a) The Commission’s duties are limited to allowing the parties sufficient opportunity to put their case. Once that point has been reached, the Commission is entitled to close the opportunity for further evidence and argument and make its decision. By way of example, in *Electra Limited v Commerce Commission*<sup>6</sup>, Electra Limited challenged the final report of the Commission on the basis that it had failed to give it adequate opportunity to comment on: changes between the draft report and final report and a consultants report released with the final report. France J held that the Commission had conducted a wide ranging consultative process and said:<sup>7</sup>

“at some point, and I believe that point had been reached, the commission has to be able to say, “enough”, and move on and make a decision.”

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<sup>4</sup> Technical Bitstream Application and OSS Workshop, dated 21-22 July 2005, per Grant Forsyth.

<sup>5</sup> Technical Bitstream Application and OSS Workshop, dated 21-22 July 2005 per Mr Osmond Borthwick “will take the approach originally suggested by Telecom, which is that material be included in the record and that the Commission will make a decision post the proceedings as to its admissibility...”.

<sup>6</sup> (High Court, Wellington, CIV-2004-485-389, 23 March 2005)

<sup>7</sup> *Electra Limited v Commerce Commission* at paragraph 103.

- (b) Before a court will supplement a statutory code with the rules of natural justice, it “*must be clear that the statutory procedure is insufficient to achieve justice and that to require additional steps would not frustrate the apparent purpose of the legislation.*”<sup>8</sup>

In the present case, sections 20 to 30 of the Act constitute a comprehensive statutory code that prescribes a procedure that is both fair and appropriate, having regard to the dynamic and fast changing nature of the telecommunications industry. The Commission has supplemented this code with extensions of time, an extra workshop and further opportunities for all parties to produce evidence and argument, to ensure fairness. The Commission’s process has been wide ranging and comprehensive.

It is also relevant that the Act does not require the Commission to prepare and circulate a draft determination to the parties for comment, prior to issuing an Initial Determination. This may be contrasted with the process required under the Act for Pricing Review Determinations (section 47). The point here is not that draft determinations are inappropriate in respect of Initial Determinations, but rather that the legislation mandates a “*fast track*” process for the “*Commission to determine price and non price terms*” in a “*comparatively short timeframe*”. In the light of that mandate, Telecom’s request for a further draft determination is misconceived.

17. A further draft determination is not required, nor justified by the rules of natural justice. Nor is there any need to allow Telecom a further opportunity to submit new information and argument.

#### **TelstraClear prejudiced by the New Material and delays**

18. Any additional delay to the issuance of the Initial Determination will be financially rewarding to Telecom and prejudicial to TelstraClear. TelstraClear and Internet NZ will also be prejudiced if Telecom’s New Material is now introduced into the record.
19. Telecom’s Submission claims that “*TelstraClear is not prejudiced or disadvantaged by the inclusion of the evidence listed in Annex A*” (paragraph 9). This claim contradicts its own position in relation to what it claims is new material submitted by other parties in this, and other applications and investigations before the Commission.<sup>9</sup> Telecom has consistently reserved its “*opportunity to respond ... in more detail*” to information it considers new.<sup>10</sup>
20. TelstraClear brought its technical experts to the workshop to address material already before the Commission. It was difficult for such experts to respond to new fact specific information provided by Telecom in a satisfactory and comprehensive manner “off the cuff”. Such material as that contained in slides 7, 18, 39, 40, 42, 45, 63, 64 and 69 of Dr Milner’s presentation requires an opportunity for analysis before response. In the spirit of moving forward in these proceedings TelstraClear responded to this material as best it could during the workshop and withdrew its objection to its admissibility.

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<sup>8</sup> *Wiseman v Foreman* [1971] AC 297, 308 (HL) per Lord Reid; see also *Furnell v Whangarei High School Board* [1973] 2 NZLR 705, 718 (PC).

<sup>9</sup> For example, in the LLU investigation Telecom complained bitterly at the Conference that it did not have the opportunity to respond to new material provided by TelstraClear.

<sup>10</sup> Telecom Submission, Annex B, 3<sup>rd</sup> column.

## Rebuttal of Annex B

21. TelstraClear disagrees with some of the claims made in Annex B of Telecom's letter. We attach a reproduction of that Annex with a new third column recording TelstraClear's rebuttal to the claims made by Telecom.

## Rebuttal of Annex C

22. Annex C (and the related comments on Slide 14 in Annex A) is entirely New Material. We are opposed to Annex C (and the related comments on Slide 14 in Annex A) being accepted as a further belated attempt to submit additional evidence and argument in relation to the substantive application. TelstraClear has not had an opportunity to undertake a comprehensive analysis of it. However, even a cursory consideration of the annex reveals that it is incomplete, inaccurate and has major shortcomings. We **enclose** a memorandum prepared by Mr Potter that critiques Annex C (and the related comments on Slide 14 in Annex A).

23. For the reasons outlined in this letter and its enclosures, TelstraClear requests that the Commission excludes Annex C (and the related comments on Slide 14 in Annex A) from the record or gives it no weight.

*Yours sincerely,*

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

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**Comments on Telecom's Annex B**

	<b>Evidence from other parties</b>	<b>Telecom's comments</b>	<b>TelstraClear's comments</b>
1.	Dr Potter's slides 1 to 22 and his evidence in totality	<p>All of Dr Potter's evidence was new. In contrast to Dr Garth, Dr Potter has provided no paper to the Commission at any time and TelstraClear did not make him available at the conference. From p 26 of the July workshop transcript Dr Potter refers to theoretical simulations he has done (which have not been previously made available). At p 37 of the transcript Dr Potter notes that his evidence is all based on an assumption that lines are equal in length. This can be contrasted with Dr Garth's slides showing <i>more realistic simulations</i> of Telecom's network, the network at hand.</p>	<p>Telecom came to the workshop well-prepared with two Telecom technical advisors; Dr Milner and Mr Mason, and one external technical advisor; Dr Garth, and was clearly prepared to engage in discussion on the technical issues which Dr Potter discussed (which related to issues previously raised by Telecom). While Dr Potter had not previously appeared in these proceedings, his evidence traversed issues which have been central to these proceedings; TelstraClear arranged for his attendance as he had expertise specific to the issues identified by the Commission in the workshop agenda; and, as is evident from the workshop transcript, Telecom's experts, particularly Dr Milner, engaged in detailed and extensive exchanges with Dr Potter on the matters raised by Dr Potter (and vice versa).</p> <p>Accordingly, the Commission is entitled to rely on Dr Potter's evidence as it stands. There is no justification for Telecom to seek a further opportunity to respond.</p>
2	DeLoitte's slides 1 to 7	<p>Telecom noted this was new information at p 184 of the July transcript. Slides 3 and 4 were discussed at the workshop and Telecom continues to reserve the opportunity to make further submissions on these points. Telecom was unable to comment on the "model impact" at the conference. Mr Corbitt does not have access to Restricted Information and is therefore prevented from being able to consider the models used by DeLoitte on eOR in previous submissions.</p> <p>Slides 5, 6 and 7 were not referred to at the workshop and are new material. Telecom does not understand their purpose and considers they should be excluded on the basis that they are irrelevant or no weight should be given to them. We note that TelstraClear has largely accepted eOR for broadband as its "interim solution" and these slides are also irrelevant on that basis,</p>	<p>The Deloitte report on OSS issues was provided as an appendix to TelstraClear's submission on the draft Determination. Accordingly, Telecom has been aware of the Deloitte report (and the fact that certain information was redacted in that report as Restricted Information) for two months prior to the workshop. TelstraClear notes that Telecom has not applied for Mr Corbitt (or for that matter any other business person) to have access to Restricted Information in the Deloitte Report. Telecom was aware that Mr Engel formed part of the TelstraClear team at the conference and at the</p>

**Comments on Telecom's Annex B**

	<b>Evidence from other parties</b>	<b>Telecom's comments</b>	<b>TelstraClear's comments</b>
			<p>workshop.</p> <p>In any event, Mr Engel expressly avoided discussing any Restricted Information in his presentation and only talked about the impacts of Telecom's OSS at a non-confidential level.</p> <p>Slides 5, 6 and 7 represent a summary of the views expressed in the Deloitte Report on the appropriate approach to the design of an inter-operator electronic provisioning system, as further informed by Deloitte's observations from the eOR demonstration which followed the Commission's request at the conference that Telecom provide further information on eOR for Broadband to TelstraClear (including Deloitte as its expert adviser on OSS) prior to the Workshop.</p> <p>Accordingly, the Commission is entitled to rely on Mr Engel's evidence as it stands. There is no justification for Telecom to seek a further opportunity to respond.</p>

**Comments on Telecom's Annex B**

	<b>Evidence from other parties</b>	<b>Telecom's comments</b>	<b>TelstraClear's comments</b>
3	Process map dated 18 March 2004 on New UBS eOR for broadband	Telecom does not understand the contents or the purpose of this document and it was not referred to at the workshop. Accordingly it should be excluded as irrelevant or no weight should be attributed to it.	<p>The process map distributed at the workshop was intended to set out the fact that the end-to-end customer experience is impacted by the efficiency of the eOR for broadband system for uploading and downloading wholesale order information as well as by the nature of Telecom's back office systems. The process road map was developed by TelstraClear following the demonstration of eOR for broadband to explain our continuing concerns with eOR for broadband not meeting the Commission's proposed principle of equivalence in customer experience between broadband services based on bitstream and Telecom's retail products.</p> <p>There is no justification for Telecom to seek a further opportunity to respond.</p>
4	TelstraClear OSS paper	This raised a number of new proposals which Telecom questioned at the workshop.	<p>Commissioner Webb requested at the Conference that the parties identify the areas of agreement and disagreement between them on OSS using Annex E from Telecom's Cross Submission on the draft Determination. Telecom subsequently provided a Roadmap for OSS, which effectively modified the information contained in Annex E to TelstraClear on 20 July (the day before the Conference). TelstraClear's OSS paper summarised its response following the eOR for broadband presentation before the workshop and Telecom's OSS roadmap.</p> <p>Accordingly, the TelstraClear paper complies with the Commission's request and responds to Telecom's own modified proposals provided following the conference. The Commission is entitled to rely on the TelstraClear OSS paper</p>

**Comments on Telecom's Annex B**

	<b>Evidence from other parties</b>	<b>Telecom's comments</b>	<b>TelstraClear's comments</b>
			as it stands. There is no justification for Telecom to seek a further opportunity to respond.

**Comments on Telecom's Annex B**

	<b>Evidence from other parties</b>	<b>Telecom's comments</b>	<b>TelstraClear's comments</b>
5	TelstraClear's revised proposal	The Commission requested TelstraClear firm up its views in a proposal to be provided on the second day of the workshop and discussed on that day.	<p>TelstraClear has modified its proposals solely for the purpose of constructively addressing Telecom's concerns. It has done so by proposing compromise solutions. However, our core proposal for an unrated shaped service remains the same.</p> <p>TelstraClear provided its revised proposal on request of the Commission and in response to Telecom's Annex B proposal circulated prior to the workshop (which was a modification of Telecom's own earlier proposal, which itself first appeared part way through these proceedings). This proposal is intended to address issues which were well traversed at the workshop (and previously at the Conference). The proposal addresses substantially the same issues which Telecom's modified Annex B seeks to address but taking a different approach. The proposal was discussed extensively at the workshop. Telecom clearly had an adequate opportunity to address the TelstraClear proposal at the workshop.</p> <p>Aside from the areas where questions were asked by the Commission at the workshop and the parties undertook to take the question away and respond subsequently, TelstraClear does not consider that a further opportunity to respond is needed.</p> <p>Accordingly, the Commission is entitled to rely on the TelstraClear proposal as it stands. There is no justification for Telecom to seek a further opportunity to respond.</p>

## MEMORANDUM

### Comments on Telecom's Annex C

#### 1 BACKGROUND

1. In Telecom's letter and the associated annexes, Telecom continues to misrepresent and misuse the ACIF Code C559, in order to calculate their assertion of a reduction in ADSL coverage with TelstraClear's proposed unconstrained (or high PIR constrained) ADSL service.

##### 1.1 Outline of Spectral Compatibility Determination in ACIF C559

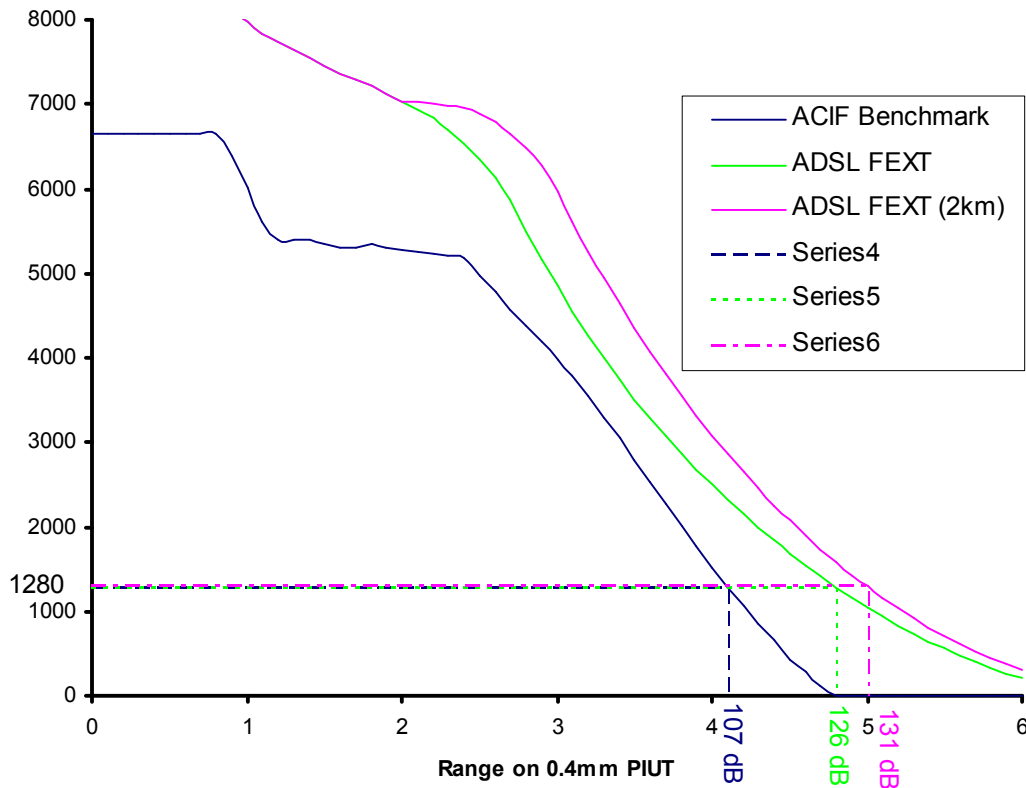
2. ACIF C559 controls crosstalk interference to acceptable levels by two measures:
  - (a) All systems are required to transmit within the power spectral density (PSD) masks specified in international standards (e.g. G992.1 for ADSL); and
  - (b) Some systems are restricted to maximum ranges from the exchange so that they cannot cause interference to long ADSL systems. No such restriction is applied to ADSL systems (Class 6a) in C559.
3. The code specifically protects a class of systems called Basis Systems and defines an ideal receiver model for each Basis System. In order to measure the extent of crosstalk interference into Basis System, a target benchmark performance for each Basis system is defined. The Benchmark for the ideal ADSL Basis System is a graph of ADSL payload rate versus range on a specific cable type. That Benchmark represents the worst possible rate achievable by the Basis System at each range when all possible combinations of interfering systems are allowed, with interference at the maximum permitted by the template for each interferer. The Benchmark is effectively a measure of interference tolerance within the code and is not intended to be used for ADSL design.
4. Telecom has misled the Commission by inferring in its Slide 30 entitled "ADSL limiting technology" that Table 2.2 of Part 2 of the ACIF code refers to the worst case interferers that determine the ADSL Benchmark. In fact Table 2.2 has nothing to do with crosstalk interference or the calculation of the Benchmark, being instead the limiting case for a mask for the transmit PSD of non-deployment class systems. Although not published in the code, it is easily shown that the worst case interferer that determines the ADSL Benchmark at long range is not FEXT from adjacent ADSL systems, but NEXT from ISDN and low rate SHDSL. This is demonstrated in the slides 8-11 presented by TelstraClear at the recent Workshop; those slides show that the ISDN interferer case has lower rate, because ISDN causes considerably more interference than the interference from other ADSL and the assumed background noise of -140 dBm/Hz.
5. The cable type used for ACIF calculations is 0.40mm paper insulated unit twin cable with attenuation of about 13.8 dB/km at 300 kHz and 26.2 dB/km at 1024 kHz. C559 and the associated standard S043-2 include full specifications of masks and templates for all potential crosstalk disturbers (called Deployment Classes) and for the Basis System receivers, along with detailed crosstalk models and Benchmarks. Crosstalk levels used by ACIF are comparable to those used in ANSI T1E1.4 for its Spectrum Management Standard. The ACIF tool has been proved to be accurate to within a few

bit/s by comparison with similar tools developed by NEC Australia and Adtran (Huntsville, Alabama).

## **2 TELECOM'S CALCULATION OF THE NUMBER OF LINES**

### **2.1 Inappropriate use of the ACIF Benchmark**

6. Telecom states that it has used the ACIF Benchmark (it is not a mask, but rather a minimum performance guarantee for the ideal Basis System) to determine the expected design rule of 105 dB that would in its view be the required service qualification limit if TelstraClear's proposed Bitstream service were to proceed. Telecom has not given a detailed method for that determination, but it appears to correspond to a point on the ACIF Benchmark at about 4.1km or 107 dB that guarantees a throughput of approximately 1 Mbit/s for the Basis System (that corresponds to about 1280 kbit/s of ADSL payload on the benchmark plot).
  
7. TelstraClear finds it quite surprising that Telecom would use for its design an ACIF tool based on such ideal conditions, when it has its own design approach based on New Zealand cables and interference conditions. While TelstraClear is in agreement with the use of the ACIF approach as a comparative calculation tool, the case represented by the ADSL Benchmark is clearly inappropriate for New Zealand conditions, which do not need to account for significant levels of ISDN or low rate SHDSL interference. With the removal of those interference modes, a more realistic minimum performance benchmark is the FEXT curve presented by TelstraClear in slide 8 at the recent workshop and presented again in Figure 1 below. If Telecom were to base its design on that curve which is more representative of New Zealand conditions, the chosen range that would ensure a throughput of 1 Mbit/s is 4.8 km, which corresponds to about 126 dB at 1024 kHz. If instead Telecom prefers the FEXT results based on full power FEXT disturbers of length only 2 km, then 1 Mbit/s throughput is available at 5km or 131 dB range. Both the ACIF benchmark and the performance curves for FEXT + ADSL NEXT + -140 dBm/Hz background noise are given in figure 1, with the FEXT result provided for both full range FEXT disturbers and FEXT disturbers of length 2 km.



**Figure 1. ACIF Benchmark compared with FEXT limits for long line FEXT and 2km FEXT based on full power disturbers.**

8. Although Figure 1 is based on an ideal receiver model, TelstraClear can understand Telecom's assertion in Annex C that "those that have loss over 130 dB are highly likely to experience a degradation of performance as cable binder fills increase." The complementary conclusion that lines below 130 dB are unlikely to suffer degradation from full power FEXT has been demonstrated above by TelstraClear.
9. In conclusion, the ACIF calculations presented in Slide 8 at the workshop and reproduced here as Figure 1 show that even with FEXT from a full complement of ADSL disturbers at their maximum transmit PSD, Telecom New Zealand's target of 130 dB is effectively achieved. Virtually no lines below 130 dB are expected to be degraded below 1 Mbit/s throughput due to FEXT from full power ADSL disturbers.
10. The correct ACIF calculation for New Zealand conditions leaves only the roughly 15,000 lines beyond about 130 dB for which power reduction might possibly offer some additional coverage. So far, this memorandum has only set the scope in terms of potential lines affected as a basis for the analysis of Telecom's claim in the next section. Even before any analysis of the efficacy of the bit rate limiting approach, the number of potential lines has diminished considerably.

### 3 THE CORRECT LOGICAL APPROACH TO CALCULATION OF THE NUMBER OF LINES AFFECTED

11. The essence of Telecom's claim is that by reducing the bit rate of ADSL systems to match the service rate, the following consequences ensue:

- (a) The downstream transmit power on those ADSL systems with bit rate limiting is reduced compared with the power that would be required at the maximum rate for that line, hence causing a reduction in the FEXT interference to long ADSL systems on adjacent pairs in the cable.
  - (b) The overall reduction in FEXT from such reduced interference results in a significant reduction in the total interference and hence a corresponding increase in the rate achievable on the long ADSL system.
  - (c) That increase in rate on the long ADSL system changes it from a system that was not viable with full power FEXT to one that is now viable (assume the basis for viability is 1 Mbit/s throughput or similar).
12. All of these steps would need to be demonstrated with reasonably high probability to show a significant impact.
  13. For Telecom to have demonstrated reduced coverage in the case of FEXT from full power disturbers compared with the coverage from its bit rate limiting strategy, it should have performed the following detailed calculations for each of the steps above:

### **3.1 Reduced FEXT interference**

14. Telecom should have determined the proportion of ADSL disturbing systems interfering into the longest lines (~130 dB) that can achieve various levels of power reduction in 2 dB steps from 0 to 12 dB as permitted by G992.1. That is clearly a histogram representing the probability of each power reduction value.
15. Following the discussion at the workshop, it is clear that the potential for FEXT reduction depends on the margin at which the disturbing ADSL systems are operating. If the disturbing systems are on long lines, then TelstraClear has shown that only a small proportion of systems can achieve a small power reduction. In that case the remaining full power disturbers will dominate the total FEXT interference and there is minimal advantage.
16. Telecom has indicated and TelstraClear has accepted that there is some additional scope for power reduction if the disturbers on shorter lines of 2 km length share the cable with long ADSL systems. TelstraClear still cannot fully accept this argument because of the nature of reciprocal FEXT as discussed at the workshop. In order to quantify the effect of these mixed range cables, Telecom would need to have provided the network statistics of the ranges of the FEXT disturbers that interfere with long ADSL systems. Because FEXT disturbers of similar length to the long disturbed ADSL system will not reduce their power, only those cases where almost all disturbers are much shorter than the disturbed system would contribute to a reduction in total FEXT load.
17. Telecom's choice of disturbers of 2km length is clearly a bad case and is not necessarily representative of the whole population of long lines. To prove that the effect is real, Telecom should have provided statistics of the proportion of long lines of various lengths in their network for which the disturbers are predominantly of much shorter length.

18. In addition, Telecom should also have weighted its FEXT calculations with the proportion of lines it expects to have operating in the unconstrained (or high PIR constrained) bit rate mode proposed by TelstraClear as only those lines would contribute to a change in coverage of customers on long lines.

### **3.2 Reduced total interference leading to increased rate**

19. Telecom's proposed bit rate limiting approach can only result in reduction of the total FEXT into the longer disturbed systems. The total interference that determines the rate of the long ADSL system is the sum of FEXT and other interference such as NEXT from adjacent upstream ADSL signals and external Radio Frequency (RF) interference. The reduction in FEXT interference that can be demonstrated in step (a) in paragraph 11 must be seen in the light of other modes of interference that are often stronger than FEXT.
20. Combining the impact of FEXT and other modes of interference requires a statistical approach where the statistical distribution of the total FEXT power must be combined with the statistical distribution of the other modes of interference. Because both interference distributions have high variance, the procedure is complex and difficult. Because it is usual to design transmission systems for the 99<sup>th</sup> percentile of the total interference (ie choose a service qualification dB limit that allows a notional 1% of systems to be degraded), then the best indicator of the relative contribution of the FEXT and the other interference is the 99<sup>th</sup> percentile of each.
21. The ACIF Benchmark rate vs range curve is designed to represent this 99<sup>th</sup> percentile of the interference. If Telecom has data on the rate vs range performance of its existing ADSL long lines, then that would be representative of mostly the background noise. With current relatively low penetrations of ADSL, the FEXT would not be contributing significantly. A direct comparison of the 1<sup>st</sup> percentile of the observed rates on long lines with the curves in Figure 1 would have shown whether the background noise or the FEXT is the dominant limitation on the ADSL rate and coverage. In Australia, Telstra has performed such a comparison which shows the background noise to be much worse.

### **3.3 Impact on number of systems exceeding 1 Mbit/s throughput and service qualification rule**

22. Since the main concerns expressed by Telecom are with coverage of longer lines, the nominal target throughput of 1 Mbit/s is considered here. There are two possible approaches to qualification of its lines for ADSL at any given rate.
23. The first approach is to apply a hard dB limit (e.g 120 dB) determined from the 99<sup>th</sup> percentile of the total interference in order to ensure a high probability that a system at that maximum range will work at 1 Mbit/s. In this case, Telecom would need to have shown that the change in the 99<sup>th</sup> percentile of the total interference resulting from the use of its bit rate limiting approach would result in a change in the dB limit from one value to another. The number of customers affected would then be all of those between the two dB limits.
24. The second approach is to provide a best effort service on long lines (as British Telecom does now), where all lines up to about 160 dB at 1024 kHz are offered service and the small percentage that fail to work satisfactorily are withdrawn. That approach is preferred by customers who in most cases receive a satisfactory service, whereas they would not have received a service at all under the dB limited approach.

To demonstrate advantage in this situation, Telecom would need to have used the full distributions of background noise and FEXT to determine the percentage of lines that would have achieved >1 Mbit/s under their bit rate limiting approach and would not have reached 1 Mbit/s with full power FEXT disturbers.

25. Based on point 14 of Annex A of Telecom's letter of the 1<sup>st</sup> August, Telecom appears to use a combination of the two methods, with an automatic limit of 120 dB and then another process to provide service to some customers beyond 120 dB. Because the FEXT at full power is not a limiting factor for lines below 120 dB, the process for lines beyond 120 dB should be of most concern in determining the number of affected customers.

### **3.4 Conclusions on quantification of affected customers**

26. While the proposed approach seems complex, it represents the information and calculations that are required to determine the number of affected customers.
27. At each stage there are factors that would considerably reduce the number of affected customers below the initial number of about 15,000 that are beyond 130 dB. The key factors are the limited number of cases in which long lines have all of their FEXT disturbers on much shorter lines, and the dominance of other interference that renders any reduction in FEXT ineffective.
28. Regarding the achievable dB range, Telecom has stated that "*those that have loss over 130 dB are highly likely to experience a degradation of performance as cable binder fills increase.*" And yet it has been shown above that any possible advantage in coverage could only be achieved around and above 130 dB.
29. The result of all of these factors is that the number of customers disadvantaged by the proposed unconstrained (or high PIR constrained) bitstream service would be very low and should not be of concern to the Commission.