COMMUNICATIONS ALLIANCE LTD

Vertigan Review Panel: Regulatory Issues Framing Paper

COMMUNICATIONS ALLIANCE SUBMISSION

MARCH 2014

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INTRODUCTION

Communications Alliance welcomes the opportunity to provide this submission in response to the Regulatory Issues Framing Paper released by the Vertigan Review Panel ("the Panel").

The Panel's remit provides a valuable opportunity to take stock of the present regulatory framework and consider the need for any sensible mid-course refinements or more substantive change that may be required.

As the Panel itself has observed, its terms of reference in relation to potential structural and regulatory change in the Australian broadband arena are very broad.

While this breadth creates room for sweeping recommendations, Communications Alliance and its Members take the view that where fundamental elements of the existing framework are in place (typically after extensive work and negotiation by multiple stakeholders) and are not manifestly 'broken', they should continue to exist in the future framework.

Examples of such elements include the principles of structural separation and the containment of the NBN Co role to that of a layer two wholesale services provider with related non-discrimination and open access obligations, as well as the determination reached on the number and location of Points of Interconnect (PoIs).

Section 1 of this submission and the attached paper developed by the Communications Alliance working committee on VDSL2 and Vectoring contains important recommendations as to the regulatory and operational decisions that will need to be made if VDSL2 with vectoring is to be incorporated into the NBN framework.

Section 2 of the submission explores the need for greater stakeholder role clarity, particularly in relation to the development of operational processes that involve NBN Co and industry. In this section Communications Alliance reiterates its willingness to continue and to expand its leadership role in developing technical standards and operational arrangements.

Individual members of Communications Alliance may make their own independent submissions (including to the Vertigan review and other interested parties) on competition or commercial aspects.

About Communications Alliance

Communications Alliance is the primary telecommunications industry body in Australia. Its membership is drawn from a wide cross-section of the communications industry, including carriers, carriage and internet service providers, content providers, equipment vendors, IT companies, consultants and business groups.

Its vision is to provide a unified voice for the telecommunications industry and to lead it into the next generation of converging networks, technologies and services. The prime mission of Communications Alliance is to promote the growth of the Australian communications industry and the protection of consumer interests by fostering the highest standards of business ethics and behaviour through industry self-governance. For more details about Communications Alliance, see http://www.commsalliance.com.au.

SECTION 1 – Competitive Technology Roll-Outs. Technical and Competition Questions for the Deployment of VDSL-2/Vectoring

Communications Alliance has raised concerns and question in the recent past about plans by some service providers to roll-out fibre to the basement/communications room of MDUs and the potential for this to interfere with existing broadband services in those premises. Greater clarity is needed as to the effective boundaries of this type of activity, e.g:

- is it open slather for any service provider who has their own fibre to roll-out network extensions of this type?
- what rules should be in place to prevent interference with existing services?
- are the anti-cherry-picking provisions currently in legislation fit for purpose?
- what obligations, if any, should be placed on providers to provide open access to these FTTN networks?
- should multiple providers be allowed to build FTTN network terminations within a single MDU?

Significant related questions pertain to the potential deployment of Vectoring as a tool to greatly enhance the data transfer rates achievable via conventional VDSL2 technology.

The Communications Alliance Working Committee 58 on VDSL2 and Vectoring has undertaken a significant body of work during the past five months with a view to revising the relevant Communications Alliance Code and Standards in order to facilitate the roll-out of VDSL2 and Vectoring.

WC58 is a broadly-based group of many of Australia's leading subject-matter experts, including representatives from major Carriers and CSPs, NBN Co, equipment manufacturers, solution providers and regulators.

WC 58 has drafted a detailed industry paper (see ATTACHMENT 1) which explains the complex – but not insurmountable - technical challenges involved in deploying vectored VDSL2 technology in a ULLS environment.

The current industry code and standards need to be changed to support VDSL2. While there are different paths forward dependent upon the preferred policy and regulatory direction, it is clear that the existing ULLS environment and the proper technical performance of vectored VDSL2 are not compatible.

It is clear from the paper's conclusions and recommendations that if priority is given to enabling consumers to enjoy the higher data transfer rates available through Vectoring – up to double that of VDSL2 alone - and if acceptable service stability and quality is to be maintained, then decisions are likely needed on several key policy/ regulatory fronts.

A. Should a single wholesale infrastructure provider of local broadband services be permitted?

To reap the maximum performance benefits of vectoring and prevent service instability (e.g. dropouts) no more than one provider can offer vectored services within each cable sheath. This effectively means that there can only be one provider of VDSL2 network services in a node serving area or within a multiple dwelling unit or business centre development. This could be a wholesale-level provider, giving the opportunity for open access to enable other providers to offer services through the node.

B. Should a single design authority be authorised to coordinate all node locations in the FTTN rollout.

A single design authority is desirable for practical reasons, given the likelihood of interference and service degradation if all nodes are not centrally coordinated. This responsibility would extend to the location of nodes in customer premises (e.g. MDUs or shopping centre).

C. Legacy building copper cabling

Communications Alliance sees the potential need to regulate legacy building copper cabling that is connected to the access network copper cables and is currently carrying telephony and/or DSL services, to prevent building owners or other carriers from further deploying broadband technologies (including VDSL2 and ADSL2+), that are spectrally incompatible with node-based VDSL2, in the same cables.

D. Transition Arrangements

Communications Alliance has considered potential transition arrangements to enable the required spectral compatibility to be maintained during the transition period in which both FTTN VDSL2 from the node and legacy services from the local exchange are permitted to coexist in the same cables.

To protect the legacy services from unacceptable interference it will be necessary reduce the speed of the VDSL2 services during the transition. Following the transition period, assuming the other broadband technologies have been decommissioned, the VDSL2 spectral shaping can be removed and restored to a normal vectored VDSL2 configuration. Vectored VDSL2 services will then achieve their optimal throughput and stability

Each of these issues is complex and has implications for Government policy, for NBN Co, other existing or potential infrastructure providers, regulators and consumers.

These issues are also being faced in other jurisdictions, and we note that In 2013 there were regulatory decisions in Germany,[1] Austria and Denmark[2] which set out conditions for the phasing out of copper sub-loop unbundling in the context of rolling out vectored VDSL2.

If the move to integrate FTTN into the NBN is to be successfully achieved, Communications Alliance submits that the Panel should give close consideration to the above analysis and findings and their implications for the Panel recommendations.

Communications Alliance and its members would be pleased to engage further with the Panel to assist it with its consideration of these issues.

[1] http://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/EN/2013/130829_DecisionVectoring.html

[2] http://www.t-regs.com/index.php/2012/10/30/vectoring-and-potentialpartial-phasing-out-of-copper-sub-loop-unbundling-obligations-full-text-of-eu-nras-actual-decisions/

SECTION 2 – Clarity for Operational Responsibilities of Government, Regulators, NBN Co and Industry.

The National Broadband Network is without doubt one of the most important, ambitious and complex infrastructure tasks ever undertaken in Australia. The stakeholder matrix associated with this project is broad and intricate.

It is not surprising that as the project has developed there have been and continue to be questions about the precise roles and responsibilities of various stakeholders, including the Federal Government, relevant Department and regulatory agencies, NBN Co, non-NBN Co infrastructure providers and industry (including via the representative role fulfilled by Communications Alliance).

On occasions – particularly where operational questions and decisions are concerned - responsibilities appear to overlap or be somewhat confused. On other occasions issues have arisen for which there does not appear to be a clear 'owner'.

It would be valuable if the Panel could give consideration as to how greater clarity could be put in place to help define the optimal roles for Government/DoC, the ACCC, ACMA, NBN Co and industry when addressing operational questions, and the best use of the various mechanisms available to implement desired outcomes – e.g.,

- Government policy, legislation, regulation and incentives
- Industry codes and guidance
- Contractual arrangements (such as the WBA)

Greater clarity is also needed about the role of network providers other than NBN Co in delivering NBN services, as discussed in Section 1 of this submission.

The development of the optional battery backup product and informed consent arrangements is a current example of where there could have been better role clarity and greater reliance on pursuing non-government regulated options.

The issues surrounding the migration of personal medical alarms and other 'over-the-top' devices such as security alarms, ATMs and EFTPOS machines, is another example where ownership of the issue has been unclear and industry has found itself being left to manage some of the gaps and associated risks.

Communications Alliance is in the fortunate position of being able to draw on the combined knowledge, expertise and experience of a broad range of industry participants, including services providers, content providers, infrastructure providers, equipment vendors, lawyers and others. Communications Alliance stands ready to continue contributing to the development of solutions, and if deemed appropriate, to take on an expanded leadership role in addressing both technical standard and operational process matters that affect and involve industry and NBN Co.

NBN Co/CSP Cooperation on Operational Processes/Questions

For the most part access seekers and NBN Co have worked effectively together within Communications Alliance to develop cooperative solutions to the many operational issues that have arisen – and will continue to - during the evolution of the NBN project.

During the first 18 months of the NBN project, starting in August 2009, the Communications Alliance NBN Steering Committee oversaw the work of seven separate industry-based groups (comprising approximately 200 individuals from 70 industry entities) that undertook the initial

network architecture design and technical and operation planning for the project. As NBN Co grew its personnel and capabilities, most of this work (comprising 600 pages of carefully considered documentation) was handed over to NBN Co for its use.

On several issues over the past two years a degree of well-mannered tension has arisen around how to progress certain operational issues.

At times there has been a degree of dispute over whether the industry-based self-regulatory functions of Communications Alliance – normally manifested in industry Codes, Standards and Guidelines – should be the primary path for decision-making on operational questions that will affect service providers and NBN Co alike. NBN Co has at times taken the view that the Communications Alliance/industry outputs can be considered as an input, but that NBN Co should make final decisions, in line with its obligations under the Special Access Undertaking (SAU) and the provisions of the Wholesale Broadband Agreement (WBA).

Examples of such areas of debate and/or disagreement have included:

- whether to implement an overall Communications Alliance Operations Code, covering the interactions between service providers and NBN Co in areas such as service activation, testing, service qualification etc.
- ownership of the B2B specification and pit-and-pipe specification; and
- aspects of arrangements for transfer of customers between service providers post-migration to the NBN

No criticism is intended or implied toward participants on either side of these debates. All parties have acted in good faith. The situation points, however, to the potential need for greater clarity as to how the self and co-regulatory frameworks that underpin the Telecommunications Act 1997 should apply in the NBN environment. In other words, what is the relationship/hierarchy between the WBA/SAU obligations vs industry-agreed co-regulatory instruments such as Codes and Guidelines?

SECTION 3 – Responses to Questions in the Framing Paper

Question 1:

Communications Alliance does not see the need for radically different structural models to be considered. This is, in part, a reflection of the reality that although we are still in the early phases of the NBN roll-out, there would be very significant disruption and consequent delay to the delivery of high-speed broadband services inherent in any 'clean-sheet' approach to structural issues – without any guarantee of a net benefit accruing from a different structural model.

Please note the comments in Section 1 of this submission concerning the structural implications flowing from the move to integrate vectored VDSL2 into the NBN framework.

Please note also that the Communications Alliance Satellite Services Working Group (SSWG) has made a separate submission to the Panel, in which it raises potential structural changes in relations to the satellite-delivered component of the NBN.

Question 2:
Communications Alliance believes that the working assumptions as listed are appropriate.

Question 3:
Yes, Communications Alliance believes that NBN Co should continue to be subject to wholesale-only (structural separation) and open access requirements.

As a matter of principle and to the extent possible, the regulation surrounding open access requirements should be framed with the objective of ensuring a level playing field in all areas of industry broadband service provision, to foster vibrant competition at the retail level, to the benefit of consumers.

Question 4:
In circumstances where NBN Co is afforded certain rights and protections, these should also come with obligations. This approach should also apply to non-NBN Co network providers. In some cases there may be a need for specific regulations to, for example, guard against the potential misuse of monopoly power. It is reasonably assumed at the outset that NBN Co will operate under the same motivation as other players in the marketplace – the desire to help create a vibrant and competitive broadband market that benefits the nation as a whole and end-users of all descriptions. Given the competing pressures on NBN Co, however, it should not be assumed that this will always be the case.

Question 5:
Competitive neutrality should be an enshrined objective at all layers of the value chain. Where NBN Co is concerned, there is a need to ensure that it is not in a position to competitively disadvantage other providers of high-speed broadband infrastructure or services, to the extent that these are permitted by government policy.

Broadband infrastructure providers that are members of Communications Alliance have raised concerns about the potential for NBN Co to prejudice the competitiveness of its wholesale competitors in a number of ways.

One example concerns the B2B specification that is used to define the ways in which wholesale providers interact with Access Seekers to exchange operational information in areas including service availability, end-user transfer and service activation.

The specification has its roots in global telecommunications IT standards for B2B Integration as used in the UK and New Zealand markets. The specification was extended by a

Communications Alliance working group in 2010. The Australian B2B extensions have been, through review, accepted back into global best practice and standards and have been implemented by NBN Co and a range of market participants who have connected to NBN Co.

NBN Co has now assumed ownership of the specification and periodically adjusts the specification as it sees the need to do so. Competitive broadband infrastructure providers have argued that this gives NBN Co, by way of unilateral modification of the specification, the power to disadvantage competitors and put them in 'catch-up' mode until they are able to make commensurate changes to their own systems. Communications Alliance has raised with NBN Co the possibility of transferring ownership of the B2B specification back to industry – i.e. Communications Alliance – so that any future changes to it can be the product of industry-wide consultation and collaboration, with all players having equal knowledge of impending changes and consequent system requirements.

Another example stems from criticism of NBN Co's decision not to charge connection fees when putting greenfields networks in place – a practice other providers see as non-commercial and potentially anti-competitive.

Question 6:
Government should regulate for service/customer experience outcomes, not on the basis of the technology used. This tenet is increasingly important as we move into a more diverse multi-technology mix for the provision of high-speed broadband services by NBN Co and other providers – with HFC, FTTN and potentially other technologies coming into the picture.

If consumers are being offered broadband services by non-NBN Co providers and do not have access to competitive offerings by other providers nor NBN Co, then they should reasonably expect to enjoy an equivalent end-user experience. Any precise definition of this however, will need to be attempted after structural and technology decisions have been made in preparation for the move to a wider multi-technology mix for the NBN.

Question 7:
Prior to 1 January 2012 greenfields developments undertaken by non-NBN Co infrastructure providers, and which were declared to be adequately served, enjoyed protection from overbuild by NBN Co.

Post-January 2012, however, such developments, built to the same specifications, do not enjoy such protection. Some non-NBN Co infrastructure providers who are members of Communications Alliance believe strongly that the uncertainty thereby created needs to be addressed, because it impacts the commercial models involved, creates a disincentive to invest and may lead to a lessening of competition.

Question 8:
In February 2012 the ACCC declared the non-NBN local bitstream access service (LBAS) followed in October 2012 by the final access determination (FAD), which contains both price and non-price terms and conditions for a 25/5 Mbps LBAS service. Communications Alliance believes that Part XIC provides the appropriate mechanism for RSPs to rely on to secure access to services on non-NBN Co services, to the extent that these are permitted by government policy. There may be a need to revisit the terms of the FAD as the roll-out progresses, when a clearer picture of these services emerges

Question 9:
(See also Section 1 re VDSL2/Vectoring deployment)

If services provided over a network other than NBN Co's are deemed to be "NBN-comparable" and if meeting that standard brings with it protection from network overbuild

by NBN Co, then there should be obligations on non-NBN Co providers that help ensure competitive neutrality and an acceptable end-user experience, consistent with the comments made in response to question 6.

In circumstances where – for example in the case of the use of vectoring and some scenarios viz deployment to MDUs - it is technically difficult or impossible to give other service providers the opportunity to deploy similar technology or offer alternative services on an equivalent basis, there will need to be obligations of the type listed in this part of the framing paper (the detail of which can be agreed once the structural decisions are taken).

In any circumstance where a non-NBN Co network is deemed to be NBN-comparable, there must be an operational framework that includes user-friendly processes for service providers to activate end-user services on the network and transfer customers to and from the network, restore services etc – this is all about reducing costs and delivering a great experience to customers.

Communications Alliance and its members are, for example, already in discussion with NBN Co about the potential merits of a 'third party portal' for customer transfer, to minimise the effort and expense that service providers will need to undertake to effect customer transfers involving non-NBN Co infrastructure in greeenfields developments.

Question 10:
The current NBN model – including the provision of non-commercial as well as less profitable services - contains a significant cross-subsidy, borne from public policy objectives. Today that subsidy is opaque. Industry believes that, going forward – and particularly if structural changes are made to the ways in which, and by whom, services are provided, it is desirable for the cross-subsidies and the funding sources for them to be transparent.

Question 11:
There are numerous ways for this to be achieved. Decision-making on this point is better left until a clearer picture emerges of any changes to the new structural and regulatory framework for provision of high-speed broadband services in Australia. As a matter of principle, Government (not industry), should be funding such non-commercial services.

Question 12:
The objective that should apply to greenfields developments is the creation of processes and regulatory structure designed to:

- ensure a level playing field for NBN Co and other infrastructure providers; and
- enable the deployment of infrastructure that is fit-for-purpose, cost-effective and responsive to end-user needs, while allowing sufficient flexibility to take account of the differing circumstances of individual developments.

Some non-NBN Co network infrastructure providers within Communications Alliance have recommended that for new developments:

- 1. All FTTP providers, including NBN Co, should be responsible for the design and construction of pit and pipe. The current requirement for a Developer to design and construct pit and pipe and transfer ownership to NBN Co should be removed from the Telecommunications Act.
- 2. NBN Co should recover the cost of the design of the pit and pipe on a cost recovery basis.

- 3. NBN Co should commence charging a connection fee to all new premises connected in new development areas. Telstra's fee for new line connection was restricted by legislation to be no more than $299.00 per new line connection.
- 4. FTTP Providers, including NBN Co in new developments need to be able to gain "Adequately Served" status and have an IPOLAR condition placed on their carrier licence.
- 5. A condition of granting a DA over a development area should include the selection of a FTTP provider that has the capability of obtaining "Adequately Served" status and willing to take on an IPOLAR condition on their carrier licence.

CA recommends that NBN Co investigate reopening tenders for build-operate-transfer (BOT) partners to facilitate a more cost-effective and timely delivery of network in new developments. The engagement of proven private FTTP providers has the potential to deliver a more cost-effective solution within the timeframes that developers demand.

Question 13:
Communications Alliance has previously outlined the need for greater clarity as to the delineation of the regulatory responsibilities of the ACCC and the ACMA as they impact on the telecommunications sector.

As discussed in Section 2, such an examination should include consideration of how the industry self-regulation and co-regulation framework, typically led by Communications Alliance on behalf of its Carrier, CSP, ISP and Content Provider members, fits into this matrix – and whether greater clarity needs to be created around the respective roles, rights and responsibilities of industry processes vs NBN Co and the regulators.

Attachment 1

COMMUNICATIONS ALLIANCE LTD

INDUSTRY PAPER ON FTTN AND VDSL2 REGULATION

COMMUNICATIONS ALLIANCE
WORKING COMMITTEE 58 ON VDSL2 AND VECTORING (WC58)
MARCH 2014

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EXECUTIVE SUMMARY

COMMUNICATIONS ALLIANCE IS WORKING ON FTTN

Communications Alliance Working Committee 58 (WC58) is a group of VDSL2 and Fibre-To-The-Node (FTTN) technical experts representing members of the communications industry. WC58 is responsible for the industry codes and standards that ensure harmonious deployment of xDSL technology on the copper access cables.

WC58 has been considering the introduction of VDSL2 and FTTN technology in light of the government's policy. It has reached agreement on a range of measures that are necessary for proper technical performance of vectored VDSL2 deployments in FTTN and Fibre-To-The-Building (FTTB) DSLAM environments.

FTTN REQUIRES REGULATORY CHANGE TO SUPPORT VECTORING

While some of the necessary technical features of VDSL2 can be enabled by updating existing industry codes and customer equipment standards, the existing codes and standards cannot on their own provide the necessary regulation for the proper technical performance of a vectored VDSL2 rollout.

Deployment of more than a single DSLAM or the presence of other access technologies in a cable will significantly reduce FTTN download and upload rates and increase service dropouts. The greatest vectored VDSL2 benefit depends upon there being one broadband operator per area, and implies the need for a single wholesale infrastructure provider of local broadband (e.g. VDSL2) services (Network Provider).

To achieve the highest community FTTN download and upload rates and fewest dropouts, WC58 can see no other viable alternative than to adopt a single coordinated Network Provider environment. As the ULLS regime does not contemplate such an environment, it will be necessary, for proper technical performance of a vectored VDSL2 rollout, to replace the current ULLS environment with one in which the Network Provider is responsible for design and for managing interference within the cables.

RECOMMENDATIONS

The current industry code and standards need to be changed to support VDSL2. While there are different paths forward dependent upon the preferred policy and regulatory direction, it is clear that the existing ULLS environment and the proper technical performance of vectored VDSL2 are not compatible.

After considering these issues, WC58 has reached agreement on a number of measures that it believes will facilitate the rollout of a vectored VDSL2 FTTN network. These measures have wider competition and commercial issues; however, WC58 cannot see any viable alternative that would allow the proper technical performance of vectored VDSL2:

a) The ULLS regime should be revoked (or an exemption from it granted) for each node serving area following FTTN rollout. After a Transition period, the Network Provider would be the only provider using the cables, apart from providers of a few special services that may be permitted to continue without compromise to vectored VDSL2.

b) Regulations must be in place to reduce detrimental effects on both VDSL2 and legacy services during any nominated transition period. Engineering design decisions on the duration and parameters for a transition period should be left to the FTTN network designer, in consultation with all relevant stakeholders.

c) During the transition period, the ***Unconditioned Local Loop Service (ULLS) Network Deployment*** industry code (C559) needs to continue to apply to legacy services and service providers, but also needs to be expanded to include sections that apply only to the Network Provider as the sole provider of a vectored VDSL2 Deployment Class.

d) An approach to ensure a single Network Provider per area or building would need to be established. Alternately, the regulation of broadband service deployment in respect of in-building cabling will be necessary.

Under current regulations, the existing industry codes and standards cannot be evolved in accordance with these recommendations and with the principles outlined in the body of this paper. Before proceeding to register evolved codes and standards that support VDSL2 over FTTN, Communications Alliance must therefore await the policy deliberations of regulators and government.

Implementing the changes necessary to permit commercial VDSL2 services on copper access cables would require considerable time.

The need for guidance is now urgent because early VDSL2 deployments are proceeding without coordination, and reconciliation is likely to be complex and costly. The inability of the present industry codes and standards to support VDSL2 could potentially delay the transition to FTTN if the issues raised in this paper are not resolved promptly.

Before proceeding to register codes and standards to support VDSL2 over FTTN, Communications Alliance must await the policy deliberations of regulators and government on the key issues highlighted above. The lack of appropriate industry codes and standards could potentially delay the FTTN VDSL2 transition from the current trial stage to commercial services. The need for guidance is now urgent because early VDSL2 deployments are proceeding without coordination, and reconciliation is likely to be complex.

WC58 will commence drafting changes to documents in accordance with the recommendations above under the assumption that the recommendations will be adopted. This will facilitate the earliest registration and implementation of the updated regulatory arrangements. Alternately, if the preferred policy outcomes differ, Communications Alliance will update its work plan to implement the preferred policy.

INTRODUCTION

Communications Alliance Working Committee 58 is a group of VDSL2 and Fibre-To-The-Node (FTTN) technical experts representing the following members of the communications industry: AAPT, Adtran Networks, Alcatel Lucent, Huawei, iiNet, International Copper Association, Layer10, M2, NBN Co, Netcomm Wireless, OneAccess Networks, Optus and Telstra. WC58 was established by Communications Alliance's Customer Equipment and Cable Reference Panel (CECRP) and Network Reference Panel (NRP) and is responsible for the industry codes and standards that ensure harmonious deployment of xDSL technology on the copper access cables.

Under its terms of reference, WC58 is currently seeking to revise:

1. Industry Code C559:2012: *Unconditioned Local Loop Service Network Deployment*;
2. Australian Standard AS/CA S041.3:2009 *Requirements for DSL Customer Equipment for connection to the Public Switched Telephone Network - Part 3: Filters for use in connection with all ADSL services*; and
3. Australian Standard AS/ACIF S043: *Requirements for Customer Equipment for connection to a metallic local loop interface of a Telecommunications Network*

so as to align them with international developments in VDSL2 technology and because the current versions neither permit commercial VDSL2 deployments on Australian copper access cables nor assure the necessary coordination between operators to achieve the highest VDSL2 data rates and lowest dropout rates.

WC58's consideration of the technical regulatory aspects of the introduction of VDSL2 and FTTN technology have, of necessity, taken place in light of current government policy, and a range of reviews currently being conducted into the future structure of Australian broadband services (including the Cost-Benefit Analysis and Review of Regulation of NBN announced by the Government in December 2013 (the Vertigan Review)).

WC58 has reached agreement on a range of measures that are necessary for proper technical performance of vectored VDSL2 deployments in FTTN and Fibre-To-The-Building (FTTB) DSLAM environments.

While some of the necessary technical features of VDSL2 can be enabled by updating existing industry codes and customer equipment standards, those codes which were originally drafted by WC58 for the current unbundled (ULLS) competitive environment, cannot on their own provide the necessary regulation for a VDSL2 rollout. Instead, replacement of ULLS regulations with new FTTN regulations will be necessary to support the new environment and to enable the timely development of the industry codes that will underpin a vectored VDSL2 based FTTN.

WC58 is not seeking to prescribe the competition or commercial outcomes of deploying VDSL2 services, recognising this is the proper role of government. However the technical characteristics of vectored VDSL2 technology have led WC58 to the view that the existing ULLS environment and the proper technical performance of vectored VDSL2 are not compatible. It is recognised that individual industry members represented on the committee may make their own independent submissions (including to the Vertigan review and other interested parties) on competition or commercial aspects.

ABOUT COMMUNICATIONS ALLIANCE

Communications Alliance is the primary telecommunications industry body in Australia. Its membership is drawn from a wide cross-section of the communications industry, including carriers, carriage and internet service providers, content providers, equipment vendors, IT companies, consultants and business groups.

Its vision is to provide a unified voice for the telecommunications industry and to lead it into the next generation of converging networks, technologies and services. The prime mission of Communications Alliance is to promote the growth of the Australian communications industry and the protection of consumer interests by fostering the highest standards of business ethics and behaviour through industry self-governance. For more details about Communications Alliance, see http://www.commsalliance.com.au.

SECTION 1 – FTTN TECHNICAL BACKGROUND

1.1 INTRODUCTION

This section addresses some key implications of the technical and operational issues that arise when designing an FTTN rollout with vectored VDSL2.

The ITU-T Recommendation on Vectoring (i.e. G993.5 *Self-FEXT cancellation (vectoring) for use with VDSL2 transceivers*[3]) states at the end of Section 1 (Scope):

> "*Maximum gains are achieved when the self-FEXT cancelling system has access to all of the pairs of a cable carrying broadband signals. For multi-binder cables, significant gains are possible when the self-FEXT cancelling system has access to all of the pairs of the binder group(s) in which it is deployed and has the ability to cancel at least the majority of dominant self-FEXT disturbers within the binder. When multiple self-FEXT cancelling systems are deployed in a multi-binder cable without binder management, gains may be significantly reduced.*"

In other words, the greatest benefit from vectoring comes when there is one system managing all the cable pairs in each cable (i.e. effectively a single wholesale infrastructure provider of local fixed broadband services for each cable). Deployment of more than a single DSLAM or the presence of other access technologies in a cable may significantly reduce the benefits of vectoring for VDSL2 end users, that is significantly reduce download and upload rates, or increase service dropouts. The ITU-T is saying that in practice, more than one VDSL2 operator with services in the same copper access cable degrades broadband performance until the download and upload rates are similar to VDSL2 without vectoring.

The Broadband Forum[4] has modelled VDSL2 performance and suggests that a download rate of 100Mbps (inclusive of overheads) is possible using vectoring on a 500m line. It also found that without vectoring in a cable with other VDSL2 services, the rate would be between 40 Mbps and 80 Mbps (inclusive of overheads)[5][6] as reproduced below.

[3] Recommendation G.993.5 is available from: http://www.itu.int/ITU-T/recommendations/rec.aspx?rec=10414
[4] http://www.broadband-forum.org
[5] Based on Figure 6 in Broadband Forum publication MR-257 from http://www.broadband-forum.org/marketing/download/mktgdocs/MR-257.pdf
[6] End user 'speed tests' will normally report results between 10% and 15% below the rate inclusive of overheads.

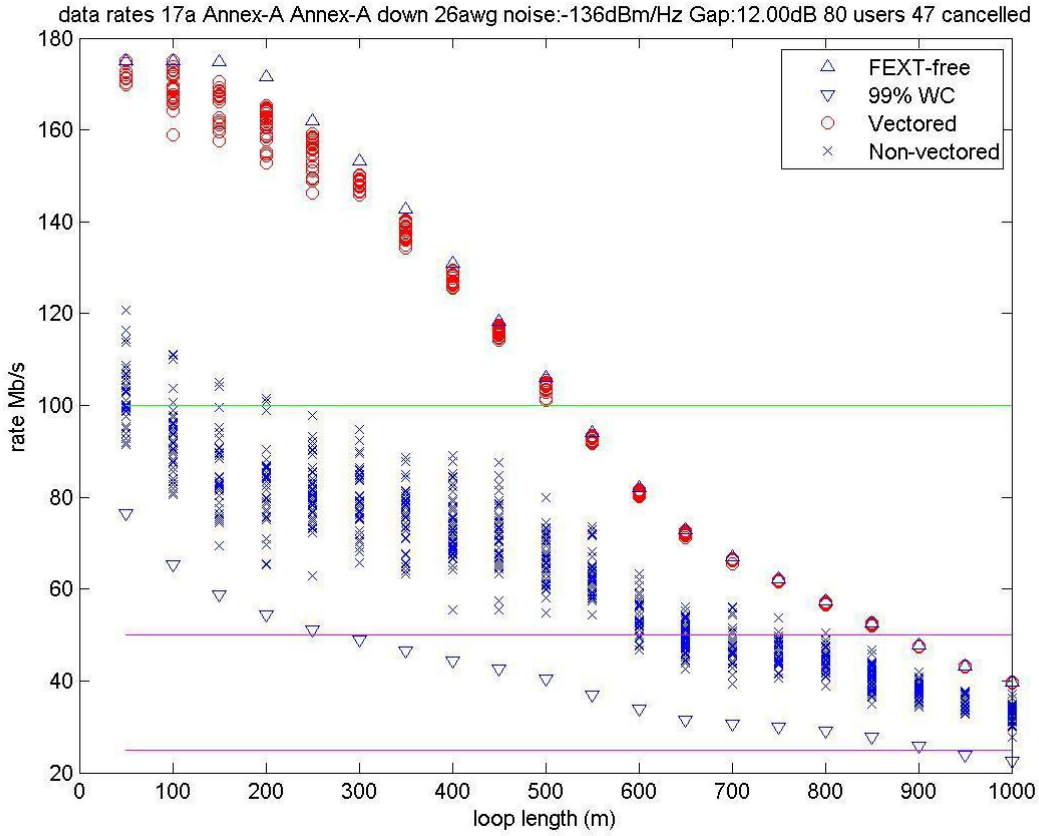

FIGURE 1
Broadband Forum MR-257 Figure 6

Notes to Figure:

1. Downstream Rates, Profile 17a, 26 AWG, -136dBm/Hz noise, 80 users, and 47 cancelled.
2. Red are vectored lines and blue are non-vectored.
3. These results do not include practical customer premises interference levels and other common cabling degradations.
4. Vectoring implementations limit the sum of the download plus upload rate to 160 Mbps. Thus 110 Mbps download and 50 Mbps upload (each inclusive of overheads) is possible, whereas 120 Mbps download and 50 Mbps upload is not.

Stability of the VDSL2 service is critical to a good end user experience and is more important than a high data rate for real time (e.g. VOIP) and streaming video services. Instability exhibited by VDSL2 includes dropouts (when the VDSL2 spontaneously disconnects itself and reconnects[7]) and error bursts which may impact download and upload rates and the perceived quality of real time services. While such events are inevitable, good design and control of broadband deployments within cables can significantly reduce their incidence.

[7] Spontaneous disconnections followed by retraining and reconnection is experienced as a service dropout. Dropouts in a vectored VDSL2 environment are typically several minutes duration.

1.2 SINGLE NETWORK PROVIDER AND UNIQUE NODE LOCATION

While the use of vectoring with VDSL2 can provide much higher data rates to end users, vectoring can only work at its full capacity when all broadband services in a copper access cable are vectored VDSL2 from a single operator. If there is more than one VDSL2 operator, vectored download rates degrade toward the unvectored rates.

The highest vectored download rates are only achievable if there is a single network provider (hereafter called the Network Provider) that designs the node deployments and has exclusive coverage of the node's serving area. The presence of a second operator's VDSL2 services in a cable reduces download rates by up to 50%.

It is assumed that this single Network Provider will be obliged to provide wholesale Layer 2 access products to competing Retail Service Providers (RSPs).

Such an approach would be consistent with the direction being taken in other jurisdictions. For example, the German regulatory authority, the Bundesnetzagentur, published in August 2013 its final decision on the launch of vectoring in the Telekom Deutschland GmbH (Telekom) network. It states that:

> *"Telekom must continue to allow its competitors access to the local loop at the cabinets. Telekom may refuse access to this sub-loop variant under certain conditions, however, so as to enable vectoring to be implemented at the street cabinet by itself or another company. The decision therefore ensures that all players in the market will still be able to interconnect at the cabinet using optical fibre and implement vectoring, on condition that they offer an appropriate bitstream product under open access arrangements. This applies both to Telekom and to its competitors."*[8]

And in December 2013 there were regulatory decisions in Austria and Denmark[9] which set out conditions for the phasing out of copper sub-loop unbundling in the context of rolling out vectored VDSL2.

1.3 PREFERABLY ONLY VECTORED VDSL2 TECHNOLOGY USING SPECTRUM ABOVE ANALOGUE TELEPHONY

In an FTTN environment, the highest download and upload rates and the most stable services (i.e. least dropouts) are achieved if all services are based on a single 'band plan' (spectrum plan) for all customers. More than one band plan causes excessive crosstalk in the parts of the spectrum where the band plans differ. Crosstalk harms download and upload rates and can cause an increase in dropouts.

Analogue telephony (hosted by a legacy telephone exchange or cabinet) may be provided on the same line as VDSL2 without any significant detriment to either service, provided the services are properly designed and installed with correct filtering to separate the signals in the end user premises. However provision of services using other broadband transmission technologies such as ISDN, ADSL2+ and SHDSL, all commonly deployed today, reduces vectored VDSL2 download and upload rates due to uncancellable crosstalk from those other technologies. Further rate degradation may occur if vectoring needs to be disabled in the spectrum occupied by these other technologies in order to reduce dropouts.

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8 http://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/EN/2013/130829_DecisionVectoring.html

9 http://www.t-regs.com/index.php/2012/10/30/vectoring-and-potentialpartial-phasing-out-of-copper-sub-loop-unbundling-obligations-full-text-of-eu-nras-actual-decisions/

1.4 LEGACY SERVICES AND TRANSITIONAL ARRANGEMENTS

In order to facilitate a smoother migration to the final FTTN solution, existing broadband services from the exchange or legacy street cabinets might be permitted to share the cables with the new VDSL2 node during a transition period. The transition will add technical complexity to the migration, but its primary purpose would be to provide additional flexibility for Retail Service Providers (RSPs) and end users that need to install a new VDSL2 modems and/or remediate their in-premises cabling and filters to be compatible with VDSL2.

During such a transition period, VDSL2 download and upload rates will suffer significant but not catastrophic degradation because of the crosstalk from those legacy systems and the possible need to disable vectoring in part of the spectrum to reduce dropouts.

In addition to possibly disabling vectoring in spectrum subject to crosstalk, WC58 members agree that to properly protect the legacy systems' performance during a transition, VDSL2 needs to be spectrally shaped according to Communications Alliance industry code C559 'Deployment State A' rules to prevent the VDSL2 system from causing interference that significantly reduces download rates on legacy services. VDSL2 spectral shaping would ensure legacy system download rates remain largely unchanged, but shaping will further reduce VDSL2 download rates. C559 already includes mechanisms for definition by an Access Seeker of compliant shapers as Non-Deployment Class Systems (as used for Telstra's Top Hat shapers). The reduction in vectored VDSL2 rate due to shaping and the presence of crosstalk from legacy systems is up to 15 Mbps.

Following the transition period, assuming the other broadband technologies have been decommissioned, the VDSL2 spectral shaping can be removed and restored to a normal vectored VDSL2 configuration. Vectored VDSL2 services will then achieve their optimal throughput and stability.

1.5 ANALOGUE TELEPHONY TRANSITIONAL ARRANGEMENTS

The transitional arrangements for traditional analogue telephony hosted by a legacy telephone exchange or cabinet are a critical part of the FTTN design, with significant implications for node design and the customer premises. The technical details will need to be agreed between the current provider of analogue telephony and the VDSL2 Network Provider and the outcomes are not yet determined.

a) Analogue telephony services in their present form might or might not continue for those end users that migrate to FTTN.
b) Analogue telephony-only end users might not migrate to FTTN for some time.

The main regulatory implication of a decision to continue with legacy analogue telephone services relates to the need to continue to meet telephony quality standards, including the end to end performance requirements in the ***End-To-End Network Performance for the Standard Telephone Service*** industry code (C519). In some cases on longer unconditioned lines, WC58 expects analogue telephone services with VDSL2 or ADSL may be technically incompatible because the C519 quality standards will not be able to be achieved. That issue can only be resolved by:

a) Modifying current C519 telephony quality benchmarks to permit reduced telephony quality, an approach that is unacceptable because of the reduction in telephony loudness level;, or
b) by not permitting end users with longer unconditioned lines to receive a FTTN or FTTB VDSL2 service unless the underlying traditional analogue telephony service is migrated to an equivalent VOIP service. That VOIP service could be delivered over the new VDSL2 access.

A further issue is a need for VDSL2 customer premises filters and associated standards if analogue telephony and VDSL2 coexist for more than a short transition period.

1.6 INCOMPATIBILITY OF SIMULTANEOUS STREET CABINET AND IN-BUILDING VDSL2 DEPLOYMENTS SERVING THE SAME BUILDING

'Basement' or 'Building' deployments of VDSL2 DSLAMs (FTTB) are becoming more common as service providers offer whole of building broadband solutions that exploit the existing building telephone wiring. We assume that basement VDSL2 deployments will only occur when reuse of a building's existing legacy telephone cabling is a fundamental requirement of the basement DSLAM business case. In other words, if alternative cables are already available, or the business case can support the installation of new cabling, this may lead to the use of another technology (e.g. Ethernet) rather than a vectored VDSL2 solution, thus avoiding the spectral compatibility issues and approaches discussed in this paper.

With a VDSL2 DSLAM installed in the building, end users wishing to obtain broadband ADSL2+ or VDSL2 services from other service providers with exchange or street cabinet based DSLAMs would find that their download rates are severely degraded by crosstalk occurring within the building cabling from VDSL2 signals originating from the building DSLAM. Conversely, end users of the in-building DSLAM would find their upload rates severely impacted by the street cabinet hosted VDSL2 services, due to differences in upstream transmit levels.

If permitted by policy and regulation, the deployment of two VDSL2 DSLAMs that could potentially serve the same building might arise in two different sequences:

a) If the *in-building VDSL2 system is installed first*, its presence would inhibit the practical deployment of another VDSL2 feed into the building, such as from a provider deploying a street cabinet. However a street cabinet solution may still be required in order to provide vectored VDSL2 services to other nearby buildings that do not have a basement DSLAM.

b) If a *street cabinet system is deployed first*, its presence may act as a disincentive to a prospective in-building provider, but only if the street cabinet is sufficiently close to the proposed building.

Regardless of the order in which two VDSL2 DSLAMs serving the same area appear, the data and dropout rates of services delivered to end users that are connected to the original DSLAM will suffer an immediate impact from the time that the first service from the second DSLAM is activated in a shared cable. Data rates can only be maximised and dropout rates minimised by ensuring different providers deliver services using independent, separated cables.

If the street cabinet installation occurs after the basement node installation, the provider of street-cabinet services could avoid connecting services to end user premises covered by a basement DSLAM. The street cabinet provider may also reduce the number of VDSL2 ports equipped in the street cabinet platform, to save the cost of investing in ports that cannot be practically be put into service. Occupants of buildings covered by a basement DSLAM would therefore only have an option of receiving services via the basement provider, and end users outside the building footprints would only have an option of receiving services via the street cabinet provider.

The members of WC58 consider the avoidance of VDSL2 feeds from separate DSLAMs in shared cable is a critical requirement for assuring stable (i.e. minimising the dropout rate) and viable VDSL2 service delivery. This outcome would be achieved if today's environment evolves to a new system of local FTTN and FTTB wholesale broadband infrastructure monopolies.

SECTION 2 – REGULATION REQUIRED FOR CODE EVOLUTION

This section addresses the current regulatory environment and areas where WC58 seeks clarification. Clarifications are requested to ensure the most efficient and timely evolution of current industry codes, which are a prerequisite for commercial VDSL2/FTTN service migrations or activations using existing copper access cables.

2.1 CURRENT ULLS ENVIRONMENT AND VDSL2

Current regulations for the declared Unconditioned Local Loop Service and Line Sharing Service (the ULLS regime) allow for investment in competitive infrastructure using the copper access network to deliver a range of telecommunications services into the market.

One of the original purposes of this ULLS regime was to encourage infrastructure competition by making provision for the flexible and competitive deployment of a range of access technologies. Many access technologies have been codified in the current C559 industry code and are today deployed throughout the Australian copper network. However the current ULLS regime cannot reliably support our understanding of the community's high FTTN download and upload expectations.

VDSL2 rates are maximised by using vectoring from a single Network Provider. If multiple access seekers use ULLS to provide VDSL2 over shared copper distribution cables, the download and upload rates and stability (i.e. dropout rate) of VDSL2 services will suffer considerable degradation for 2 reasons:

a) Vectoring cannot be supported with multiple providers' DSLAMs because it is not possible to cancel crosstalk from those other systems. Uncancelled crosstalk reduces download and upload rates, and can cause dropouts as foreign services start up or return to idle.

b) Spectral incompatibility of services from multiple locations cannot be resolved in the same manner as for ADSL2+, where spectrum shaping was adequate to ensure compatibility. With VDSL2 deployments from two or more DSLAMs using the same cables, services from each VDSL2 DSLAM are degraded.

In order to provide the highest FTTN download and upload rates and minimum dropouts, WC58 can see no other viable alternative than to adopt a single coordinated Network Provider environment. As the ULLS regime does not contemplate such an environment, it is necessary to replace the current ULLS and C559 environment with one in which the Network Provider is responsible for design and for managing interference within the cables.

2.2 STATUS OF CURRENT CODES AND STANDARDS

In this section, the relevant codes and standards for DSL deployment are addressed, along with the nature of the changes to those codes and standards necessary to support commercial FTTN/VDSL2 rollout.

C559:2012 Unconditioned Local Loop Service (ULLS) Network Deployment Rules *Industry Code*

The industry code C559 is designed to ensure spectral compatibility between broadband services on copper access cables in a competitive environment. Because the access copper cables, originally designed for telephony at low frequencies, suffer from considerable crosstalk interference between the copper pairs at the higher frequencies used for DSL, C559 must include deployment rules to prevent unacceptable interference.

C559 defines protected 'Basis Systems' (ADSL2+, SHDSL, etc.) and a range of frequency masks for DSL and other 'Deployment Classes' that ensure they cannot unacceptably

interfere with the protected systems. Its scope includes all copper access cables between the exchange MDF and the network boundary point; it cannot ensure spectral compatibility of systems sharing in-building or private cabling today as in-building cables are out of scope.

Because achieving the maximum benefits from the rollout of vectored VDSL2 requires the revocation of (or exemption from) the ULLS regime in FTTN node serving areas, the code is only relevant in its current form to ongoing legacy service deployment on copper access cables, i.e. where there is no FTTN.

During any transition period where legacy services and FTTN VDSL2 are permitted to coexist, some small modifications to C559 are required in order to define a generic node VDSL2 Deployment Class that can then have its ADSL2+ band spectrum modified (as a non-deployment class system) to prevent unacceptable interference to legacy systems from the exchange. That node deployment class does not have to have its spectrum above the ADSL2+ band defined completely as the Network Provider should have some design flexibility in choice of band plan.

AS/ACIF S043.2:2008 Requirements for Customer Equipment for connection to a metallic local loop interface of a Telecommunications Network - Part 2: Broadband *Standard*

This standard describes the frequency masks and some other requirements for signals transmitted by customer modems in 'Equipment Classes' that align with the 'Deployment Classes' of C559. It is mainly intended to complement the spectral compatibility requirements of C559 and does not provide a full modem specification.

At present, vectored VDSL2 modems are not covered by the standard. In order for vectored VDSL2 customer modems to be able to enter the Australian market and be connected to services from the copper access cables, a generic equipment class for a vectored VDSL2 modem needs to be added to S043.2. That equipment class would be flexible enough to use any standards compliant band plan that might be loaded by the Network Provider.

AS/CA S041.3:2009 Requirements for DSL Customer Equipment for connection to the Public Switched Telephone Network - Part 3: Filters for use in connection with all ADSL services *Standard*

This standard specifies centralised and inline (distributed) filters for use in customer premises with ADSL and ADSL2+ services. The current standard is limited to static specifications and does not include the dynamic testing requirements recently developed by the Broadband Forum in TR-127 in recognition of heightened technical stringency to improve VDSL2 service stability (i.e. reduce dropouts) for 'real time services' including VOIP and video delivered over vectored VDSL2.

The need for a new filter standard depends on the Network Provider's design for the telephone service to be delivered with FTTN VDSL2. If the design is based on a 'naked' VDSL2 service (meaning all traditional exchange based analogue telephony is migrated and delivered using VOIP over VDSL2), then a new filter specification may not be required. However, continuing provision of legacy telephone services from the exchange or for new analogue telephone services from the node would require VDSL2 compliant filters.

Presently, there are no international VDSL2 filter standards suitable for use in the Australian network. The lack of international standards for VDSL2 filters would not be a major concern, as existing ADSL2+ filter requirements could be extended to VDSL2 frequencies. This does not mean that all existing ADSL2+ filters will meet such a new filter standard.

If a new filter specification is required, its development may take up to 1 year, given the need for a new testing regime to be approved and implemented by test laboratories and the 2 month ballot period for the standard.

C519:2004 End-to-End Network Performance for the Standard Telephone Service *Industry Code*

This industry code specifies various parameters of the end to end analogue telephone service (i.e. today's legacy exchange-based telephony services). A critical parameter is the 'loudness specification' for telephony services. The code requires telephony providers to limit the loudness loss (or attenuation) in the access portion of the analogue telephone network. Currently, this requirement prevents the deployment of ADSL2+ with telephony on lines that exceed 6.5dB voice band attenuation from the exchange.

The use of analogue telephony from the exchange on the same copper pair as FTTN VDSL2 is currently contingent on this requirement too, with implication that the most distant end users with the highest line attenuations may not be able to simultaneously qualify for their existing exchange-based telephone service and a new node-based VDSL2 service on the same line.

Telephony loudness is critical. WC58 does not foresee scope to change C519. The FTTN design for the longest exchange-lines may require rearrangement of the existing connections in the access network, telephone service amplification, or the use of naked VDSL2 (i.e. forced migration to VOIP based telephony over VDSL2 for those end users with high exchange-line voice band attenuation).

RCIT.0004 Splitter Specification for ADSL/POTS *Telstra Technical Reference Document*

This Telstra standard specifies the requirements for splitters when using ADSL2+ on the same copper pair as a Telstra-provided analogue telephone service. If Telstra-provided analogue telephony is used on the same access pair as VDSL2 at any stage in the FTTN rollout, then this requirement (or any update thereof) must be met by the Network Provider. It should also apply to any provider of in-building DSL when that service shares the building cable with Telstra-provided analogue telephony; however the regulation of such non-standard connections to Telstra telephone services within customer premises is unclear.

2.3 THE NETWORK PROVIDER REQUIRES EXCLUSIVE BROADBAND SERVICE USE OF DECLARED ULLS CABLES IN THE FINAL FTTN

The current ULLS regime applies to all unconditioned access copper cable pairs, and does not include the necessary exemption for completed node serving areas in the final FTTN where The Network Provider must be the only broadband network provider. Note that some telephony-only and low-band special services from legacy networks may also be permitted to continue to operate.

2.4 C559 ULLS NETWORK DEPLOYMENT CODE BLOCKS VDSL2 USE IN THE UNBUNDLED ENVIRONMENT

C559 includes an "Unacceptable Excess Power" clause that effectively prevents any deployment of VDSL2 on access copper cables until the industry has given due consideration to VDSL2 technology choices and rollout options. WC58 believes that it would be inadvisable to remove that clause while the ULLS regime remains in force for a given serving area. If it were to be removed, other service providers could deploy VDSL2 or VDSL2-like technologies that would interfere with The Network Provider's VDSL2.

While the ULLS regime remains in place, the Network Provider must be exempted from that "Unacceptable Excess Power" provision, in order to enable an exclusive vectored VDSL2 rollout which in turn will deliver the best vectored VDSL2 data rates and lowest dropout rates for end users.

With a single step migration to VDSL2 (i.e. with no transition period), revocation of the ULLS regime for the relevant serving area would be adequate to enable VDSL2 rollout, as C559

would no longer apply. Where there is a transition period and the ULLS regime is not revoked then there will be a need to revise the C559 industry code.

2.5 PARTIAL EXEMPTIONS AND PERMISSIONS DURING A TRANSITION PERIOD

During any transition period, the Network Provider must be permitted to roll out VDSL2, while other service providers must continue to deploy according to the current C559 network deployment rules. Because the node serving area remains a ULLS environment during the transition period, The Network Provider must:

a) Be exempted from the "Unacceptable Excess Power" requirement of C559.
b) Be obliged to shape the VDSL2 signal from the node according to the 'Deployment State A' requirements of the current C559, to prevent 'Unacceptable Interference' to legacy services on access copper cables. That requires the definition of a new VDSL2 Deployment Class in C559 that is used by the Network Provider to engineer VDSL2 equipment configurations and rules that avoid unacceptable interference.

In addition, other service providers must not be permitted to deploy the new VDSL2 Deployment Class on the same access copper cables as the Network Provider. The VDSL2 Deployment Class must be reserved for the exclusive use of The Network Provider on those cables.

2.6 BUILDING DEPLOYMENTS ARE CURRENTLY UNREGULATED

Current legislation does not facilitate the enforcement of spectral compatibility in customer premises cabling, despite the fact that there is a subset of the customer premises cabling that is directly connected to network copper and is necessary for delivery of the standard telephone service to end users. It is fundamental to the design of ADSL2+ and VDSL2 services that they use that network-connected copper in the building, usually sharing that network-connected building cabling with the telephone service.

In order to protect the integrity of the services delivered over access network connected cables within-buildings, there needs to be some way for FTTN designers to ensure that their node based services would not suffer interference from other uncontrolled in-building systems sharing those cables. Communications Alliance currently recommends in C559, but cannot mandate, that in-building systems use separate cable sheaths from network connected services. However that advice is rarely heeded, because VDSL2 deployments in-buildings are intended for use with the telephone services on those network-connected building cables.

Unless the recommendations in C559 can be given mandatory status and enforced (i.e. to reserve the network-connected building telephony cabling for The Network Provider), one of the alternatives below may be needed.

2.7 ALTERNATIVES TO SPECTRAL COMPATIBILITY REGULATION IN ACCESS NETWORK-CONNECTED BUILDING CABLING.

Failure to adequately protect the network-connected services as they pass through customer premises cabling, by prohibiting the use of that cabling by anything other than low-band services such as analogue exchange-based telephony, leaves the following alternatives for VDSL2 provision:

a) The current status where the first to use the building cabling for VDSL2 can do so and any subsequent use by another party results in both sets of services being

degraded. In this situation, the first user of an in-building DSLAM would need to use legal measures to control any further usage of the building cables for VDSL2, to prevent use by a second party. Subsequent providers of VDSL2 would need to use separate cabling for their VDSL2 delivery (i.e. install new building cabling). Note that this approach may not avoid issues.

b) If the Network Provider's FTTN node (installed in a street side cabinet) is the first to provide VDSL2 over the network-connected building cabling, then current regulations do not prevent another provider from subsequently installing a premises DSLAM and using the same in-building cabling and degrading an existing service.

c) A regulated first-in approach where the first DSLAM using the network connected building cabling for DSL must register and provide a VDSL2 service meeting minimum quality standards, and any additional VDSL2 DSLAMs would not be permitted to deploy on that building cabling. The Network Provider would then be informed of and could account for such deployments within its rollout plans.

Where the Network Provider, as part of its FTTN design, decides that a building is most appropriately served by a premises node (rather than a node in a street cabinet), that node should be considered network equipment and treated from a regulatory perspective as any other network node. It should be able to take the necessary measures to protect the VDSL2 services from that node from any interference from other systems using the building cabling.

This is discussed further below in the context of determining the single Network Provider per area.

SECTION 3 – OPTIONS FOR TRANSITION TO FTTN

This section presents options, tradeoffs and considerations for addressing the policy and regulatory questions raised in this paper.

3.1 POTENTIAL OPTIONS FOR THE FUTURE OF ULLS IN THE CONTEXT OF THE FINAL FTTN

WC58 understands the need for an orderly transition from the current legacy services to a new environment with node based DSLAMs delivering VDSL2 services. That transition must take into account the need for continuing management of spectral compatibility during that transition and the practical requirements for transfer of legacy services to the Network Provider's node DSLAMs. The key options are:

(a) Continue to support the current ULLS environment indefinitely with a single VDSL2 Network Provider deploying its FTTN in parallel with existing legacy copper pair access services.
Expectations of the assurable minimum VDSL2 download and upload rates and VDSL2 stability would be correspondingly reduced as noted elsewhere in this paper.

(b) Continue to support the current ULLS environment indefinitely with competitive VDSL2 Network Providers (>= 2 Network Providers) deploying their FTTN solutions in parallel with each other in the same areas and in parallel with existing legacy services.
Expectations of the assurable minimum VDSL2 download and upload rates and VDSL2 stability would be correspondingly reduced as noted elsewhere in this paper. In this option, service rates and stability are expected to be significantly lower than in (a) above.

(c) At the time of VDSL2 roll out, either retire or migrate all access copper cable services onto Layer 2 bitstream services delivered using a single Network Provider's FTTN platform, with an intention that migrations proceed rapidly. Upon completion of migrations, the ULLS regime would be revoked for each node serving area immediately. With a single step migration to VDSL2 and with no transition period, revocation of the ULLS regime for the relevant serving area would avoid the need for substantial changes to C559, because C559 would no longer apply.

(d) Continue to support the current ULLS environment during a defined transition period. The purpose of the transition period is to facilitate orderly migration from today's ULLS environment to a model supporting a single VDSL2 Network Provider per area, and to minimise disruption to end users and service providers utilising access copper cables. During the orderly transition, the VDSL2 Network Provider will operate its new VDSL2 services in parallel with existing access services, and this is likely to result in lower minimum VDSL2 download and upload rates and VDSL2 stability than will ultimately be possible in a single Network Provider VDSL2-only context. At the completion of the orderly transition in each area, VDSL2 download and upload rates can be increased to their maximum potential and VDSL2 stability will be optimum.

Considerations:

Communications Alliance needs to modify and evolve today's industry codes to support VDSL2 and FTTN deployments. The manner in which they are evolved depends on the future of ULLS policy. In order to expedite the deployment of vectored VDSL2, WC58 needs

confirmation of a policy decision that would enable it to commence drafting the necessary changes.

3.2 PARAMETERS OF THE TRANSITION FROM ULLS TO THE NEW ENVIRONMENT

WC58 recognises the likely requirement for a transition period during which legacy services coexist with new FTTN services. The mix of exchange and node based services in each area can give rise to higher risk of creating unacceptable interference between broadband services. This is due to the potential for signal power level mismatches at the mid-span location of the node. During a transition, legacy services will impact upon vectored VDSL2 services as uncancellable crosstalk.

Vectored VDSL2 services may also interfere unacceptably with legacy services unless the VDSL2 spectrum is shaped according to the provisions of the current C559 to minimise any impact. The cost of such coexistence to vectored VDSL2 services is a significant reduction in the rates and stability of FTTN VDSL2 services. The impact on VDSL2 services might be more acceptable if there were a well-defined transition, in a clearly defined window of time per node serving area.

With clarification of the policy issues, including the need for a single network provider of FTTN per cable or node serving area, and regulatory changes to allow parts of C559 to apply only to the selected Network Provider, an orderly transition is possible. However the decisions on transition periods and the services to be offered during transition periods are mainly network design decisions (many with significant cost implications) to be made by the Network Provider in consultation with service providers.

Further questions of a technical or practical nature may arise as a result of this decision.

3.3 TIMING OF THE TRANSITION FROM ULLS TO THE NEW ENVIRONMENT

If the need for an orderly transition from the ULLS regime to a new FTTN regime described above is accepted, there is a series of follow on questions surrounding the timing of the transition:

(a) Will the window of time allocated for transition be relatively short (for example of one month duration), or long (for example many years in duration), or an interval somewhere in between these two extremes?

(b) Will the same transition interval apply for each kind of legacy technology currently using copper access cable (ADSL2+, ISDN, SHDSL, E1, analogue telephony, etc.), or will different transition intervals apply to different kinds of legacy technologies?

(c) Should the questions raised in the previous two bullets be resolved through:
   a. bilateral agreements between Telstra and each Network Provider that will acquire control of the access copper cable pairs;
   b. multilateral agreements between Telstra, the new Network Provider and the current end users legacy services;
   c. either of the former options operating within a framework of general policy guidance;
   d. a definitive transition policy framework outlining an explicit approach to transition timing; or
   e. definitively by a regulator?

Considerations:

The existence and timing of any transition must be recognised as the design prerogative of the Network Provider in consultation with all relevant stakeholders. Resolution of the timing of the transitional approach is urgent, in fact critical. Key engineering decisions depend on the answers, and will affect the equipment and configuration that gets deployed in a node and

cabinet, and the operational processes required to perform a migration. Decisions regarding an approach to transitional timing will fundamentally impact the overall FTTN and FTTB financial outcome.

Further questions of a technical or practical nature may arise as a result of this decision.

3.4 DETERMINATION OF THE SINGLE NETWORK PROVIDER PER AREA

At present, there is considerable industry uncertainty regarding this question and industry seeks prompt clarification.

Some VDSL2 deployments are understood to have already been undertaken, both for the general community and within buildings. Industry is uncertain about how or whether these basement and area deployments will be accommodated within the overall national FTTN deployment, and about implementation and coordination of a single VDSL2 Network Provider per area.

Options:

a) The single Network Provider for each area is determined as an explicit policy decision.

b) A regulator, operating according to a policy defined by the Government, develops and manages a process to determine the single Network Provider per area or building.

Considerations:

The planning and design processes that precede the physical construction and commissioning of a VDSL2 node involve significant engineering effort and are typically expended over an extended time period. These planning and design processes include site selection, council approvals, preparation of facilities, construction and provisioning of power and backhaul as well as equipment order lead-times and physical installation and commissioning of the VDSL2 DSLAMs. To ensure consistent coverage and performance of VDSL2 services, a consistent network design is required for the whole network and in each given area.

The single Network Provider per area should ideally be determined before potential investors commence their individual planning and design activities to avoid inefficient engineering, rushed engineering, and asset stranding. Decisions regarding the approach for selection of a single Network Provider per area, and the timing of each decision with respect to the planning and design processes in each area will fundamentally impact the overall FTTN and FTTB financial outcome.

Further questions of a technical or practical nature may arise as a result of this decision.

3.5 MANAGING THE DESIGN OF THE NATIONAL FTTN / VDSL2 NETWORK TO ACHIEVE COORDINATED NODE PLACEMENT, COORDINATED SPECTRUM USE AND CONSISTENT DESIGN RULES

Where there exists a possibility for more than one designer deploying FTTN in an area, for example:

(a) in an area containing a mix of Single Dwelling Units and Multiple Dwelling Units where some buildings may be equipped with basement nodes, or

(b) areas subject to other technical constraints,

different design decisions may lead to deployment issues for one or all Network Providers.

Choosing the location for nodes is a critical engineering design decision and is subject to engineering design constraints. WC58 sees a need for a single network designer to control the national design and placement of node locations, and to determine critical parameters such as required node capacity at each location, with additional consideration for

download and upload capacities that form part of the FTTN policy. Ad hoc deployment cannot be permitted if reliable universal service coverage is required.

Options:

a) Delegate national design responsibility to a single Network Provider, charged with the responsibility of coordinating the design and placement of FTTN nodes.
b) Delegate national design responsibility to a regulator.
c) Delegate national design responsibility to the mutual parties involved in each area, to resolve through bilateral / multilateral agreement, potentially overseen by a regulator.

Considerations:

The need for guidance is now urgent because early VDSL2 deployments are proceeding without coordination, and reconciliation is likely to be complex and costly.

3.6 REGULATION OF IN-BUILDING CABLING

The C559 industry code which regulates spectral compatibility of services utilising access copper cables is constrained from regulating in-building and other private cables. Where in-building and other private cable is necessary to deliver carriage services utilising access copper cables, ideally the operator of the in-building system would voluntarily honour the requirements of the code. The code currently includes non-binding guidance to this effect. Prior to the possibility of VDSL2 based FTTN deployments, the concern that the operator of an in-building system would not voluntarily honour the code has been on a smaller scale. WC58 now recognises this concern as a significant threat to coordinated FTTN rollout and requires immediate resolution.

The operator of a node based VDSL2 FTTN service is dependent both on the access copper cables in the street as well as the in-building cables within a Multi Dwelling Unit or Shopping Centre for delivery of broadband services. If an alternate operator installs a DSLAM and offers services that share the in-building cables, the in-building and node services would be expected to harmfully interfere with each other.

Options:

a) Expand the scope of regulation so that the C559 industry code regulates in-building cables where those cables are necessary for the reticulation of externally sourced carriage services. Regulation of in-building cables would provide some assurance that VDSL2 and ADSL2+ services fed from The Network Provider's FTTN nodes would not suffer unacceptable interference.
b) Avoid regulation of the in-building cables by defining the processes for identifying and enforcing a single Network Provider per area.
   This approach allows one provider to be nominated to serve the general area (i.e. an FTTN Network Provider) and another provider to be nominated to serve a particular building within that area (i.e. an FTTB Network Provider), providing the FTTN Network Provider is exempted from offering services into the building, and the FTTB Network Provider is prohibited from originating services within the building delivered to addresses outside the building using cables shared with the FTTN Network Provider.
c) A flexible approach, where subject to the desires of the building owners and occupiers, an alternative provider may install a premises DSLAM.
   As this would effectively prevent or frustrate the delivery of FTTN services from an external Network Provider node, the external Network Provider would be exempted from offering services into the building.

Considerations:

Regulation of spectral compatibility within building cabling would first require identification of that cabling that was installed for the purpose of carrying analogue telephony and DSL services within the building or campus from the network to end-user premises. Because the building 'MDF' intervenes between the access network copper cables and the building cables, the definition may not always be clear.

If a Network Provider deploys a street cabinet node and a building owner subsequently selects an alternate provider, a proportion of the Network Provider's node capacity will be effectively unusable. Conversely, if a building owner that previously selected an alternate provider and subsequently wishes to revert to the FTTN Network Provider, expansion of that efficiently deployed FTTN cabinet may be impractical.

If a building owner or its occupants are provided the discretion to choose, who are the stakeholders that take part in the decision making process? How are disputes resolved? Should there be a self/co-regulatory process?

Would an alternative provider using a building DSLAM be required to provide an NBN-like service of a specified quality and performance? Would that provider also be required to provide wholesale access to that DSLAM from a specified NBN POI? Should the alternative provider be barred from offering retail services?, or be obliged to offer wholesale services? Should the wholesale services only be available to unrelated entities?

SECTION 4 – QUESTIONS AND RECOMMENDATIONS

This section recommends policy responses to a number of questions that WC58 consider relevant to the roll out of an FTTN network using vectored VDSL2.

1.	Will today's ULLS be replaced or evolved? If so, with what will it be replaced or how will it be evolved? What are the parameters and timing for the transition?

In order to provide the highest download and upload rates to end users using vectored VDSL2, WC58 can see no other viable alternative than a single wholesale infrastructure provider of local fixed broadband services for each copper access cable.

Recommendation:

The ULLS regime should be revoked (or an exemption from it granted) for each node serving area following FTTN rollout. After a transition period, the Network Provider would be the only provider using the cables, apart from providers of a few special services that may be permitted to continue without compromise to vectored VDSL2.

2.	If today's ULLS will be replaced or evolved, should regulations allow for an orderly transition?

Recommendation:

Regulations must be in place to reduce detrimental effects on both VDSL2 and legacy services during any nominated transition period. Engineering design decisions on the duration and parameters for a transition period should be left to the FTTN network designer, in consultation with all relevant stakeholders.

3.	In order to ensure adequate service quality during any transition period, will regulators provide legal basis for the development of separate deployment rules for the Network Provider and other users of legacy services on copper pair access cables?

Recommendation:

During the transition period, C559 would need to continue to apply to legacy services and service providers, but also include sections that apply only to the Network Provider as the only user of a vectored VDSL2 Deployment Class.

4.	If a single Network Provider per area policy will be implemented, what is the preferred model or process through which that single Network Provider per area will be determined?

This issue is causing considerable industry uncertainty and is a matter for Government to decide.

Further questions of a technical or practical nature may arise as a result of this decision.

5.	How will the design of the national FTTN / VDSL2 network be managed to achieve coordinated node placement, use of spectrum and consistent design rules?

Recommendation:

Delegate national design responsibility to a single network designer (assumed to be the Network Provider) that is competent to balance the technical constraints and tradeoffs.

6.	Will in-building cabling be regulated?

Recommendation:

An approach to ensure a single Network Provider per area or building should be established. Alternatively, the regulation of broadband service deployment in respect of in-building cabling will be necessary.

SECTION 5 – CONCLUSIONS

Before proceeding to register codes and standards to support VDSL2 over FTTN, Communications Alliance must await the policy deliberations of regulators and government on the key issues highlighted above. The lack of appropriate industry codes and standards could potentially delay the FTTN VDSL2 transition from the current trial stage to commercial services. The need for guidance is now urgent because early VDSL2 deployments are proceeding without coordination, and reconciliation is likely to be complex.

WC58 will commence drafting changes to documents in accordance with the recommendations above under the assumption that the recommendations will be adopted. This will facilitate the earliest registration and implementation of the updated regulatory arrangements. Alternately, if the preferred policy outcomes differ, Communications Alliance will update its work plan to implement the preferred policy.

Attachment 2

Membership of Communications Alliance Working Committee 58 on VDSL2 and Vectoring

Peter Cooke (Chair)	Telstra
James Duck (secretary)	Communications Alliance
Michael Hilton	AAPT
Danet Khuth	AAPT
James Park	ACCC
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Paul Brooks	Layer10
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Stefan Keller-Tuberg	
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