

**COMMUNICATIONS
ALLIANCE LTD**



DRAFT INDUSTRY CODE

DR C658:2025

NEXT-GENERATION BROADBAND SYSTEMS
DEPLOYMENT IN CUSTOMER CABLING

PART 1

PERFORMANCE REQUIREMENTS

DRAFT FOR PUBLIC COMMENT

PUBLIC COMMENT STARTS – 22nd JANUARY 2025

PUBLIC COMMENT ENDS – 25th FEBRUARY 2025

DR C658:2025 Next-Generation Broadband Systems Deployment in Customer Cabling – Part 1 – Performance Requirements Industry Code

First published as C658:2018
Second edition as C658:2019

Disclaimers

- 1) Notwithstanding anything contained in this Industry Code:
 - a) Communications Alliance disclaims responsibility (including where Communications Alliance or any of its officers, employees, agents or contractors has been negligent) for any direct or indirect loss, damage, claim, or liability any person may incur as a result of any:
 - i) reliance on or compliance with this Industry Code;
 - ii) inaccuracy or inappropriateness of this Industry Code; or
 - iii) inconsistency of this Industry Code with any law; and
 - b) Communications Alliance disclaims responsibility (including where Communications Alliance or any of its officers, employees, agents or contractors has been negligent) for ensuring compliance by any person with this Industry Code.
- 2) The above disclaimers will not apply to the extent they are inconsistent with any relevant legislation.

Copyright

© Communications Alliance Ltd 2025

This document is copyright and must not be used except as permitted below or under the Copyright Act 1968. You may reproduce and publish this document in whole or in part for your or your organisation's own personal or internal compliance, educational or non-commercial purposes. You must not alter or amend this document in any way. You must not reproduce or publish this document for commercial gain without the prior written consent of Communications Alliance. Organisations wishing to reproduce or publish this document for commercial gain (i.e. for distribution to subscribers to an information service) should apply to Communications Alliance by contacting the Communications Alliance Commercial Manager at info@commsalliance.com.au.

INTRODUCTORY STATEMENT

The **Next-Generation Broadband Systems Deployment in Customer Cabling** Industry Code (C658:2025) replaces the registered **Next-Generation Broadband Systems Deployment in Customer Cabling** Industry Code (C658:2019).

The purpose of the changes is to:

- Add a new Deployment Class System based on G.fast technology that is spectrally masked to operate above 20 MHz (G.fast SM);
- Add content on a dispute resolution process; and
- Update the System Notification Process to reflect learning from operational experience.

Peter Cooke
Chair

G.fast Working Committee

January 2025

TABLE OF CONTENTS

1	GENERAL	3
1.1	Code Overview	3
1.2	Objectives	3
1.3	Introduction (Informative)	4
1.4	Scope	7
1.5	Commencement date	8
1.6	Code review	8
1.7	Powers of the Telecommunications Industry Ombudsman to handle complaints under the Code	8
2	ACRONYMS, DEFINITIONS AND INTERPRETATIONS	9
2.1	Acronyms	9
2.2	Definitions	10
2.3	Interpretations	24
3	REFERENCE ARCHITECTURE	25
4	GENERAL REQUIREMENTS FOR OPERATION OF A SYSTEM	26
4.1	Cooperation in Good Faith	26
4.2	Interference to NGBS	27
4.3	Interference to Legacy Systems	28
4.4	Priority Order	28
4.5	Special Conditions for Legacy Systems	28
4.6	Consequences of failure to Notify	30
5	FUNDAMENTAL TECHNICAL REQUIREMENTS	31
5.1	Technical Requirement 4.2 – Interference to Next-Generation Broadband System	31
5.2	Technical Requirement 4.3 – Interference to Legacy Systems	33
5.3	Reverse transmissions and building interconnection cables	35
6	COMPLIANCE BY DEPLOYMENT CLASS SYSTEMS	37
6.1	Deemed Compliance with Technical Requirement 4.2	37
6.2	Deemed Compliance with Technical Requirement 4.3	38
6.3	Requirement for an existing Higher Priority Deployment Class System to change Deployment Class in order to satisfy Clause 4.1	38
6.4	Modified Sharing Resolution Process	42
7	PROCESS REQUIREMENTS FOR COOPERATION IN GOOD FAITH BETWEEN PROVIDERS SHARING A CABLE BUNDLE	44
7.1	Introduction	44
7.2	Cooperation Process	44
7.3	Notification of System Details	57
7.4	Non-Compliance with this Code	59
8	TABLES OF DEPLOYMENT CLASSES AND DEEMED COEXISTENCE	61

8.1	Deployment Class Systems	61
8.2	Coexistence Scenarios	62
8.3	Full Coverage Ranges	64
<hr/>		
9	REFERENCES	66
<hr/>		
	APPENDIX	68
<hr/>		
A	PROCESS FLOWS (INFORMATIVE)	68
<hr/>		
	PARTICIPANTS	78
<hr/>		

1 GENERAL

1.1 Code Overview

- 1.1.1 This Code consists of three Parts that describe rules and processes to enable multiple Providers to efficiently share Customer Cabling and maintain performance goals for Next-Generation Broadband Systems (NGBSs) and for Legacy Systems. Based on a fundamental requirement for Cooperation in Good Faith between Providers, this set of rules and processes has been developed by industry members of Communications Alliance.
- 1.1.2 Part 1 of the Code defines the fundamental rules to prevent unacceptable System degradation and a set of processes that enable Providers to implement those rules in an orderly manner.
- 1.1.3 Part 2 of the Code provides the detailed technical basis for performing calculations that are required to implement the rules in Part 1.
- 1.1.4 Part 3 of the Code defines the System types and parameters for defined Deployment Classes that are necessary to support the rules in an efficient manner. Currently only VDSL2 Deployment Classes are defined.
- 1.1.5 It is expected that this Code will be updated regularly and a future revision may cover newer technologies including XG.fast.

1.2 Objectives

- 1.2.1 The objectives of the Code are:
 - (a) to facilitate competition in the Deployment of Next-Generation Broadband Systems (e.g. Vectored VDSL2, non-Vectored VDSL2, G.fast) by Carriers and Providers;
 - (b) to minimise the potential for interference between telecommunications Systems Deployed in the same Shared Cable Bundle;
 - (c) to ensure a minimum level of performance for certain Next-Generation Broadband Systems, including to meet Statutory Infrastructure Provider (SIP) obligations and other government policy expectations;
 - (d) to protect the performance of certain Legacy Systems (e.g. ADSL2+) Deployed in the same Shared Cable Bundle as a Next-Generation Broadband System;
 - (e) to provide flexibility and scope for technology Upgrades within a framework of International Standard Systems.

1.3 Introduction (Informative)

- 1.3.1 This Code specifies performance requirements to manage coexistence of Systems Deployed over one or more pairs of conductors in a Shared Cable Bundle in Customer Cabling.
- 1.3.2 This is necessary to facilitate the conflicting goals of:
- (a) maximising competition between Providers in respect of the installation of infrastructure; and
 - (b) maximising the speed attainable in respect of individual services.
- 1.3.3 The goals conflict because operation of more than a single Next-Generation Broadband System (NGBS) Digital Subscriber Loop Access Multiplexer (DSLAM) on (or the presence of other access technologies in) a Shared Cable Bundle causes 'cross-talk' interference which significantly reduces data rates and increases the chance of service dropouts. The Code therefore specifies performance requirements to manage co-existence of multiple Systems in a Shared Cable Bundle.

Legacy ADSL Systems, Customer Cabling and the ULLS Network Deployment Rules code (C559)

- 1.3.4 The Code prohibits Providers from causing Unacceptable Interference to Legacy ADSL Systems that are Deployed in Shared Cable Bundles consistently with the current industry Code: *Unconditioned Local Loop Service (ULLS) Network Deployment (C559)*. The Code extends this requirement to Building Systems and Campus Systems that have not previously been required to comply with C559 because they operated only in customer cabling (and did not use the ULLS).

Unlike C559, which manages interference by limiting the bit rate impact, this Code regulates interference by managing spectrum usage. C559 defines a set of Deployment Classes which can always be operated together, while this Code defines specific sharing situations for limited combinations of Deployment Class Systems. The Deployment Classes defined in this Code are different from the deployment classes defined in C559.

Fundamental rules (Part 1, 4.2)

- 1.3.5 The Code requires Providers wishing to Deploy a System to a Shared Cable Bundle accessible by other Providers:
- (a) To cooperate with each other to ensure (wherever possible) a sharing solution is achieved.
 - (b) To achieve a solution that meets the Code's fundamental technical requirements of:
 - (i) not emitting Unacceptable Excess Power;

- (ii) not causing Unacceptable Interference to a Higher Priority System; and
 - (iii) not causing Unacceptable Interference to a Legacy System.
- (c) To comply with certain technical requirements (if the Provider is seeking to use a deemed compliance approach).

Priority (Part 1, 4.4)

1.3.6 The Code generally requires any System not to cause Unacceptable Interference to any equal or Higher Priority Deployment Class System or any Legacy System. Priority is determined by:

- (a) Full Coverage status.
- (b) System type (Deployment Class Systems have Higher Priority than Non-Deployment Class Systems).
- (c) Priority Date (Systems Deployed earlier generally have priority over Systems Deployed later, taking into account some additional conditions for System Upgrades).

Exceptions to enable sharing

1.3.7 There are two specific exceptions that can require an otherwise Higher Priority System to make changes in order to accommodate a Lower Priority System:

- (a) Case 1: Two Systems at the same Network Reference Point (e.g. two Building Systems serving the same building).
- (b) Case 2: Two Systems at separated Network Reference Points (e.g. a Building System and a Network System node serving the same building).

In both cases the Sharing Resolution Process created by the Code attempts to enable sharing by requiring a change of Deployment Class System by the Higher Priority System where necessary. The Provider with the lower Priority System will then be able to Deploy a compatible System.

Situations where sharing is blocked

1.3.8 There are two situations that will prevent a sharing of Shared Cable Bundles and require adherence to the Priority Order without a forced change in Deployment Class:

- (a) Where an existing (Higher Priority) Deployment Class System would lose Full Coverage.
- (b) Where the change would result in an Unacceptable Operational Impost on a Provider with an existing or Higher Priority Deployment Class System.

Registration, Notification of System details and the co-operation process (Part 1, Section 7)

- 1.3.9 Providers who follow the Code rules may receive the protections the Code offers e.g. by subscribing to the Communications Alliance industry list for updates of system notifications, making all necessary System details available to all other Providers. The Code establishes a co-operation process that a Provider may trigger by Notifying a new System or an Upgrade to an existing System.

Technologies defined as Deployment Class Systems

- 1.3.10 The Code defines a series of Vectored and non-Vectored VDSL2 Deployment Class Systems, a G.fast Deployment Class System and compatible combinations of those Deployment Class Systems.

NOTE: There are provisions within Section 7 that prevent a Notification of a second G.fast system in a Shared Cable Bundle. This provision is necessary to prevent more than one G.fast system being Deployed to a Shared Cable Bundle, in acknowledgement of G.fast's time-division duplex approach which causes two or more G.fast systems that would share a cable bundle to be spectrally incompatible with each other.

Administrative details

- 1.3.11 Section 112 of the *Telecommunications Act 1997* (the Act) sets out the intention of the Commonwealth Parliament that bodies and associations representing sections of the telecommunications industry develop industry Codes relating to the telecommunications activities of participants in those sections of the industry.
- 1.3.12 The development of the Code has been facilitated by Communications Alliance through a Working Committee comprised of representatives from the telecommunications industry and regulators.
- 1.3.13 This Code is to be submitted to the Australian Communications and Media Authority (ACMA) for registration under section 117 of the Act.
- 1.3.14 The Code should be read in the context of other relevant codes, guidelines and documents.
- 1.3.15 The Code should be read in conjunction with related legislation, including:
- (a) the Act;
 - (b) the *Competition and Consumer Act 2010 (Cth)*; and
 - (c) Telecommunications Regulations 2001.

- 1.3.16 If there is a conflict between the requirements of the Code and any requirements imposed on a Provider by statute, the Provider will not be in breach of the Code by complying with the requirements of the statute.
- 1.3.17 Compliance with this Code does not guarantee compliance with any legislation. The Code is not a substitute for legal advice.
- 1.3.18 Statements in boxed text are a guide to interpretation only and not binding as Code rules.

1.4 Scope

- 1.4.1 The Code applies to the following sections of the telecommunications industry under section 110 of the Act:
 - (a) Carriers; and
 - (b) Carriage Service Providers.
- 1.4.2 The Code deals with the following telecommunications activities listed in section 109 of the Act:
 - (a) carrying on business as a Carrier; or
 - (b) carrying on business as a Carriage Service Provider; and
 - (c) supplying goods or service(s) for use in connection with the supply of a Listed Carriage Service.
- 1.4.3 Subject to 1.4.4, the Code applies to Carriers and Carriage Service Providers planning to operate, and operating, telecommunications Systems to supply services over Shared Cable Bundles, and imposes performance requirements and, indirectly, design features, on those Systems to facilitate sharing of those Shared Cable Bundles.

NOTE: While the Code applies to the operation of all Systems carried over Shared Cable Bundles (subject to the exclusions in 1.4.4), the Code only affords protection to certain VDSL2 Deployment Class Systems using spectrum in frequency ranges including above 2.208 MHz, certain G.fast Deployment Class Systems using spectrum in frequency ranges above 20 MHz, and to Legacy ADSL Systems.

- 1.4.4 The Code does not apply to:
 - (a) a System that is only capable of operating in frequency bands below 12.5 kHz;
 - (b) operation of a System on a ULL in accordance with C559, including the use of Customer Cabling jumpered to the ULLS;
 - (c) operation of telecommunications Systems over Exclusive Customer Cabling, except to the extent that other Providers need access to information, and to ensure that the

Exclusive Customer Cabling is not a part of the same Shared Cable Bundle as a System fed from an Access Cable.

- (d) Notwithstanding (c), the Code does apply in a limited way to services over Exclusive Customer Cabling (i.e. clause 4.3.1 does apply).

NOTE: Exclusive Customer Cabling is defined elsewhere in this Code. Whether a Carrier can be granted 'exclusive access' to Customer Cabling is to be determined according to the legal rights of the parties. This Code is not intended to imply a legal right for such access.

1.5 Commencement date

The Code will commence on the day of registration with the ACMA.

1.6 Code review

The Code will be reviewed after 5 years of the Code being registered by the ACMA and every 5 years subsequently, or earlier in the event of significant developments that affect the Code or a chapter within the Code.

1.7 Powers of the Telecommunications Industry Ombudsman to handle complaints under the Code

The Code does not confer powers or functions on the TIO under section 114 of the Act.

2 ACRONYMS, DEFINITIONS AND INTERPRETATIONS

2.1 Acronyms

For the purposes of the Code:

ACMA

means the Australian Communications and Media Authority.

AEST

means Australian Eastern Standard Time.

CA

means Communications Alliance.

CCF

means Cross Connect Facility.

CE

means Customer Equipment.

CSP

means Carriage Service Provider.

DPBO

means Downstream Power Back Off.

DSLAM

means Digital Subscriber Loop Access Multiplexer.

G-NAF

means Geocoded National Address File.

ITU-T

means International Telecommunications Union – Telecommunications sector.

MDF

means Mid Distribution Frame.

NBP

means Network Boundary Point.

NGBS

means Next-Generation Broadband System.

NRP

means Network Reference Point.

PSD

means Power Spectral Density.

ULLS

means Unconditioned Local Loop Service.

UPBO

means Upstream Power Back Off.

VDSL2

means Very high speed Digital Subscriber Line 2.

2.2 Definitions

For the purposes of the Code:

Access Cabling

means:

- (a) any part of the telephony access network cabling that includes main, branch, distribution and lead-in cabling as shown in the Reference Architecture of Figure 1 of Section 3. Access Cabling;

and excludes:

- (b) Tie Cables that connect a DSLAM to a CCF or joint, or
- (c) cabling beyond the customer side of the Network Boundary Point.

NOTE: Access Cabling does not refer to Customer Cabling or Exclusive Customer Cabling.

Act

means the *Telecommunications Act 1997 (Cth)*.

Alien

means a System that does not belong to a Vectored group of Systems, and hence causes uncancellable crosstalk to a Vectored System.

Attainable Net Data Rate

has the meaning given by ITU-T Recommendation G.9701.

Building Provider

means a Provider whose services within a building or Campus are provided using only Building Systems or Campus Systems.

Building System

means a System that provides carriage services to end-users only over Customer Cabling within a particular building and does not use Access Cabling.

Campus

means a site consisting of multiple buildings (e.g. a university, shopping centre, housing complex) where those buildings are connected by Customer Cabling to the Network Boundary Point.

Campus System

means a System that provides carriage services to end-users only over Customer Cabling within a particular Campus consisting of multiple buildings, and does not use Access Cabling.

Carriage Service Provider

has the meaning given by section 87 of the Act.

Carrier

has the meaning given by section 7 of the Act.

Coded Data

means transmissions which carry information including signalling, synchronisation, timing and payload.

NOTE: in a Discrete Multi-Tone System such as VDSL2 or G.fast, Coded Data is carried in the frequency bands within which the transmitted tones nominally reside. In other kinds of System, Coded Data may be carried in the full range of frequencies permitted through the transmitter's band-pass filter.

Coexistence Mask

means a Power Spectral Density Mask that constrains the PSD transmitted by a Non-Deployment Class System for the purpose of preventing Unacceptable Interference to a Deployment Class System.

Coexistence Period

means in respect of any Shared Cable Bundle within the serving area of an nbn Fibre To The Node, Fibre To The Building, Fibre To The Basement and/or Fibre To The Curb DSLAM (as defined in nbn's Wholesale Broadband Agreement), the period defined by nbn, during which nbn is required to adjust the normal operations of its VDSL2 Systems by applying DPBO.

Coexisting System

means a System which is permitted to coexist with a Higher Priority Deployment Class System by virtue of:

- (a) being listed in Column 2 of Table 2 or Table 3 of Part 1 correlating to that Deployment Class System, or
- (b) complying with all Coexistence Masks for that Deployment Class System.

NOTE: A Coexisting System will be a Deployment Class System in certain situations. For example, when the Coexisting System is a Deployment Class listed in Column 2 of Table 2 or Table 3, and where the Coexisting System is operated in accordance with the technical parameters applicable to that Deployment Class.

Cooperation in Good Faith

means the fundamental Code requirement in Section 4.1, that outlines the only means by which a Provider can comply with this Code.

Cooperation Process

means the set of processes described in Section 7.2 for compliance with the Code's main requirement of Cooperation in Good Faith as outlined in Section 4.1, including Notification of System details and Operation Times, and for Sharing Resolution.

Cross Connect Facility

means any cable joint or a termination device for multiple cables consisting of wire terminating modules or strips or connectors, which allows pairs of conductors which are part of Access Cabling or Customer Cabling or a Tie Cable from a DSLAM to connect to other pairs of conductors on the customer side of that CCF.

NOTE: A CCF logically has an A (network) and B (customer) side, but does not have to be actually implemented as two discrete sides as in a traditional distribution frame. The major types of CCF within the local loop are located within traditional exchange buildings (MDFs), within roadside cabinets and specific street furniture (pillars) and at openable joints. There may also be CCFs within customer premises.

Customer Cabling

has the meaning set out in section 20 of the Act.

Customer Equipment

means equipment used, or installed for use on the customer side of the network boundary, and used as the end-user modem to access a Carrier service.

Day

means a period of time from an event on a specified calendar date until midnight Australian Eastern Standard Time at the end of the next calendar day.

Deployed (also including Deploy, Deploying, Deployment)

means:

- (a) a System that is:
 - (i) installed and connected to the Shared Cable bundle; or
 - (ii) installed in a way that allows it to be jumpered to use the Shared Cable Bundle; and
- (b) the System is operationally capable of providing a carriage service via the Shared Cable Bundle; and
- (c) services from that System have been offered to end users by means of that Shared Cable Bundle.

Deployment Class

means a class of System based on an International Standard, with a corresponding complete description of all technical parameters, that this Code defines for the purpose of enabling deemed compliance with its fundamental requirements.

Deployment Class System

means a System that meets all of the requirements of one of the Deployment Classes listed in clause 2.1 of Part 3 to this industry Code.

NOTE: A Deployment Class System as defined in this Code is never a Non-Deployment Class System or Legacy System as defined in this Code.

Distribution Cable

means the Access Cabling from the pillar or cabinet to the Distribution Point closest to the end-user, but not including the Lead-in Cable.

NOTE: See Figure 1 in Section 3 for more information.

Distribution Point

means the CCF (usually an openable joint) between the Distribution Cable and the Lead-in Cable.

NOTE: See Figure 1 in Section 3 for more information.

Digital Subscriber Loop Access Multiplexer

means the equipment which performs the exchange or network side modem function of a network or Building System. 'DSLAM' is used in this Code in this generic sense to describe the network end of any System.

Downstream

means the direction towards the CE from the Highest NRP in the legacy telephony customer access network and the extension of that telephone cabling, possibly through an MDF, into the customer premises. Where an

anomaly occurs due to closed loops (e.g. within a cable between two building MDFs each with a separate feed from the access network) the Downstream direction is determined by reference to Section 5.3.

Downstream Power Back Off

means a System function, the purpose of which is to equalise PSD levels in a Shared Cable Bundle between separated DSLAMs and hence prevent Unacceptable Interference being caused to other Downstream transmissions.

NOTE: DPBO is only used within the ADSL2+ frequency bands below 2.208 MHz. This code uses either kHz or MHz (=1000 kHz) for frequency units as appropriate.

Drop Cable

means a cable that connects from the Shared Cable Bundle to an end-user CE. Drop Cable is defined with reference to a specific Shared Cable Bundle, and is therefore different for each Shared Cable Bundle traversed by the System; for example, the cabling on a floor of a building may constitute a Shared Cable Bundle for services feeding CE on that floor and its drops may be short, but the whole of the floor cabling may be a Drop Cable when referring to the Shared Cable Bundle in the riser.

DSLAM

means equipment that transmits from the network end towards Customer Equipment and is used or installed to deliver a Carrier service.

Exclusive Customer Cabling

means Customer Cabling where the owner of the cabling has exercised a legal right to grant to a single specified person exclusive access to the whole of the Shared Cable Bundle for the operation of a System or Systems over that Shared Cable Bundle. Exclusive Customer Cabling cannot include cabling that is only a subset of a Shared Cable Bundle. Exclusive Customer Cabling cannot include a Shared Cable Bundle that is accessible by more than one Provider, including for the delivery of POTS or DSL from the access network in the same cable as a DSL Deployment.

External Interface Port

means the port on a System DSLAM where the connection is made to Tie Cable or Customer Cabling or the port on a System CE where the connection is made to Customer Cabling.

Frequency Division Duplex

means the allocation of separate spectrum to Upstream and Downstream transmissions.

Full Coverage

means the Provider's Systems can provide Full Port Coverage and Full Rate Coverage to all potential end users in an area which have requested a service.

Full Port Coverage

means the Provider is able to provide new services on reasonable request.

NOTE: If an end user has applied for a service and a service has not been provided within 3 months from the time of that application, the Provider must forfeit its Full Port Coverage status. This clause is only applicable to Systems that have passed the point in time where end users can first apply for a service. Prior to that time this condition is considered satisfied if the proposed System would have access to the Shared Cable Bundle.

Full Rate Coverage

means the Provider is able to demonstrate either:

- (a) that the Maximum Inline Attenuation from the DSLAM to the end user with the highest attenuation line of those in the Shared Cable Bundle does not exceed the maximum attenuation given in
 - (i) Table 4 of Part 1 for a System using VDSL2, or
 - (ii) Table 5 of Part 1 for a System using G.fast, with acceptable stability, using the Deployment Class type and parameters as Notified;

or

- (b) for every end user served by a line with Inline Attenuation that exceeds the relevant attenuation described in either
 - (i) Table 4 of Part 1 for a System using VDSL2, or
 - (ii) Table 5 of Part 1 for a System using G.fast; andusing the Deployment Class type and parameters as Notified; that both the minimum Attainable Net Data Rate is not less than specified below, and that all services operate with acceptable stability.

for:

- (c) a Network or Campus System using a VDSL2 based DCS, 25 Mbit/s Layer 2 Rate Downstream;
- (d) a Building System using a VDSL2 based DCS, 50 Mbit/s Layer 2 Rate Downstream; or
- (e) a System using a G.fast based DCS, 225 Mbps Layer 2 Rate Downstream plus Upstream.

Full Coverage may also be achieved through complementary coverage by more than one System from the one Provider that is operating multiple Deployment Class Systems that together provide Full Coverage across the footprint of the Shared Cable Bundle.

NOTES:

1. The access speed targets above are realised over the Maximum Inline Attenuation by using the attenuation limit from the corresponding column of Table 4.

2. This requirement for Full Coverage can be satisfied by multiple DSLAMs that complement each other to fully cover the Shared Cable Bundle at the required rate. If another (DSLAM or DSLAMs) has Full Coverage of a subset of the end users fed through the Shared Cable Bundle, then a DSLAM can claim Full Coverage by covering just the remainder of end users fed through the Shared Cable Bundle. For example, two DSLAMs could feed different floors of a building each only having partial coverage through a common Shared Cable Bundle, but together claim Full Coverage.

3. The calculation of Downstream rates for the purpose of ascertaining Full Coverage is based on the longer-term network solution where shaping for protection of Legacy Systems is not required.

General Excess PSD Mask

means the upper envelope or Limit Mask of permissible transmitted PSD applicable to all Systems, for the purpose of protecting Systems from Unacceptable Excess Power.

NOTE: For more information refer to Section 4 of Part 2 of this Code.

Higher NRP

means a NRP that is Upstream of another NRP.

Highest NRP

means the NRP from which all other NRPs that feed the Shared Cable Bundle are Downstream.

Incumbent System

A System that is Notified and in operation before a Provider Notifies a new System or Upgrade to initiate a Cooperation Process. This does not include the System for which the Initiator Notifies an Upgrade.

Initiator

means that Provider whose Notification of a new System or of a System Upgrade, in the absence of an active Cooperation Process for a Shared Cable Bundle, triggers a new Cooperation Process for that Shared Cable Bundle.

International Standard

means a Standard issued by a standards body recognised by Standards Australia, or a Recommendation issued by the International Telecommunication Union Telecommunications Standardization Sector (ITU-T).

Lead-in Cable

means that cable between the lowest joint in the customer access network at a Distribution Point and the building or Campus MDF.

Legacy ADSL System

means a Legacy System that uses transmission technology corresponding to one of the ADSL or ADSL2+ Basis Systems defined in C559, where that System is:

- (a) a ULLS System deployed in accordance with C559; or
- (b) a Building System or Campus System that complies with the Unacceptable Excess Power mask in C559.

Legacy Coexistence Mask

means a Power Spectral Density Mask that constrains the PSD transmitted by any System at frequencies below 2.208 MHz, for the purpose of preventing Unacceptable Interference to a Legacy System.

Legacy System

means a System used to provide a Legacy Service as defined in the *Telecommunications Amendment (Next-Generation Broadband Interference Management) Regulation 2015* over Shared Cable Bundles.

NOTE: A Legacy System is never a Deployment Class System or a Non-Deployment Class System.

Limit PSD Mask

means the absolute maximum PSD that a System is permitted to transmit as a function of frequency. When used in this Code, the term is intended to have the same meaning as in ITU-T Recommendation G.993.2.

Lower NRP

means a NRP that is Downstream of another NRP.

Maximum Inline Attenuation

means the maximum over all potential end user CE connections of the sum of the inline attenuations at 3.75 MHz of all cable segments in the path connecting the DSLAM to the end user via the Tail Cable, Shared Cable Bundle and Drop Cable.

Maximum Vectoring Gain

is a property of a Vectored Deployment Class System describing the highest possible dB improvement in crosstalk immunity that results from Vectoring on a channel. The Maximum Vectoring Gain may be different for Upstream and Downstream directions of transmission.

MIB PSD Mask

has the same meaning as in clause 3.35 of ITU-T Recommendation G.993.2.

Month

means a period of time from the calendar date in one calendar month to:

- (a) the same date in the following calendar month; or
- (b) where there is no same date in the following calendar month the first date of the subsequent calendar month; and

unless otherwise stated terminating at midnight Australian Eastern Standard Time (AEST) at the end of the final calendar day of the period.

NOTES:

1. For the purpose of this Code, all times and dates are assumed to follow AEST convention, regardless of the state or timezone in which the System or Provider to which the times or dates apply are located.

2. As an example, the Month commencing at any time during 17th February AEST would terminate at the end of the second which starts at 23:59:59 AEST on 17th March.

3. As an example, the Month terminates according to AEST convention, even if daylight savings is in force at the time.

4. As an example, the 30th January has no same date in the following calendar month of February, so the period of time would end on the 1st March i.e. the first day of the subsequent calendar month.

Network Provider

means a Provider that provides services using a Network System.

Network Reference Point

means any CCF or other location in access or Customer Cabling where a DSLAM may be connected via a Tie Cable.

Network System

means a System that provides carriage services over both Access Cabling (including Lead-in Cable) and Customer Cabling.

Next-Generation Broadband Service

means a service based on one of the following transmission technologies:

- (a) VDSL;
- (b) VDSL2;
- (c) VDSL2 with Vectoring;
- (d) G.fast; or
- (e) a successor technology to any of the technologies listed above.

Next-Generation Broadband System

means a System that:

- (a) uses a DSLAM connected via a Tie Cable to a CCF in a metallic pair cable telecommunications network; and
- (b) is capable of being used to supply a Next-Generation Broadband Service.

NOTES:

1. Paragraph (a) of this definition is intended to capture Systems fed from both Network System and Building System DSLAMs.

2. The effect of (b) is intended to be that the Code only protects Systems which are expected to achieve Full Coverage at a speed equivalent to the Government's expectations for nbn. A System that is not expected to achieve that performance assumes a Lower Priority than Systems that meet that performance when assessing interference between Systems.

Non-Deployment Class System

means a System that is not a Deployment Class System and not a Legacy System.

Notified

means a Provider of a System has begun its design, informed potential customers of its plans and informed all parties on the Provider List of the intended Deployment of that System on specified Shared Cable Bundles, including having provided the required details of the Deployment Class (if applicable) and the prescribed parameters for that Deployment Class or other System.

Operation Time

means the date and time at which an Initiator intends to begin operating a new or Upgraded System. The Initiator must have informed all other Notified Providers in the cable bundle at least 14 days before that date.

Power Spectral Density Mask (PSD Mask)

means a representation of the power per unit of bandwidth, normally expressed as its logarithm in dBm/Hz, as a function of frequency, which is used either as a:

- (a) Limit PSD Mask that specifies the maximum PSD a System may transmit (includes a Limit PSD Mask, a Coexistence Mask, a Referred Upstream PSD Mask, a Legacy Coexistence Mask, a Downstream Shaped PSD Mask or the General Excess PSD Mask); or
- (b) A Template PSD Mask that describes the nominal PSD a System would transmit in specific circumstances.

Prior System

means a System for which the DSLAM was Notified and operated prior to another Subsequent System's DSLAM.

Priority Date

means the date on which a System Provider has first validly Notified a System on that Shared Cable Bundle. Note that Priority Date may be retained when that Provider Notifies an Upgraded System on the same Shared Cable Bundle but may be forfeited under other conditions.

Priority Order (including Higher Priority and Lower Priority)

means the order from highest to lowest priority allocated to Systems for the purpose of protecting Higher Priority Systems from Unacceptable Interference from Lower Priority Systems.

NOTE: For more information refer to Section 4.1 and 4.4 of Part 1 of this Code.

Provider

means a Carriage Service Provider or Carrier that operates or plans to operate a System in Customer Cabling.

Provider List

means the list maintained by Communications Alliance of email addresses and Notification web sites for all System Providers that have Subscribed under the process described in Section 7.1.

Receiving Provider

means the Provider Notifying a new System or Upgrade and is the intended recipient of a request for information from a Requesting Provider as described in Section 7.2.18.

Requesting Provider

means the Provider who initiates a request for information as described in Section 7.2.18.

Shared Cable Bundle

means any grouping of pairs of conductors where the proximity of the cable sheaths and/or pairs of conductors in the grouping have the potential to cause Unacceptable Interference between them.

NOTES:

- 1. This includes groupings of separate cables that run together for some or all of their routes.*
- 2. However a properly earthed screened cable does not become part of such larger Shared Cable Bundle but remains as its own separate Shared Cable Bundle.*

Sharing Resolution Process

means the process by which a Higher Priority Provider, whose choice of Deployment Class blocks all other Deployment Class Systems from being Deployed in the Shared Cable Bundle, may be required to change to another Deployment Class that enables sharing of the Shared Cable Bundle.

Spectrum That Overlaps

means spectrum that carries Coded Data or which is intended to carry Coded Data that is common between two Systems sharing the same Shared Cable Bundle, including both the situation where the Systems share spectrum in the same transmission direction, and the situation where the Systems share spectrum in opposite transmission directions.

Subscribed

means a Provider has sent to Communications Alliance the details of its web sites and email addresses as required in Section 13 of Part 2 of this Code.

Subsequent System

means any System for which the DSLAM was Notified (and operated) after another System's DSLAM.

System

means a DSLAM and one or more items of Customer Equipment that is used to access carriage services. In this Code, the term System may be used to refer to requirements that apply to the combination of a DSLAM and one or more end user's Customer Equipment, or to a DSLAM individually, or to Customer Equipment individually.

System Notification File

means the file that is made available at Notification on a Provider's web site and describes a system's parameters according to the templates in Section 13 of Part 2 of this Code.

Tail Cable

means that segment of cable that connects a DSLAM to the nearest end of the Shared Cable Bundle. For an access network DSLAM the tail cable includes all Access Cabling and sometimes Customer Cabling as far as the start of the Shared Cable Bundle.

Template PSD Mask

means the nominal PSD Mask describing the levels at which a System transmits. When used in this Code, the term is intended to have the same meaning as in ITU-T G.993.2.

Tie Cable

means that segment of cable that connects a DSLAM to a CCF in the Access Cabling or in a building or Campus.

Time Division Duplex

means the use of separate alternating time windows for Upstream and Downstream transmissions within the same spectrum.

ULLS System

means a System that uses the Unconditioned Local Loop Service declared by the ACCC, or previously used that ULLS prior to nbn rollout.

Unacceptable Excess Power

means transmitting at a PSD level that exceeds the General Excess PSD Mask specified in Section 4 of Part 2 of this Code.

Unacceptable Interference

means transmitting at a PSD level that exceeds the relevant Coexistence Mask for a Higher Priority Deployment Class System.

NOTE: The Coexistence Mask:

(a) results in higher interference than is caused by another like Deployment Class System from the same DSLAM (after Vectoring cancellation where Notified); and

(b) can result in a lower bit rate for the Higher Priority Deployment Class Systems than would have occurred if the Shared Cable Bundle was used exclusively to carry such Deployment Class Systems.

Unacceptable Interference to a Legacy System

means interference from a System to a Legacy ADSL System (or to the frequency bands below 2.208 MHz in a Deployment Class System) that degrades the expected Upstream or Downstream rate contribution from those bands to below the ADSL2+ rate benchmarks specified in C559.

NOTE: For more information refer to Section 4.3 of Part 1 of this Code.

Unacceptable Operational Impost

means a Provider of an existing System would be required, as a result of a potential change of Deployment Class System, to physically reconfigure physical port allocations or cabling on its System DSLAM or to Deploy a second DSLAM to implement that change of Deployment Class System.

Upgrade

means any:

- (a) replacement or modification to a System that results in a change to the Notified System type, or of the parameters that describe that System's implementation, including:
 - (i) from a Deployment Class System to another Deployment Class System;
 - (ii) from a Non-Deployment Class System to a Deployment Class System;
 - (iii) from a Deployment Class System to a Non-Deployment Class System;
 - (iv) from a Non-Deployment Class System to another Non-Deployment Class System;
 - (v) from a Legacy System to a Deployment Class System or Non-Deployment Class System;
 - (vi) a situation in which an original System and Upgraded System coexist alongside each other (e.g. an existing System is overbuilt by a new System, or two Systems operate side-by-side for an indefinite period of time); and/or
- (b) software or firmware change that alters the ability of the System to achieve Full Coverage.

NOTE: Full Coverage for an Upgraded System means that DSLAM ports of the Upgraded System will be available to meet demand when an end user has applied for the Upgraded service. See Section 7 for more information.

Upstream

means the opposite direction from Downstream.

Upstream Power Back Off

means a System function, the purpose of which is to equalise Upstream PSD levels in a Shared Cable Bundle between separated end user modems and hence prevent Unacceptable Interference being caused to other Upstream transmissions.

Vectoring

means a technology by which the DSLAM and modems cooperate to identify the parameters of all intersystem crosstalk paths and proactively cancel the crosstalk into every receiver to reduce interference.

Victim

means a System that suffers crosstalk interference from other Systems.

2.3 Interpretations

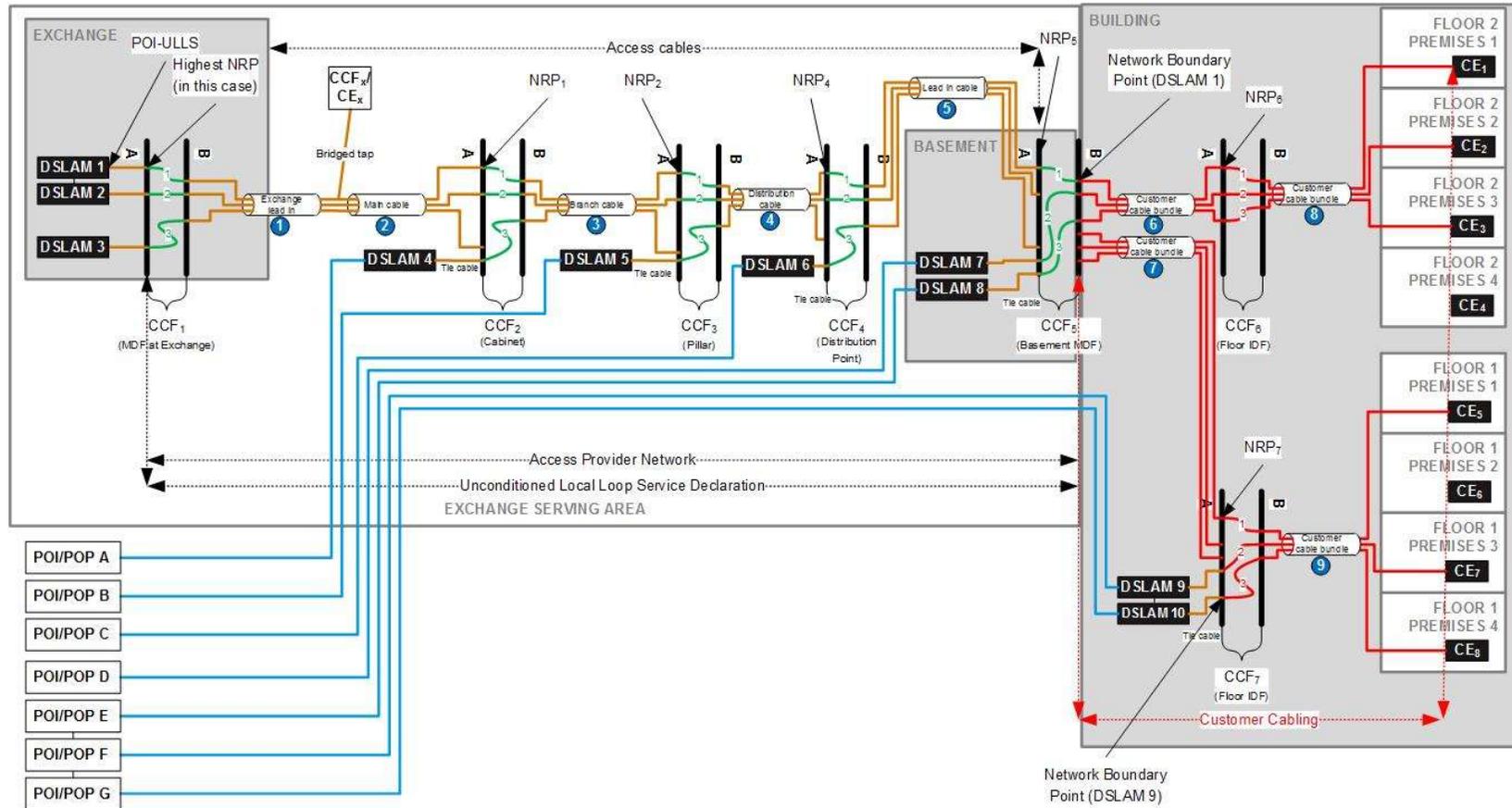
In this Code, unless the contrary appears:

- (a) headings are for convenience only and do not affect interpretation;
- (b) a reference to a statute, ordinance, code or other law includes regulations and other instruments under it and consolidations, amendments, re-enactments or replacements of any of them;
- (c) words in the singular include the plural and vice versa;
- (d) words importing persons include a body whether corporate, politic or otherwise;
- (e) where a word or phrase is defined, its other grammatical forms have a corresponding meaning;
- (f) mentioning anything after include, includes or including does not limit what else might be included;
- (g) words and expressions which are not defined have the meanings given to them in the Act;
- (h) a reference to a person includes a reference to the person's executors, administrators, successors, agents, assignees and novatees; and
- (i) in case of a discrepancy between a Mask described by a table in this Code and a Mask described by a graph in this Code, the table description must take precedence.

3 REFERENCE ARCHITECTURE

3.1.1 Refer to Figure 1 for a reference architecture.

FIGURE 1
Reference Architecture for Next-Generation Broadband Systems



4 GENERAL REQUIREMENTS FOR OPERATION OF A SYSTEM

4.1 Cooperation in Good Faith

- 4.1.1 Where two or more Providers are operating or have Deployed or propose to deploy Next-Generation Broadband Systems or Legacy Systems in a Shared Cable Bundle, all of those Providers, except those that have Deployed a Legacy System within the scope of C559, must Cooperate in Good Faith to enable viable sharing of the Shared Cable Bundle where applicable.

NOTES:

1. *Sharing of the Shared Cable Bundle between two G.fast systems is not viable because of the unavoidable interference that would occur between the two systems.*
2. *Sharing of the Shared Cable Bundle between a G.fast system and a VDSL2 system may be viable if they use separate spectrum e.g. above and below 20 MHz.*

- 4.1.2 A Provider is taken to have Cooperated in Good Faith if and only if at all times, the Provider satisfies one of the following conditions:
- (a) The Provider has Notified and all Notified Providers come to an agreement on how to share the Shared Cable Bundle; or
 - (b) The Provider has Notified and the Provider complies with the technical requirements described in 4.2, 4.3 and 4.5 of this Code, makes evidence of that compliance, including cable data and cable models, available to other affected Providers and ACMA on request, and in addition complies with all processes of this Code, if necessary changing System parameters to comply with the technical requirements of the Sharing Resolution Process; or
 - (c) The Provider has not Notified its System, does not take part in the processes of this Code and accepting its consequent lack of any priority status, complies with the technical requirements described in 4.2, 4.3 and 4.5 of this Code, makes evidence of that compliance, including cable data and cable models, available to other affected Providers and ACMA on request.

NOTES:

1. *For the purposes of 4.1, Legacy Systems Deployed within a building and not using ULLS are not within the scope of C559.*
2. *The first Deployment of a Next-Generation Broadband System to a Shared Cable Bundle is not limited in its technical parameters by this Code, except for the requirement not to cause Unacceptable Interference to a Legacy System (4.3.1).*

3. *The advent of a Provider of a Notified Deployment Class System wishing to share the Shared Cable Bundle with a Prior System, or of a Subsequent System wishing to share the Shared Cable Bundle with a prior Notified Deployment Class System, invokes the detailed sharing requirements of this Code (Section 4) which then apply to all Providers sharing the Shared Cable Bundle, including the prior Provider.*
4. *A prior Non-Deployment Class System Provider that does not Upgrade to a Deployment Class System may be required to vacate spectrum if a subsequent Provider of a Notified Deployment Class System Deploys to a Shared Cable Bundle.*
5. *These rules apply separately to each Shared Cable Bundle traversed by the System, where different Systems may be present in the different Shared Cable Bundles.*
6. *Evidence of compliance needs to include the information listed in Part 2 of the Code. Providers of systems in operation should have the necessary reports and information available to provide on request.*

4.2 Interference to NGBS

- 4.2.1 Except as in 4.5.5 and 4.5.6 a Provider operating a System must not, within any Shared Cable Bundle in which a separate Notified Deployment Class System is in operation,
- (a) emit Unacceptable Excess Power; or
 - (b) cause Unacceptable Interference to a Deployment Class System of equal or Higher Priority that is in operation in that Shared Cable Bundle.

NOTES:

1. *Where there is no Deployment Class System DSLAM of Higher Priority that can feed through the Shared Cable Bundle, 4.2.1 (b) is considered to be satisfied.*
2. *The lack of any active service feeding through the Shared Cable Bundle from a DSLAM does not void the requirement to comply with 4.2.1 (b) because a new service activated from that DSLAM at any time must receive protection.*
3. *A Provider wishing to Deploy a Deployment Class System and receive the protection from Unacceptable Interference available under this Code may choose to meet the requirements in the definition of a Notified Full Coverage Deployment Class System.*
4. *The Code does not prescribe the Systems that can be Deployed by Providers. The Code therefore leaves open the (theoretical) possibility of a Provider Deploying a completely new System (i.e. a System not described in a Deployment Class). However, the effect of the definition of a 'Deployment Class System' is that a Provider Deploying a Non-Deployment Class*

System is not protected from Unacceptable Interference under the Code.

4.3 Interference to Legacy Systems

4.3.1 A Provider operating a System must not cause Unacceptable Interference to a Legacy System within a Shared Cable Bundle through which any existing network DSLAM or Notified Building DSLAM or Notified Campus DSLAM has the possibility of providing a service using:

- (a) A Legacy ADSL System; or
- (b) a Deployment Class System operating in spectrum below 2.208MHz.

NOTES:

1. Where there is no compliant possibility of feeding through the Shared Cable Bundle from a Legacy ADSL System DSLAM or from a Deployment Class System DSLAM operating in spectrum below 2.208 MHz, 4.3.1 is considered to be satisfied.

2. Note that protection against interference to a Legacy System is required whenever a Deployed Notified Legacy ADSL System DSLAM or a DSLAM of a Deployment Class System that uses spectrum below 2.208 MHz has the possibility of being jumpered to provide a service over that Shared Cable Bundle.

4.4 Priority Order

4.4.1 For the purposes of 4.2.1(b), and subject to 6.3 and 6.4, Priority Ordering of Systems sharing the same Shared Cable Bundle is assigned from highest to lowest priority as follows:

- (a) Full Coverage Deployment Class Systems that have been Notified are prioritised in order of Priority Dates with the prior Deployments having Higher Priority.
- (b) Non-Full Coverage Deployment Class Systems that have been Notified are grouped at a Lower Priority than those in (a), prioritised within the group in the order of their Priority Dates.
- (c) Deployment Class Systems that have not been Notified and Non-Deployment Class Systems are grouped at a Lower Priority than those in (b), with no specific ordering within the group.

4.5 Special Conditions for Legacy Systems

4.5.1 Under this Code, Legacy Systems do not have to be Notified, but a Provider of a pre-existing or proposed building or Campus Legacy System may choose to Notify in order to inform other Providers that there is a Legacy System at a given NRP and hence allow other Providers at Lower NRPs to shape spectrum

below 2.208 MHz to avoid causing Unacceptable Interference to a Legacy System. Up until the end of the Coexistence Period, all Shared Cable Bundles which are accessible for the provision of Legacy services from the Access Cabling must be assumed to be carrying Legacy Systems that require protection under 4.3

- 4.5.2 Legacy Systems that use the ULLS access copper are not required to Notify. Because they must be C559 compliant, there is no requirement for them to comply with this Code prior to the end of the Coexistence Period.
- 4.5.3 Recognising that all Building Systems and Campus Systems are required to comply with 4.3, a Provider that is operating or intends to operate a System (apart from as described in 4.5.2) in a Shared Cable Bundle needs to determine whether either of the following conditions exists and if so shape spectrum as required by 4.3:
- (a) any Deployment Class System using spectrum below 2.208 MHz has been Notified for the Shared Cable Bundle
 - (b) any network based or Notified Building or Campus Legacy System that could provide services over the Shared Cable Bundle is in operation.
- 4.5.4 Recognising that all Building or Campus Legacy Systems are required to comply with 4.2, a Provider that is operating or intends to operate a Legacy System in a Shared Cable Bundle needs to determine whether any Deployment Class System has been Notified, and except in cases described in 4.5.2, 4.5.5 and 4.5.6, must adjust its spectrum to comply with the relevant Coexistence Masks for all Notified Deployment Class Systems in operation, or cease to operate its System.
- 4.5.5 Before the end of the Coexistence Period defined by nbn for the node serving area in which the Shared Cable Bundle lies, all Building Systems and Campus Systems that are Legacy Systems are exempt from the requirements of 4.2.

NOTE: This clause ensures that Legacy Systems that would be usable under C559 and which nbn expects to be in operation during the Coexistence Period, are not prevented from operating during that time because they cause Unacceptable Interference to a Deployment Class System. After the Coexistence Period, this exemption is removed whence most C559-compliant Legacy Systems will cause Unacceptable Interference to a Notified VDSL2 Deployment Class Systems and hence must not operate within Shared Cable Bundles for which Deployment Class Systems have been Notified.

- 4.5.6 Beyond the end of the Coexistence Period defined by nbn for the node serving area, Systems used to deliver special services, as permitted by nbn, are exempt from the requirements of 4.2.

4.6 Consequences of failure to Notify

- 4.6.1 If a Provider has not Subscribed with Communications Alliance or has not Notified in accordance with this Code, its proposed Deployment to the Shared Cable Bundle must be placed at the lowest priority and hence must defer to other Providers that have Subscribed and Notified. That includes not operating the System if it fails to meet the technical requirements in 4.2 to 4.5 of this Code.

NOTES:

1. For more information on the Notification Scheme and Cooperation Process refer to Section 7.2 of Part 1 of this Code, and Sections 12 and 13 of Part 2 of this Code.

2. The registration date is available from the ACMA register of industry codes, available from:
<https://www.acma.gov.au/register-telco-industry-codes-and-standards>

5 FUNDAMENTAL TECHNICAL REQUIREMENTS

This section provides more detailed explanations and specifications of the fundamental technical requirements in Section 4 that apply to all Systems that can operate over the Shared Cable Bundle. In practice, these requirements are only applicable to Non-Deployment Class Systems, while Deployment Class Systems can use the pre-determined deemed compliance rules in Section 6.

5.1 Technical Requirement 4.2 – Interference to Next-Generation Broadband System

Clause 5.1 sets out the requirements for the operation of a Coexisting System. In practice, these may not apply to Deployment Class Systems that can comply by meeting the deemed compliance rules in Section 6.1.

- 5.1.1 For the purposes of 4.2.1(a), a System emits Unacceptable Excess Power if the average of its continuous transmit PSD in either direction exceeds the General Excess PSD mask. Note that for Systems with non-continuous or burst mode transmissions, the average of its continuous PSD is taken to be the average PSD transmitted during the “on” cycle.
- 5.1.2 For the purposes of 4.2.1(b), and except as described in 4.5.5, 4.4.6 and 6.1, a System causes Unacceptable Interference to a Deployment Class System if the System transmits PSD in either direction, when referred to the specified location, exceeds the relevant Coexistence Mask for that Deployment Class.
- 5.1.3 A Coexistence Mask specifies the limit mask PSD that can be transmitted in a specified direction by any other System that is permitted to coexist with a specific Deployment Class System. Coexistence Masks may only be defined in spectrum up to the maximum frequency used by the Deployment Class System to carry Coded Data. Below 2.208 MHz, both Legacy Coexistence Masks and Coexistence Masks apply.
- 5.1.4 Coexistence Masks are adjusted as described below and further in Part 2 of this Code.
- 5.1.5 For the Downstream Coexistence Mask corresponding to a particular Deployment Class System,
 - (a) That part of the Downstream Coexistence Mask that is within the Downstream band of the Deployment Class System represents the maximum PSD that a System can transmit in the Downstream direction and cause acceptable FEXT into the Downstream of the Deployment Class System when the System DSLAM is co-located with the Deployment Class System DSLAM.
 - (b) That part of the Downstream Coexistence Mask that is within the Upstream band of the Deployment Class System represents the maximum PSD that a System can transmit in the Downstream direction and cause acceptable NEXT into

the Upstream of the Deployment Class System when the System DSLAM is co-located with the Deployment Class System DSLAM.

- (c) The Downstream Coexistence Mask is defined at the output of the DSLAM of the Deployment Class System that is protected from Unacceptable Interference. The Downstream Coexistence Mask for a non-Vectored Deployment Class System should generally be equal to the Limit PSD Mask of the Deployment Class System being protected.

5.1.6 For the Upstream Coexistence Mask,

- (a) That part of the Upstream Coexistence Mask that is within the Upstream band of the Deployment Class System represents the maximum PSD that a System can transmit in the Upstream direction and cause acceptable FEXT into the Upstream of the Deployment Class System.
- (b) That part of the Upstream Coexistence Mask that is within the Downstream band of the Deployment Class System represents the maximum PSD that a System can transmit in the Upstream direction and cause acceptable NEXT into the Downstream of the Deployment Class System.
- (c) The Upstream PSD mask is defined at the CE transmitter of the System and depends on the cable attenuation between that CE and the Deployment Class System DSLAM that is protected from Unacceptable Interference. The Upstream Coexistence Mask should generally be equal to the CE transmit PSD of a non-Vectored Deployment Class System being protected when that Deployment Class System CE is Deployed from the same location through the same Shared Cable Bundle.

5.1.7 Coexistence Masks are adjusted to match the level of residual FEXT after crosstalk cancellation as experienced in by a Vectored Deployment Class System. Because Vectoring cancels FEXT by up to the specified Maximum Vectoring Gain for the Deployment Class System, the effective FEXT into a Vectored Deployment Class System is required to be lower than the uncanceled FEXT by an amount equal to the specified Maximum Vectoring Gain in the relevant direction. This places a much lower limit on crosstalk from other disturbers which cannot be cancelled by the Vectored System.

Therefore, to protect a Vectored Deployment Class System, a reduction equal to the Maximum Vectoring Gain Upstream or Downstream for the Deployment Class System must be applied to an Upstream or Downstream Coexistence Mask for all frequencies that are permitted to carry Coded Data in the nominated Upstream or Downstream direction respectively, at or above the minimum Vectoring tone (see Part 3) specified for that Vectored Deployment Class System. Those out-of-band parts of the

Coexistence Mask that are not used for transmission in the nominated direction do not require such adjustment.

- 5.1.8 In future versions of this Code, similar adjustments may be required for NEXT if and when Vectoring is used to cancel NEXT.
- 5.1.9 In order to demonstrate compliance with the Downstream Coexistence Mask (already referred to the Deployment Class System DSLAM) for a given Deployment Class System, a Provider must determine the Downstream transmit PSD Mask for the proposed System (or measure the highest transmit PSD over all line conditions) and must refer (as in Part 2) that PSD to the DSLAM location of the Deployment Class System to show that the Downstream Coexistence Mask is not exceeded.
- 5.1.10 In order to demonstrate compliance with the Upstream Coexistence Mask for a given Deployment Class System, a Provider of a Non-Deployment Class System must use the method described in Part 2 to generate the Deployment Class System's Upstream Coexistence Masks for the full range of proposed System CE locations. The System Provider should then use the measured or design characteristics of the System to demonstrate that none of those Upstream Coexistence Masks would be exceeded by the System's upstream PSD transmitted from those locations to a system DSLAM at its planned location.

NOTE: The intention of clause 5.1 is to elaborate on the concept of Unacceptable Interference, but without incorporating the 'bit rate degradation' concept directly (i.e. 'must not degrade below 25 Mbit/s Layer 2 Rate Downstream' etc.). Clause 5.1 limits the protection that a Deployment Class System is afforded. A Deployment Class System is only 'protected from Unacceptable Interference' under the Code if it itself meets the applicable mask for that Deployment Class System. If it exceeds that mask, the Code does not operate to protect the Deployment Class System against degradation of performance.

5.2 Technical Requirement 4.3 – Interference to Legacy Systems

- 5.2.1 Clauses 5.2.2 to 5.2.3 describe the Legacy Coexistence Masks and processes that ensure compliance with 4.3. Legacy Coexistence Masks generally apply to all Systems, but in practice, do not apply to:
 - (a) Systems that can comply by meeting the deemed compliance rules in Section 6.2; or
 - (b) Legacy Systems that are Deployed under C559 rules for ULLS (see 4.5.2).
- 5.2.2 For the purposes of 4.3.1, and except as in 4.5.2 and 6.2, a System that shares a Shared Cable Bundle, that is in the feeding area of a Legacy ADSL System DSLAM, or of a Deployment Class System from a Higher NRP that transmits in the frequency band below

2.208 MHz, causes Unacceptable Interference to a Legacy System if in the frequency bands up to 2.208 MHz if:

- (a) its Downstream transmitted average PSD exceeds the Downstream Legacy Coexistence Mask for a Legacy ADSL System (or Deployment Class System using the band below 2.208 MHz) Deployed to the same Shared Cable Bundle. (Details of calculation of the Legacy Coexistence Mask are in Part 2), or
- (b) its Upstream transmitted average power spectral density exceeds the Upstream Legacy Coexistence Mask for any Legacy ADSL System (or Deployment Class System using the band below 2.208 MHz) Deployed to the same Shared Cable Bundle. (Details of calculation of the legacy Coexistence Mask are in Part 2).

5.2.3 Downstream Legacy Coexistence Masks are defined as being referred to the Legacy ADSL System's DSLAM. To comply with the Coexistence Masks for Legacy ADSL Systems, the Provider must determine the highest possible Downstream transmit PSD at its DSLAM (at each frequency up to 2.208 MHz) and must refer it (using the method described in Part 2.) to the transmitter of each Legacy System DSLAM to show that none of the Legacy Coexistence Masks is exceeded. As a general rule, the Downstream Coexistence Mask referred to the Legacy ADSL System DSLAM is the same as the ADSL2+ Group A mask for Deployment Class 6i in Appendix N of C559:2012 Part 3.

5.2.4 Upstream Legacy Coexistence Masks are defined at the end user modem of the proposed System. To comply with the Coexistence Masks for Legacy ADSL Systems, the Provider must determine the highest possible Upstream transmit PSD at its modem at each frequency up to 2.208 MHz. As a general rule, the Upstream Legacy Coexistence Mask is the same as the Upstream ADSL2+ Group A limit mask for Equipment Class 6i in Appendix H of S043.2:2016 Part 3.

5.2.5 A Provider required to comply with clause 5.2.2 must maintain records of the System testing, design parameters and analysis necessary to demonstrate that the System meets the appropriately referred and adjusted Coexistence Masks.

NOTES:

1. Clause 5.2.2(a) constrains the Downstream PSD below 2.208 MHz of a Coexisting System in the Shared Cable Bundle to not exceed, at any point within the Shared Cable Bundle, the PSD of any Legacy ADSL System or Deployment Class System Deployed to the Shared Cable Bundle.

2. Clause 5.2.2(b) constrains the Upstream PSD below 2.208 MHz of a Coexisting System in the Shared Cable Bundle to not exceed the Upstream PSD of another ADSL or ADSL2+ System that may legally be Deployed to the Shared Cable Bundle

3. Clause 5.2.4 constrains the Upstream PSD to the same Legacy Upstream Coexistence Mask at all locations. There is no requirement to refer the Upstream PSD to any specified location.

4. Legacy Coexistence Masks may overlap the Coexistence Masks for Higher Priority Deployment Class Systems between 1.104 and 2.208 MHz. In that frequency range, both requirements must be satisfied.

5.3 Reverse transmissions and building interconnection cables

- 5.3.1 The definition of Downstream and Upstream directions in this Code reflects the intended direction of transmission for both access network and Building System and Campus System Deployments.
- 5.3.2 Because reversal of transmission direction has the potential to cause unacceptable NEXT interference, all Frequency Division Duplex Systems such as VDSL2 which use different frequency bands to separate transmission directions must either comply with Downstream and Upstream Coexistence Masks or Deployment Class System requirements based on the defined Downstream and Upstream directions.
- 5.3.3 Time Division Duplex Systems such as G.fast use the entirety of the frequency band for each transmission direction. The concepts of Upstream and Downstream are therefore not relevant for Time Division Duplex technologies themselves but are relevant when ascertaining the harmonious coexistence of a Time Division Duplex System with a Higher Priority Frequency Division Duplex System. Time Division Duplex Systems must either comply with the relevant Upstream or Downstream Coexistence Masks for the Frequency Division Duplex Deployment Class System with which they are coexisting, or their own Deployment Class System requirements.

NOTES:

1. The G.fast-SM Deployment Class (refer to Appendix B to Part 3) is deemed to coexist with every other Deployment Class that is not a G.fast based Deployment Class.

2. A System operating as a G.fast-SM Deployment Class System cannot coexist with another System operating as a G.fast-SM Deployment Class System.

- 5.3.4 In some cases, such as where a special interconnection cable has been used to connect a VDSL2 DSLAM via an MDF in one building to an MDF in another building, it is necessary to carefully define the Downstream direction and avoid reverse transmissions.
- 5.3.5 With reference to 5.3.4, any ambiguity is avoided with the following process:
- (a) Any Shared Cable Bundle that is currently being, or has been, used for delivery of telephone or ADSL or VDSL2

services from the customer access network or from a building or Campus DSLAM must retain the direction used for those services, possibly as defined by a local arrangement and appropriate labelling of the cable block on a building MDF.

Where telephony and ADSL services are already operated in both directions in the Shared Cable Bundle, the following rules in 5.3.5(b) must apply.

- (b) For an interconnection cable that is not captured by 5.3.5(a), direction in any Shared Cable Bundle it traverses is defined by the highest priority System in operation in that Shared Cable Bundle. In the case of only 2 Non-Deployment Class System, the direction of the Prior System defines the direction.

NOTES:

1. Where a Provider has Deployed a DSLAM and wants to deliver services from that DSLAM over an unshielded interconnection cable to another MDF in another building, it must consider the services in the Shared Cable Bundle, which includes other cables in the same ducts, including the telephone network Lead-in Cables to the building that houses that DSLAM. In order to satisfy the requirements of this Code, the DSLAM and interconnection cable would be required to:

(a) never transmit Downstream signals as defined in the Deployment Class System description in the reverse direction towards the telephony access switch or Lead-in Cables (e.g. by taking a different route to the Lead-in Cable to the building), and
(b) be only usable for transmissions with one defined direction. That could be by connecting directly from the DSLAM to the second building without going through the MDF in the first building, or by establishing a local rule and labelling the MDF cable block at each end appropriately.

2. The transmission of VDSL2 Downstream signals Upstream through the Shared Cable Bundle with the lead in could unacceptably interfere with Downstream signals from a network DSLAM. While it might appear that spectrum splitting would fix the problem, that may not be the case when we consider NEXT vs FEXT levels. Any such Upstream transmissions should be subject to the Coexistence Masks for the Network DSLAM and should not be able to exert any priority over a network DSLAM.

6 COMPLIANCE BY DEPLOYMENT CLASS SYSTEMS

6.1 Deemed Compliance with Technical Requirement 4.2

- 6.1.1 This clause defines the cases in which Deployment Class Systems are deemed to comply with 4.2.1, including:
- (a) automatic compliance of all Deployment Class System with 4.2.1(a) to not emit Unacceptable Excess Power;
 - (b) tables of Deployment Class Systems that comply with 4.2.1(b) to not cause Unacceptable Interference to a given Deployment Class System.
- 6.1.2 For the purposes of 4.2.1(a), a Deployment Class System is deemed to comply with the obligation in 4.1.1(a) if the System is operated in accordance with the technical parameters applicable to the relevant Deployment Class.
- 6.1.3 For the purposes of 4.2.1(b), the System is deemed to comply with the obligation in 4.2.1(b) if:
- (a) the System is operated in accordance with a Deployment Class description; and
 - (b) the System is listed as a coexisting Deployment Class System, in Column 2 of Table 2 or Table 3 for all rows in Table 2 and Table 3 corresponding to Deployment Class Systems of Higher Priority with DSLAMs that can feed through the Shared Cable Bundle; and
 - (c) the System is operated in accordance with the specific parameters required for a Coexisting System, in column 3 of Table 2 for all rows corresponding to Deployment Class Systems of Higher Priority with DSLAMs that can feed through the Shared Cable Bundle.

NOTES:

1. The Code does not, per se, prohibit the Deployment of a System where there is already a Deployment Class System Deployed in the same Shared Cable Bundle. However, the effect of 4.2.1 is that a Provider Deploying a System where there is already a Deployment Class System will be limited in the Systems that they can Deploy in order to comply with the Code. Clause 5.1 imposes alternative obligations in relation to Non-Deployment Class Systems.

2. A Deployment Class System cannot be deemed to be compliant if the Deployment Class does not appear as a Coexisting System in column 2 of Table 2 or Table 3 for all Deployment Class Systems of Higher Priority in the cable bundle, or does not operate with the specified parameters in column 3 for each such case.

6.2 Deemed Compliance with Technical Requirement 4.3

6.2.1 A System, which includes Legacy Systems, Deployment Class Systems and Non-Deployment Class Systems, is deemed to satisfy 4.3.1 if both of the following deemed compliance conditions are satisfied:

- (a) the System's PSD satisfies one of the standard DBPO masks specified in Part 2 of this Code, and
- (b) that a selected Downstream Power Back-Off (DPBO) mask meets the deemed compliance selection rules (see further detail in Part 2) for each Legacy ADSL System or Deployment Class System using the band below 2.208 MHz that has been Deployed to the same Shared Cable Bundle.

NOTE: The G.fast-SM Deployment Class (refer to Appendix B to Part 3) is defined to operate above 20 MHz and therefore Systems meeting all of the requirements of that Deployment Class do not interfere with Legacy Systems.

6.2.2 In addition, 4.3.1 is deemed to be satisfied if for Deployment of a System to a Shared Cable Bundle at all potential end user locations, the System meets the Deployment requirement of C559 not to cause Unacceptable Interference to the ADSL and ADSL2+ Basis Systems, as if the scope of C559 protection for a ULLS deployed ADSL or ADSL2+ DSLAM were to extend through the Shared Cable Bundle to all end user premises accessible from both that ADSL or ADSL2+ DSLAM and the proposed DSLAM.

NOTES:

1. Clause 6.3.1 is the preferred deemed compliance path for 4.3.1 based on the C559 Non-Deployment Class mid-span feed masks below 2.208 MHz that are designed to be compliant with the requirements of C559 to protect the ADSL2+ Basis System.

2. Clause 6.2.2 provides an alternative deemed compliance path for 4.3.1 based only on extended C559 requirements. The extended C559 requirements are based on the concept of extending the scope of C559 protection for ADSL and ADSL2+ Basis Systems to include Customer Cabling beyond the NBP as far as the CE.

3. For the purposes of clause 6.2.2, ADSL and ADSL2+ Basis Systems are terms defined in C559.

6.3 Requirement for an existing Higher Priority Deployment Class System to change Deployment Class in order to satisfy Clause 4.1

6.3.1 Clauses 0 and 6.3.4 set out some rules for Sharing Resolution that enable the sharing of Shared Cable Bundles in some cases, whereby the Provider of a proposed or existing Deployment Class System, that has priority over another proposed or existing

Deployment Class System and prevents any Deployment by the Lower Priority System from its chosen NRP, must move to another Deployment Class that enables sharing with that Lower Priority Deployment Class System.

Clauses 6.3.3 and 6.3.9 set out the exceptions to those rules to enable sharing in other cases, whereby the Provider of a Deployment Class System that has priority is not required to change Deployment Class to enable sharing and a subsequent Provider is constrained to use a coexisting Deployment Class System or Non-Deployment Class System. Section 7 defines the processes that ensure such compliance.

NOTES:

1. The G.fast-SM Deployment Class (refer to Appendix B to Part 3) is deemed to coexist with every other Deployment Class that is not a G.fast based Deployment Class.

2. A System operating as a G.fast-SM Deployment Class System cannot coexist with another System operating as a G.fast-SM Deployment Class System.

3. Refer to Section 8.2 for more information on coexistence scenarios.

4. Refer to G671 for more information on the deployment of G.fast on Customer Cabling.

6.3.2 **Different NRP** - If a System Provider wishes to share a Shared Cable Bundle by installing a DSLAM at a different NRP than another Provider's DSLAM that uses any VDSL2 Deployment Class and the Higher Priority Provider's choice of System does not admit a viable deemed compliance option from Tables 2 and 3, the Sharing Resolution Process is invoked. In order to enable deemed sharing of the Shared Cable Bundle, the Higher Priority Deployment Class System DSLAM using any VDSL2 Deployment Class must either:

- (a) vacate some of its spectrum for use by the other Lower Priority Provider by adopting one of the split spectrum profiles. The sharing of spectrum is based on the use of higher frequencies from the Lower NRP and lower frequencies from the Higher NRP. If at the Higher NRP, the Higher Priority Provider selects the Low Split VDSL2 Deployment Class. If at the Lower NRP, the Higher Priority Provider selects the High Split VDSL2 Deployment Class. The Lower Priority Provider may then Deploy the complementary split VDSL2 Deployment Class based on the deemed coexistence in Table 3; or
- (b) vacate all spectrum from 1.104 to 17.6 MHz to enable the subsequent Provider to use the full VDSL2 17.6 MHz Deployment Class System from the Higher NRP. That might be achieved by Deploying from the Lower NRP a spectrally masked VDSL2 or by Deploying a G.fast System outside that

band as a compliant Non-Deployment Class System that can coexist with the VDSL2 17.6 MHz Deployment Class.

- 6.3.3 The requirement in 6.3.2 does not apply if either:
- (a) the Higher Priority Provider's VDSL2 DSLAM with Full Coverage of all end users on the Shared Cable Bundle when used in its Notified Vectored or non-Vectored mode of operation, no longer would have Full Coverage when changed to the chosen Deployment Class and operated in:
 - (i) Vectored mode when it is the only Provider utilising spectrum from that NRP; or
 - (ii) non-Vectored mode when it already shares spectrum with another System at the same NRP;
 - (b) the prior Provider would suffer an Unacceptable Operational Impost as a result of having to operate both split and full spectrum VDSL2 from the same DSLAM; or
 - (c) the System Notified by the Higher Priority System Provider has already vacated the spectrum to enable sharing by the other Providers according to 6.3.2.
- 6.3.4 **Same NRP** - If a System Provider wishes to share a Shared Cable Bundle by installing a DSLAM at the same NRP as another Provider's DSLAM that uses any VDSL2 Deployment Class and the Higher Priority Provider has chosen a Vectored Deployment Class that does not admit a viable deemed compliance option from Tables 2 and 3, the Sharing Resolution Process is invoked. In order to enable deemed sharing of the Shared Cable Bundle, the Higher Priority Deployment Class System DSLAM using any Vectored VDSL2 Deployment Class must change to a non-Vectored VDSL2 Deployment Class, or a System that occupies completely different spectrum, that permits sharing by at least one other Deployment Class. The System may continue to operate in Vectored mode but must use the parameters specified for the non-Vectored VDSL2 Deployment Class.
- 6.3.5 In order to apply 6.3.4, it may be necessary to adjust Tie Cable lengths if they differ by more than 0.5 dB (at 3.75 MHz).
- 6.3.6 In general, the subsequent Provider must design its Tie Cable to ensure the Tie Cables match within 0.5 dB.
- 6.3.7 However, in some cases where the prior Provider's Tie Cable has attenuation that is more than 0.5 dB below the lowest attenuation Tie Cable that could be installed by the subsequent Provider, that prior Provider must increase the attenuation of its Tie Cable, up to a maximum of 2 dB total Tie Cable attenuation, to match the attenuation of the subsequent Provider's minimum possible attenuation Tie Cable within 0.5 dB.

- 6.3.8 If 6.3.7 requires a prior Provider to extend its Tie Cable, screened cable must be used and the cost must be borne by the subsequent Provider.
- 6.3.9 The requirement in 6.3.4 does not apply if:
- (a) One of the Providers has chosen to use spectrum outside the VDSL2 band occupied by the other Provider's Deployment Class System and complies with the relevant Coexistence Masks for that Deployment Class System, or
 - (b) Both Providers Notify VDSL2 Deployment Class System and the Higher Priority Provider's VDSL2 DSLAM with Full Coverage of all end users on the Shared Cable Bundle when used in its current Vectored mode of operation, no longer would have Full Coverage when changed to any of the compliant non-Vectored Deployment Classes, or
 - (c) Both Providers Notify VDSL2 Deployment Class Systems and the Providers cannot equalise the tail cable attenuations to within 0.5 dB at 3.75 MHz.
- 6.3.10 The cost of changing Deployment Class or of changing the parameters of a Deployment Class System or Non-Deployment Class System in order to comply with this Code must be borne by the Provider of the System that must change, unless otherwise negotiated.

NOTES:

1. That process of using the deemed coexistence of the VDSL2 High and Low Split Deployment Classes cannot be implemented if an existing DSLAM using VDSL2 at the Higher NRP has Higher Priority. That is because of the operational problems of moving ports to enable the changing of the Deployment Class on existing services on the DSLAM at the Higher NRP. Instead, if the DSLAM using VDSL2 17.6 MHz at the Higher NRP is a Higher Priority Deployment Class System, the premises DSLAM must, as its only design option, avoid using spectrum below 17.6 MHz, by using a compliant Coexisting System from the second column of Table 3 or a compliant Non-Deployment Class System solution.

2. In order to enable deemed sharing with another Provider's DSLAM under the requirements of Clause 4.3.2, a prior DSLAM using a G.fast System that is not a G.fast-SM DCS must vacate the spectrum below 20 MHz for a subsequent Deployment Class System DSLAM to use with the VDSL2 17.6 MHz Deployment Class, by changing the G.fast System to operate only above 20 MHz so that it meets the Coexistence Mask for the proposed Deployment Class System.

3. The concept of Unacceptable Operational Impost is rooted in the complexity of port / line / cable grooming. An Unacceptable Operational Impost occurs if a Provider would be required to physically reconfigure ports or cabling on its DSLAM or to Deploy a second DSLAM to implement a Deployment Class System

change. For example, port reconfiguration would be necessary if a DSLAM and its management platform are only capable of applying spectrum masks or other Deployment Class System specific settings on a System-wide or card by card basis rather than on a port by port basis.

4. A Provider that cannot provide Full Coverage with a single DPU, either because of inadequate port counts or inadequate data rates, can subdivide the domain (refer to Section 5.4 of G671) to retain Full Coverage. Without Full Coverage, an incumbent Provider should not be able to prevent other G.fast deployment in the building or campus, provided that deployment is based on a technically sound subdivision of the building as described in Section 5.4 of G671.

6.4 Modified Sharing Resolution Process

- 6.4.1 The Modified Sharing Resolution Process applies in cases of equal priority when one of the equal priority Providers' Systems cannot admit any coexisting Deployment Class System.

NOTES:

1. The G.fast-SM Deployment Class (refer to Appendix B to Part 3) is deemed to coexist with every other Deployment Class that is not a G.fast based Deployment Class.

2. A System operating as a G.fast-SM Deployment Class System cannot coexist with another System operating as a G.fast-SM Deployment Class System.

- 6.4.2 If the two Providers' Systems are VDSL2, share the same NRP and cannot coexist in their proposed forms including if the differential tail cable attenuation exceeds 0.5 dB (at 3.75 MHz) but does not exceed 2 dB (at 3.75 MHz):
- (a) both Providers must Notify a non-Vectored VDSL2 Deployment Class System; and
 - (b) if the Provider that installs its Tie Cable later cannot achieve a tail cable loss within 0.5 dB (at 3.75 MHz) of the other System's tail cable, the other Provider is obliged to promptly Deploy additional screened Tie Cable to increase its tail cable loss to within 0.5 dB (at 3.75 MHz), to enable sharing.

NOTES:

1. These correspond to tail cable length differences of 13 m and 50 m of CAD55 cable respectively.

2. Equalization of Tie Cable lengths is necessary to mitigate the risk of unequal level crosstalk between Systems in the Shared Cable Bundle.

- 6.4.3 When VDSL2 Systems are Notified at separate NRPs, then in the absence of other agreement between Providers, the Provider at

the Higher NRP must use the low split and the Provider at the Lower NRP must use the high split VDSL2 Deployment Class, provided that an existing Provider must be able to retain Full Coverage and not suffer Unacceptable Operational Impost as a result of the change of Deployment Class System. An existing Provider with an operating System would suffer Unacceptable Operational Impost as a result of having to operate both split and full spectrum VDSL2 from the same DSLAM. If the existing Provider cannot retain Full Coverage with spectrum splitting, the existing Provider may continue to operate its existing System and the other Provider must only Deploy a compatible System.

7 PROCESS REQUIREMENTS FOR COOPERATION IN GOOD FAITH BETWEEN PROVIDERS SHARING A CABLE BUNDLE

7.1 Introduction

- 7.1.1 The harmonious coexistence of independent Systems in a Shared Cable Bundle depends upon cooperative configuration and operation of all Systems.
- 7.1.2 This Code defines certain configurations (refer to Table 2 and Table 3) which if Deployed as described are taken to represent Cooperation in Good Faith.
- 7.1.3 This section describes the processes that must be used to satisfy the requirement of Co-operation in Good Faith at clause 4.1.2(b).
- 7.1.4 Where more than one Provider operates in a Shared Cable Bundle, failure to follow these processes may result in a reduction in priority level and may render the Provider non-compliant with this Code.
- 7.1.5 To participate in these processes a Provider must Subscribe with Communications Alliance and must establish a web page or process where relevant information is made available to other Providers.

NOTE: Sections 12 and 13 of Part 2 of this Code (on System Notification) defines details of the required format of the information for the required web page or process.

- 7.1.6 The processes described in this section apply separately to each Shared Cable Bundle traversed by a System. All proposed Deployments must be referred to specific Shared Cable Bundles and all references to Systems refer to a System and its Shared Cable Bundle. The processes are illustrated in the flow charts provided in Appendix 1 of this Part.

7.2 Cooperation Process

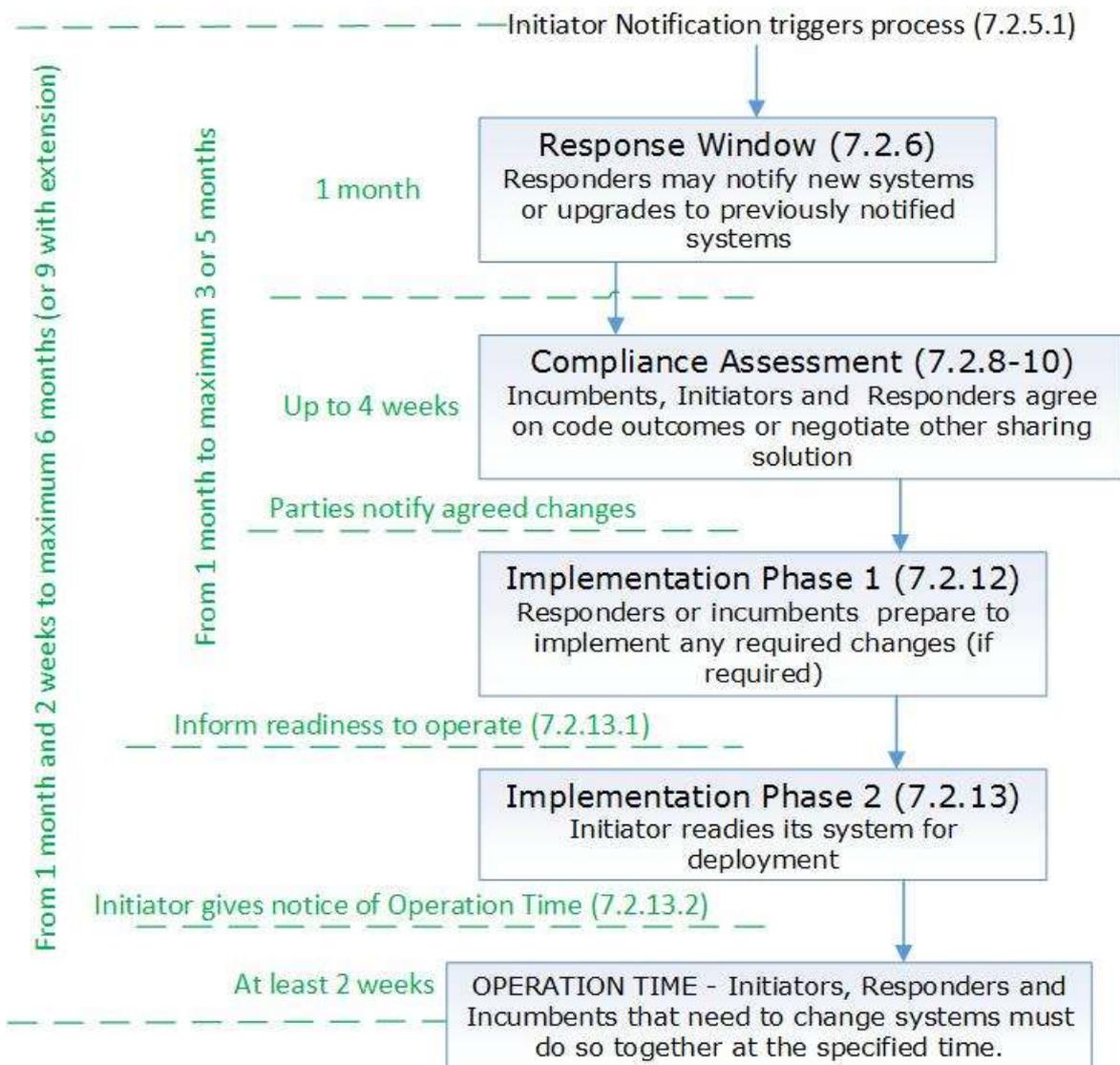
- 7.2.1 In order to take advantage of the protection offered by this Code, a Provider proposing to Deploy a new System or to Upgrade an existing System in a Shared Cable Bundle should publish a valid Notification of its proposed System.
- 7.2.2 System Priority Date
 - 7.2.2.1 Except as described in 7.2.4.3, a Provider Notifying a new System receives a Priority Date corresponding to the new System's Notification time.
 - 7.2.2.2 Except as described in 7.2.6.2, a Provider Notifying an Upgrade to a previously Notified System may retain the Priority Date of the previously Notified System.
- 7.2.3 Code Startup Arrangements
 - 7.2.3.1 This clause is no longer required.
- 7.2.4 Retraction of Notifications

- 7.2.4.1 Retraction of a Notification for a Shared Cable Bundle may occur at any time, including after the System is in operation.
- 7.2.4.2 If a Notification of an Upgrade to an existing System is retracted, the System's Priority Date reverts to its status before that Notification.
- 7.2.4.3 If a Notification of a new System is retracted, the Priority Date is forfeited.
- 7.2.4.4 Other Systems in the Shared Cable Bundle retain their Priority Dates but their Providers may choose to re-Notify with different Systems, irrespective of the validity of the retracted Notification.

FIGURE 2

**Cooperation Process Timeline
(does not include Code Startup Arrangements under 7.2.3)**

Cooperation Process Timeline (Section 7.2)



7.2.5 Cooperation Process Initiation and Termination

7.2.5.1 A Provider, hereafter called the Initiator, may trigger the Cooperation Process by Notifying a new System or an Upgrade to an existing System, provided that there is no other Cooperation Process in progress for that Shared Cable Bundle.

7.2.5.2 The Cooperation Process terminates when either:

- (a) the Initiator's Operation Time is reached and the Initiator operates its System, or
- (b) the Initiator (or all Initiators with the same Priority Date) retracts its Notification, including when the Initiator fails to operate the System after the Operation Time is reached and is deemed to have retracted its Notification.

NOTE: If the Cooperation Process terminates prematurely as a result of the Initiator's retraction, all responders retain their Priority Dates. They may then re-Notify as an Initiator to re-start another process.

7.2.6 The Response Window

7.2.6.1 A Response Window commences at the Initiator's Notification time and completes one month after the Initiator's Notification. The Initiator is required to wait 1 month following Notification to allow for any responder to propose a new System or an Upgrade to an existing System.

7.2.6.2 If any further Notification of a new System or Upgrade of an existing System by a Provider other than the Initiator is made within the response window, its Provider is classed as and hereafter referred to as a responder.

7.2.6.3 Except as set out in 7.2.6.4, during a Response Window, Initiators and responders are not permitted to change their Notifications in any way that affects the ability of any other Provider to coexist in a compliant manner, but may retract their Notifications.

7.2.6.4 Responders may change their Notifications to coexist with Higher Priority Providers' Notified Systems, up to the end of the Compliance Assessment.

7.2.6.5 For the avoidance of doubt, an Initiator failing to provide by the end of the response window a valid Notification with all required data according to the template in Part 2 is taken to have retracted the Notification, and if no other Initiator remains, renders the Cooperation Process void.

7.2.7 Responder Notification within Response Window

7.2.7.1 A Provider wishing to Upgrade an existing System or a Provider wishing to Notify a new System should respond within the Response Window in order to be included in the

Compliance Assessment (for more information, refer to 7.2.8).

7.2.7.2 There is no requirement for a Provider with an existing Notified System to respond within the Response Window as that Provider is automatically included in the Compliance Assessment.

7.2.7.3 If an Initiator's or responder's proposed System Upgrade is to a Deployment Class System, and that Initiator or responder previously declined the opportunity to propose an Upgrade of that System to a Deployment Class System in response to a previous Initiator Notification, then that responder's Priority Date for the proposed Upgrade must be the time of this Upgrade Notification.

NOTE: this prevents a Subsequent System that was previously in operation from being displaced by an Upgrade of a Prior System, where such an Upgrade could have been Notified in response to the Subsequent System's initial Notification.

7.2.8 Compliance Assessment

7.2.8.1 Following the Response Window, an initial compliance assessment must be performed in accordance with Sections 4 to 6 to determine the compliance of all Notified Systems on the Shared Cable Bundle. If all Notified Systems are compliant with the requirements of Section 4, the Providers of Notified Systems may proceed to inform others and Deploy and operate their Systems in accordance with the implementation phase in clause 7.2.12.

7.2.8.2 In order to identify Systems that other Providers have Notified for a Shared Cable Bundle, a Provider should search the web sites of all Subscribed Providers using the G-NAF and NRP location.

NOTE: More information on the G-NAF is available from: <https://data.gov.au/dataset/geocoded-national-address-file-g-naf>

7.2.8.3 If the outcome of an initial compliance assessment is that one or more Systems is non-compliant, the following steps are required:

(a) If a Higher Priority Full Coverage Deployment Class System prevents Deployment of all defined Deployment Class Systems by another Provider from that other Provider's chosen NRP from which it has Notified a Deployment Class System, then all such affected Providers must participate in a Sharing Resolution Process to possibly resolve the conflict by requiring changes to the Higher Priority Deployment Class System.

(b) If a conflict still remains and one or more proposed Systems is non-compliant, then those non-compliant

Systems must not be operated, but their Providers may re-Notify compliant Systems within the compliance assessment process, and any compliant System may proceed to or continue Deployment.

- (c) If a conflict remains because two Providers have equal priority and one or both causes Unacceptable Interference to the other, then the process in 7.2.10 applies.

7.2.8.4 The intent of this Code's rules based approach is that for most situations, the compliance assessment may be completed with minimal interaction. In these cases, the Shared Cable Bundle sharing outcome should be known on the first day after the conclusion of the Response Window.

7.2.8.5 At the conclusion of the Response Window, each Notified System Provider should be in a position to apply the Code rules to the Notified information and to determine whether a rules-based cable bundle sharing outcome exists, and if so, to identify an unambiguous outcome.

7.2.8.6 When a Code outcome is identified and within 7 days from the end of the Response Window, the Initiator and each responder must individually inform all other Notified Providers sharing the Shared Cable Bundle of their interpretation of the Code outcome.

NOTE: This is the means by which the Initiator and responders discover the interpretation of the Code outcomes that have been made by the other participants in the compliance assessment.

7.2.8.7 All Notified Providers should agree on the Code outcome for each relevant Shared Cable Bundle. If a Notified Provider fails to respond to other Providers with its interpretation of the Code outcome, or retracts its interpretation, it is taken to have agreed with the other Notified Providers.

NOTE: when all Notified Providers apply the Code rules to the same information, they should reach identical conclusions and therefore 'agree' by informing each other without having had to undertake a negotiation or discussion. If the parties disagree about the outcome, the parties are expected to discuss and negotiate to resolve the issue. If this happens, parties are invited to inform Communications Alliance of the circumstances of the ambiguity so that a future revision of this Code can be released to avoid that class of ambiguity.

7.2.8.8 Within 14 days after the conclusion of the Response Window, any party sharing a Shared Cable Bundle may inform other Notified Providers for a Shared Cable Bundle that it wishes to commence a negotiation seeking an alternative mutually agreed Shared Cable Bundle sharing outcome.

- 7.2.8.9 Any Provider of a Notified Deployment Class System may decline an invitation to negotiate for an alternative cable sharing outcome in the spectrum that their System occupies provided that their System is operated in full accordance with this Code.
- 7.2.8.10 Any such negotiation between Providers should be completed within 21 days of the end of the Response Window.
- 7.2.8.11 Further to 7.2.8.7 and 7.2.8.10, if Providers do not reach agreement about the Code outcome within the period specified in 7.2.8.10, including if a Notified Provider does not enter into a good faith negotiation to resolve the outcome in accordance with this Code, all Notified Providers should proceed with the Code's processes based on their understanding of the Code. While agreement has not been reached, Providers should attempt to negotiate a workable coexistence.

NOTE: Providers may seek a clarification of the Code's requirements from Communications Alliance at any time. Where a Code requirement continues to remain unclear, Providers may approach Communications Alliance to suggest a Code review to rectify any problem or clarify the requirement.

- 7.2.8.12 If after the end of the period specified in 7.2.8.10, a Provider reaches a different conclusion concerning the Code outcome, it should inform other affected Providers and adjust and resend any previously incorrect communications or Notifications.
- 7.2.8.13 If resolution of differences of interpretation between Notified Providers is not achieved prior to operation of their Systems, it is possible that Unacceptable Interference may occur. Once a System is in operation, the non-compliance provisions of this Code (see 7.4 of Part 1) may be used to avoid service degradations caused by non-compliance.
- 7.2.8.14 The obligations in 7.2.12.1 and 7.2.12.6 apply from a time tied to the beginning of the Cooperation Process, and apply whether agreement in 7.2.8.7 has been reached or not.
- 7.2.8.15 Within 28 days of the end of the Response Window, Initiators and responders that are required to agree on the outcome must amend their System Notifications to reflect the required changes based upon the application of the Code rules or another mutually agreed outcome. This does not require any party to alter a valid Priority Date of a previously Notified Systems.

7.2.9 Sharing Resolution Process

- 7.2.9.1 The Sharing Resolution Process is part of the compliance process and is triggered when more than one Deployment Class System has Notified for the same

Shared Cable Bundle, and a Higher Priority Provider's choice of Deployment Class System would prevent a Lower Priority Provider from Deploying any of the defined Deployment Class System from its chosen NRP.

7.2.9.2 Outcome of the process. The Sharing Resolution Process will enable sharing where possible by mandating a change of Deployment Class System on the Higher Priority Provider. The Lower Priority Provider would then be able to Deploy a complementary Deployment Class System (or a compliant Non-Deployment Class System) that can coexist with that Higher Priority Provider's changed Deployment Class System.

7.2.9.3 Refer to section 6.3 for rules relevant to the Sharing Resolution Process.

7.2.9.4 The Sharing Resolution Process may require the Higher Priority Provider to change to its preferred choice from all compliant Sharing Resolution Process Deployment Class System outcomes. Other Lower Priority Notified Providers must then re-Notify changed Systems where necessary to comply.

7.2.9.5 As an alternative to 7.2.9.4, the Higher Priority Provider may enable sharing by re-Notifying any other System that places it at a Lower Priority than the conflicting System and that would not have triggered the Sharing Resolution Process.

7.2.10 Resolution of cases of equal priority due to Coincident Priority Dates

7.2.10.1 Cases of equal priority may arise within a Shared Cable Bundle when both Systems have the same Full Coverage status and either two Providers Notify on the same day.

NOTE: One System may pre-exist the other because it is already Deployed and providing services on the date of Notification and if so, this circumstance is considered in some of the potential strategies for the sharing of Shared Cable Bundles.

7.2.10.2 In cases of equal priority, the following ordered rules must be applied:

- (a) If none of the Systems with equal priority causes Unacceptable Interference to another Notified System of equal or Higher Priority, then Providers may adopt their chosen Systems as Notified.
- (b) When two Systems have the same Priority Date, a Higher Priority System that has Full Coverage may embed its priority over another Notified System that does not have Full Coverage; it retains that relative priority as long as its Notification or a subsequent Notified Upgrade persists.
- (c) If as in (a) one System has been previously operating with a Higher Priority than the other (i.e. it has been

able to embed its relative priority by virtue of its prior Deployment Class and Full Coverage status), then sharing must be resolved as if that System had retained that Higher Priority than the other.

- (d) Otherwise if a deadlock remains, then determine whether a Sharing Resolution Process trigger exists and attempt to use the modified Sharing Resolution Process in 6.4.
- (e) Otherwise if the deadlock cannot be resolved by the modified Sharing Resolution Process, then the parties must negotiate in good faith to reach a mutually agreed sharing outcome.

7.2.11 Late Responder Notification after 1 month but within the Cooperation Process

- 7.2.11.1 Except as described in 7.2.11.2, a Provider that, after the conclusion of the one month Response Window and before the Initiator commences operating its new or Upgraded System, issues either (a) an Upgrade Notification for a previously Notified System, or (b) a new System Notification, either of which shares a Shared Cable Bundle with an Initiator's or a responder's System, is hereafter called a late responder.
- 7.2.11.2 Previously Notified Providers who make a change to their Systems as a result of Code requirements or negotiated sharing solutions during the Compliance Process are not considered to be late responders.
- 7.2.11.3 Late responders' Upgraded Systems receive the Notification time as the Priority Date.
- 7.2.11.4 Late responders may not participate in the compliance assessment process under 7.2.8.
- 7.2.11.5 Late responders' Systems must remain compliant with the outcomes of the compliance assessment. A late responder must only Deploy a compliant System that does not cause Unacceptable Interference to any other prior Notified Deployment Class System.

NOTE: The purpose of this requirement is to avoid disadvantaging timely participants or frustrating the timely availability of new and Upgraded end user services. The loss of priority consequence can be avoided if a potential late responder (a) continues operating their existing System in accordance with the Code and the compliance assessment outcomes and (b) waits until after the time that the Initiator and other responders commence operating their new or Upgraded Systems before issuing a new Notification for their own System.

- 7.2.11.6 Except as described in 7.2.11.7 a late responder must only operate its updated or new System after the Operation Time provided by the Initiator.

7.2.11.7 Responders or late responders wishing to operate their System earlier than the Initiator's Operation Time must only do so if it does not cause Unacceptable Interference to any Deployment Class System Notified and in operation prior to initiation of the Cooperation Process.

7.2.12 Implementation Phase

7.2.12.1 An Initiator has 6 months from its Notification time to commence Deployment of the Notified System and provide a service.

7.2.12.2 The Initiator may obtain a single extension of up to 3 months to that original window, for any of the following documented reasons:

- (a) a permit or connection from a local authority has not been granted after four months of having applied, or
- (b) delays caused by an action of or a failure to act by building managers, power suppliers or other regulators.

NOTE: Sub-clause (a) means that the Initiator must submit a valid application for a permit or connection no later than two months from the original Notification and make documentation of the application available upon request.

7.2.12.3 An Initiator that meets the requirements above for an extension must amend its Notification and retain relevant evidence of the delay described above.

7.2.12.4 Subject to 7.2.12.5, failure of an Initiator to Deploy a compliant System within the required 6 months (or 9 months with extension according to 7.2.12.2) from the start of the Cooperation Process results in forfeiture of Priority Date. For any subsequent Notification by the Initiator on that Shared Cable Bundle, the Priority Date may not be earlier than one year from the start of that incomplete Cooperation Process.

7.2.12.5 If the Initiator's Notified System turns out to be non-compliant and the Initiator chooses not to Deploy as a result of the compliance assessment, or if the Sharing Resolution Process resulted in a requirement to Deploy a different technology type that the Provider chose not to Deploy, 7.2.12.4 does not apply.

NOTE: the purpose of this clause is to ensure that a second Provider that would otherwise have Notified its own System is not disadvantaged by the non-Deployment of an earlier Notified System.

7.2.12.6 Responders proposing new Systems have 3 months from the start of the Cooperation Process to inform their readiness to Deploy the new or Upgraded System.

7.2.12.7 Subject to 7.2.12.8, failure of a responder proposing a new System to inform the Initiator of its readiness to operate its System within 3 months of the start of the Cooperation Process results in forfeiture of Priority Date, which for any subsequent Notification by that Provider on that Shared Cable Bundle may not be earlier than one year from the prior Notification.

7.2.12.8 If the responder's Notified System turns out to be non-compliant as a result of the compliance assessment, or if the Sharing Resolution Process resulted in a requirement to Deploy a different technology type that the Provider chose not to Deploy, 7.2.12.7 does not apply.

NOTE: the purpose of this clause is to ensure that a second Provider that would otherwise have Notified its own System is not disadvantaged by the non-Deployment of an earlier Notified System.

7.2.12.9 Responders proposing Upgrades to Incumbent Systems, and incumbents that are forced to change their Systems as a result of the Compliance Process, have 5 months from the start of the Cooperation Process to inform their readiness to Deploy the new or Upgraded System.

7.2.12.10 Subject to 7.2.12.8, failure of a responder proposing an Upgrade to an Incumbent System, or an incumbent forced to change their System as a result of the Compliance Process, to inform the Initiator of its readiness to operate its System within 5 months of the start of the Cooperation Process results in forfeiture of Priority Date, which for any subsequent Notification by that Provider on that Shared Cable Bundle may not be earlier than one year from the prior Notification.

NOTES:

1. In circumstances where:

(a) there is a single Initiator and no responder, and

(b) the Initiator's Notified System complies with this Code without requiring any change to another Notified System that is already operating;

then the Initiator's Notified System may operate from a date 14 days after informing all Notified Providers of the intended System Operation Date.

2. In circumstances where (a) there is a single Initiator and no responder, and (b) the Initiator's System is in conflict with another Notified System that is already operating, and (c) the Initiator's System has the highest priority after the compliance process; then the Initiator's Notified System may operate from a date 14 days after informing all Notified Providers of the intended System Operation Date. Other Systems must only operate from the Operation Date with Systems that can coexist with the Initiator's System.

3. In circumstances where (a) there is a single Initiator and no responder, and (b) the Initiator's System is in conflict with another Notified System that is already operating, and (c) the Initiator's System has the Lower Priority after the compliance process; then the Initiator's may only operate a System that can coexist with all Higher Priority Systems from a date 14 days after informing all Notified Providers of the intended System Operation Date. Other Lower Priority Systems must only operate Systems that can coexist with the Initiator's System from the Operation Date.

4. In circumstances where (a) there is a single Initiator and at least one responder, and (b) there is an unambiguous outcome either because of the new Priority Order or as a consequence of the Sharing Resolution Process; then the ultimate operational outcome will be known immediately but responders are not required to be operating their Notified Systems until 3 months from start of the Cooperation Process. The Initiator may only inform other Providers of its Operation Date which may not be earlier than a date which is the earlier of (a) 14 days after all responders, and Notified incumbents that were forced to make changes to their Systems to comply, have informed they are ready to operate, or (b) 3 months after start of the Cooperation Process.

7.2.13 Process for Notifying the intended System Operation Date

7.2.13.1 After:

- (a) completion of the compliance assessment, and
- (b) before a new System is operated or an Upgraded System operated in its Upgraded configuration, and
- (c) within 3 or 5 months of the start of the Cooperation Process as defined above,

a responder or Notified incumbent that was forced to make changes to their Systems to comply, must inform all Notified Providers in the relevant Shared Cable Bundles that its Upgrade or new System is ready for operation. Failure to do so constitutes retraction of the Notification.

7.2.13.2 After:

- (a) completion of the compliance assessment, and
- (b) after all responders and incumbents with compliant Coexisting Systems have informed readiness to Deploy, or have exceeded the specified 3 months for responders with new Notifications or 5 months for incumbents, and
- (c) at least 14 days before its new System is operated or an Upgraded System operated in its Upgraded configuration, and
- (d) within 6 months of start of the Cooperation Process (or 9 months with a valid extension),

the Initiator must inform all Notified Providers in the relevant Shared Cable Bundles of the intended System Operation Date no less than 14 days prior to that date. Failure to do so constitutes a retraction of the Notification.

NOTE: The intended System Operation Time must be communicated via email in accordance with the process described in Part 2 of this Code.

7.2.14 Failure to Implement a Sharing Resolution Process outcome

7.2.14.1 If an incumbent Higher Priority Provider fails to implement a change of Deployment Class as required by the Sharing Resolution Process, that Provider's System must forfeit its Priority Date and status. Other Notified Providers sharing the Shared Cable Bundle may then achieve Higher Priority and may Deploy their intended System subject to the Code rules in section 4.1.

7.2.14.2 If an Initiator with Higher Priority Provider fails to implement a change in Deployment Class required by the Sharing Resolution Process, that Higher Priority Provider is taken to have retracted its Notification. The Lower Priority Provider may then be able to re-Notify and Deploy its intended System subject to the Code rules in section 4.1.

7.2.14.3 If after the Higher Priority Provider has changed its Deployment Class as required by the Sharing Resolution Process, the other Provider fails to Deploy and implement a complementary compliant System that resulted from the Sharing Resolution Process within the handshaking timeframe defined in section 7.2.13, the former may re-Notify and Deploy its original System in accordance with the 14 day handshaking protocol described in 7.2.13. While the former continues to Deploy that Notified System, the latter may not re-Notify for that Shared Cable Bundle for any other System that uses Spectrum That Overlaps with the former.

NOTE: the purpose of this clause is to ensure that the latter Provider would not otherwise disadvantage any other Provider by the non-Deployment of its Notified System.

7.2.14.4 If after the Higher Priority Provider has changed its Deployment Class System as required by the Sharing Resolution Process, the Lower Priority Provider fails within the required 3, 5 or 6 months from the start of the Cooperation Process to inform readiness to operate a complementary compliant System that requires the change made by the Higher Priority Provider, the Higher Priority Provider may re-Notify and Deploy its original System. Henceforth, while the Higher Priority Provider continues to Deploy in that spectrum, the Lower Priority Provider may not Notify for that Shared Cable Bundle any other System that uses the same spectrum.

7.2.15 Upgrades to Complementary Full Coverage

A Provider that:

- (a) Is operating an existing Full Coverage Deployment Class System in a Shared Cable Bundle or bundles (e.g. a Building System feeding a tree structure with risers and per floor cabling within a building); and
- (b) Upgrades to one or more new Deployment Class System to subsets of that Shared Cable Bundle or bundles such that the new Systems replace or coexist with the existing System in some or all parts of the Shared Cable Bundle (e.g. separate Deployment Class System on some floors, with the Building System feeding the remaining floors); and
- (c) those Deployments and the original System (if retained) provide Full Coverage to the entirety of the original System's Full Coverage end users;

may continue to claim Full Coverage for the existing and new Deployment Class System and may retain the Priority Date of the existing System for itself and all new Systems within the coverage of the original Notification's Shared Cable Bundles.

7.2.16 Revocation of Full Coverage

- 7.2.16.1 If an end user has applied for a service and a service has not been provided within 3 months from the time of that application, the Provider must forfeit its Full Coverage status.

NOTE: This clause is only applicable to Systems that have passed the point in time where end users can first apply for a service. Prior to that time this condition is considered satisfied if the proposed System would have access to the Shared Cable Bundle.

- 7.2.16.2 If an end user applies for a service and a port cannot be provided within 3 months from the time of that application, the Provider must update its Notification to record its loss of Full Coverage status.

7.2.17 Special Measures for G.fast Notifications

- 7.2.17.1 Providers who Notified their G.fast Systems prior to commencement of the Code receive the Notification date as their Priority Date.
- 7.2.17.2 Providers may Notify new G.fast Systems from the day after Code registration and receive the Notification date as their Priority Date.
- 7.2.17.3 In the event there is more than one Notification and/or Priority Date for a G.fast system in a Shared Cable Bundle that was Notified prior to the commencement of this Code, Providers must engage in the G.fast Dispute Resolution Process set out below.

7.2.18 G.fast Dispute Resolution Process

- 7.2.18.1 In the event that a dispute arises in relation to a Notification or Priority Date of a G.fast system in a Shared Cable Bundle, Providers must engage in good faith negotiations and, if necessary, mediation.
- 7.2.18.2 In attempting to resolve disputes, Providers must have regard to the principles and requirements of this Code.
- 7.2.18.3 A Requesting Provider must notify a Receiving Provider of a dispute within thirty business days of the Code commencement, or otherwise within five business days of a Notification.
- 7.2.18.4 A Requesting Provider may request information from another Provider regarding the Receiving Provider's notification, including (but not limited to) evidence to validate any aspect of the Notification the subject of the dispute.
- 7.2.18.5 The Receiving Provider must respond to the Requesting Provider's request under section 7.2.18.4 within five business days.
- 7.2.18.6 In the event that Providers cannot resolve disputes pursuant to clause 7.2.18.5, Providers must make reasonable endeavours to refer a matter in dispute for arbitration by an independent expert agreed by the Providers.
- 7.2.18.7 Providers must comply with the determination of an independent expert.
- 7.2.18.8 Providers must ensure that dispute resolution measures required by this clause are conducted by persons with sufficient decision-making authority consistent with timely dispute resolution.

NOTE: The intention of this clause is to provide a framework to resolve disputes regarding the Priority Order of Notifications. In particular, this certainty is important for G.fast systems, given when two or more G.fast systems are Deployed to the same Shared Cable Bundle, no G.fast system is expected to be technically viable, including the first G.fast system that was Deployed.

7.3 Notification of System Details

- 7.3.1 If a Provider intends to Deploy a System then that Provider should Notify to make the following information available for other Providers and for Shared Cable Bundle owners/managers:
 - (a) Details required in the template given in Part 2; and
 - (b) Whether the DSLAM has been Deployed to use Exclusive Customer Cabling.

NOTE: Failure to make the information available may allow a subsequent Provider of a Notified Full Coverage Deployment Class

System to assume a Higher Priority and this Code may prevent the prior Provider from continuing to operate that System.

- 7.3.2 Providers wishing to Notify existing or intended Systems need to subscribe to the industry contact list maintained by Communications Alliance and provide the following information for use by other Subscribed Providers:
- (a) A URL where the Provider publishes its data on Notified Systems (if the provider intends to publish the information publicly, noting the confidentiality provisions in clause 7.3.4); and
 - (b) An email address for correspondence with a human for purposes of negotiation; and
 - (c) An email address for correspondence to collect data on Notifications e.g. via an information system with no capability to send an email reply.
- 7.3.3 For the purposes of 7.3.1, a Provider is taken to have Notified if the Provider has caused valid information to be included in its published information at a URL or a point from which the information can be retrieved or obtained, as provided to CA for the list of participants; and sent to all other Subscribed Providers either:
- (a) an email with directions to the details provided under that URL; or
 - (b) an updated System Notification File containing the notifiable information for every System which that Provider wishes to Notify.

NOTES:

- 1. The date and time of the email provides confirming evidence of the Priority Date which is recorded with the System Notification information.*
- 2. Refer to Part 2 of the Code in section 12 (System Notification) and section 13 (System Notification Scheme) for the requirements on what is valid information.*
- 3. Refer to Part 2 of the Code in section 13.3 for more information on the list of participants.*

- 7.3.4 Information provided by a Provider in a Notification is confidential information of that Provider.
- 7.3.5 Another Provider accessing such information must not:
- (a) disclose such information to any person other than to its officers, employees, contractors or advisers (or, in the case of nbn, to its Shareholder Ministers as required) to whom such information is reasonably required to be disclosed for the purposes of this Code (provided that any person to whom such disclosure is made is subject to an obligation to keep such information confidential); or

- (b) use such information for any purpose other than for the purposes described in this Code.

NOTE: For the avoidance of doubt, a Provider may request the execution of a Confidentiality Deed prior to sharing its confidential information with another Provider.

- 7.3.6 A Provider must send to Communications Alliance, no later than the end of the month in which a System Notification File was provided under clause 7.3.3, an updated System Notification File containing the notifiable information for every System which that Provider wishes to Notify.

NOTES:

1. For example, if an updated System Notification File was provided on 29 June, a Provider then sends the updated System Notification File to Communications Alliance by the end of June.

2. A regulator may, in addition to or as part of its statutory powers to gather information, request from Communications Alliance a System Notification File sent under clause 7.3.6. For transparency purposes, Communications Alliance would inform the relevant Provider about such a request.

- 7.3.7 Where a Provider:

- (a) Has followed the Code process to obtain the System Notification File of a second Provider, including any bilateral arrangements to share confidential information under clause 7.3.5.; but
- (b) Has not received the System Notification File from the second Provider within seven days after finalising bilateral arrangements to share confidential information

then the first Provider may request Communications Alliance make available to the first Provider the most recent System Notification File of the second Provider that the second Provider sent to Communications Alliance under clause 7.3.6.

NOTE: For transparency, Communications Alliance would inform the second Provider about making a System Notification File of the second Provider available to the first Provider.

7.4 Non-Compliance with this Code

- 7.4.1 There is significant potential to emit Unacceptable Excess Power or to cause Unacceptable Interference if the Code is not correctly adhered to. The potential harms to another Provider's services include, severe reduction in bit rates, an increased chance of drop outs, and indefinite disruption of services. These potential harms may constitute interference with a Carriage Service.
- 7.4.2 Responsibility for correctly complying with the Code rests with each individual Provider.
- 7.4.3 If a Provider believes that its services have been degraded because of another Provider's potential non-adherence to the

Code, it is the responsibility of the Provider whose services are degraded to inform the allegedly non-complying Provider of the alleged non-compliance. The Provider whose services are degraded should support its claims with:

- (a) test results;
- (b) the notified System parameters of both Providers; and
- (c) references to Code requirements.

7.4.4 When alleging that a Provider is not operating a System compliantly with the Code, the allegations should specifically include details of:

- (a) the location of the System, and
- (b) its identity (if known or Notified), and
- (c) the clause or clauses of the Code which are allegedly not being complied with, and
- (d) the impacts or effects of the alleged non-compliance

7.4.5 If a Provider makes a complaint against another Provider alleging non-compliance with the Code, the allegedly non-complying Provider must rectify any known non-compliance either by modifying the System or by disconnection:

- (a) in 7 days where there is an alleged total loss of service; or
- (b) In 14 days in all other circumstances.

7.4.6 While the time intervals in 7.4.5 allow time for the investigation of compliance by the allegedly non-complying Provider, and time to develop and implement System changes to rectify that non-compliance, a Provider that knows it is non-compliant and is causing loss of service to another Provider's System(s) must rectify that non-compliance within 1 day.

7.4.7 In responding to a complaint raised under section 7.4.5, the allegedly non-complying Provider must provide evidence of ongoing compliance with the Code and address all points raised in 7.4.3 and 7.4.4. The allegedly non-complying Provider must bear any costs associated with this.

7.4.8 Subject to both:

- (a) first having made a non-compliant Provider aware of its non-compliance, and
- (b) having allowed the requisite time for the non-compliant Provider to respond and rectify the alleged problem;

a Provider of an operating Notified Deployment Class System with services that continue to be impacted by the potential or actual non-compliance may complain to the ACMA about an alleged contravention of a code registered under Part 6 of the Telecommunications Act, at which point the ACMA may conduct an investigation under Part 26 of the Telecommunications Act, arriving at findings and potentially taking enforcement action.

- 7.4.9 If a Provider is found by the ACMA to have not complied with the Code, that Provider must address or rectify non-compliance within 1 day and inform any affected Providers of Notified Deployment Class Systems that the non-compliance has been addressed or rectified within the same time period. For clarity, this means that a Provider is required to change non-complying Systems to avoid the non-compliance, or to disconnect non-complying Systems from Shared Cable Bundles, within 1 day of being found by ACMA to have not complied with the Code.

8 TABLES OF DEPLOYMENT CLASSES AND DEEMED COEXISTENCE

8.1 Deployment Class Systems

- 8.1.1 Table 1 lists all Deployment Class Systems for use under this Code, along with their international standards basis.

TABLE 1
Deployment Class Systems

Deployment Class System	International standard(s)
VDSL2 17.6 MHz	G.993.2 17a
VDSL2 Low Split 17.6 MHz	G.993.2 17a
VDSL2 High Split 17.6 MHz	G.993.2 17a
G.fast-SM	G.9700, G.9701

8.2 Coexistence Scenarios

8.2.1 Refer to Tables 2 and 3 for information on coexistence scenarios.

TABLE 2

Coexistence scenarios that only apply when Systems are co-located at the same NRP

Higher Priority Deployment Class System	Deployment Class System deemed to coexist (May be Vectored or non-Vectored)	Parameters that must match Deployment Class System
G.fast-SM	VDSL2 17a VDSL2 17a High Split VDSL2 17a Low Split	
Non-Vectored VDSL2 17a	G.fast-SM VDSL2 17a VDSL2 17a High Split VDSL2 17a Low Split	UPBO a, b, AELE-MODE, DPBO UPBO a, b, AELE-MODE, DPBO UPBO a, b, AELE-MODE, DPBO
Non Vectored VDSL2 High Split	G.fast-SM VDSL2 17a VDSL2 17a High Split VDSL2 17a Low Split	UPBO a, b, AELE-MODE, DPBO UPBO a, b, AELE-MODE, DPBO UPBO a, b, AELE-MODE, DPBO
Non Vectored VDSL2 Low Split	G.fast-SM VDSL2 17a VDSL2 17a High Split VDSL2 17a Low Split	UPBO a, b, AELE-MODE, DPBO UPBO a, b, AELE-MODE, DPBO UPBO a, b, AELE-MODE, DPBO

8.2.2 Systems are considered to be at the same NRP if their DSLAMs' Tie Cables connect to the same NRP (frame or joint). The deemed sharing outcomes only apply if they meet the criterion for difference in Tie Cable attenuations of less than 0.5 dB at 3.75 MHz, that results in closely matching PSDs at the entry to the Shared Cable Bundle. The cases of deemed coexistence in Table 2 are based on a further requirement that both Systems use the same values for all parameters listed in the third column of that Table.

8.2.3 Tables 2 and 3 complement each other and some cases of Systems that are deemed to coexist at the same location without constraints on Tie Cable attenuations are included only in Table 3.

TABLE 3

Coexistence scenarios that apply irrespective of relative location.

Higher Priority Deployment Class System Vectored or non-Vectored	System that is deemed or permitted to coexist (May be vectored or non-Vectored)	Parameters that must match Deployment Class System
G.fast SM	VDSL2 17a Low Split	Coexisting System PSD Masks must satisfy Higher Priority Deployment Class System Coexistence Masks.
	VDSL2 17a High Split	Coexisting System PSD Masks must satisfy Higher Priority Deployment Class System Coexistence Masks.
	VDSL2 17a	Coexisting System PSD Masks must satisfy Higher Priority Deployment Class System Coexistence Masks.
VDSL2 17a	G.fast-SM	Coexisting System PSD Masks must satisfy Higher Priority Deployment Class System Coexistence Masks.
	{VDSL2 >17.6 MHz}	Coexisting System PSD Masks must satisfy Higher Priority Deployment Class System Coexistence Masks.
VDSL2 17a High Split (Note 1)	VDSL2 17a Low Split	DPBO masks must be used below 2.208 MHz to adjust for separation
	G.fast-SM	Coexisting System PSD Masks must satisfy Higher Priority Deployment Class System Coexistence Masks.
	{VDSL2 >17.6 MHz}	Coexisting System PSD Masks must satisfy Higher Priority Deployment Class System Coexistence Masks.
VDSL2 17a Low Split (Note 2)	VDSL2 17a High Split	DPBO masks must be used below 2.208 MHz to adjust for separation
	G.fast-SM	Coexisting System PSD Masks must satisfy Higher Priority Deployment Class System Coexistence Masks.
	{VDSL2 >17.6 MHz}	Coexisting System PSD Masks must satisfy Higher Priority Deployment Class System Coexistence Masks.

NOTES:

1. VDSL2 High Split is only intended to be Deployed by a Higher Priority Building Provider of VDSL2 17.6 MHz to accommodate a low split network DSLAM as second Provider as required by Clause 6.1. In that situation, the Higher Priority Building Provider would also have the option of upgrading to G.fast > 20 MHz.

2. If the Low Split Network DSLAM has been Deployed to coexist with a Higher Priority Building System, a subsequent VDSL2 System in another building or Campus would need to use the high split and/or the spectrum above 17.6 MHz. In addition to the situation

in Note 1, G.fast > 20 MHz may be Deployed by a subsequent Building Provider to share with a Higher Priority network DSLAM using VDSL2 < 17.6 MHz, or by a prior Building Provider of Non-Deployment Class System full band G.fast in order to share with a Higher Priority network Deployment Class System VDSL2 < 17.6MHz.

3. Only Deployment Class Systems listed without braces in the second column have deemed compliance when coexisting with the listed Deployment Class System in the first column. Systems enclosed within '{' and '}' characters are informative only; as Non-Deployment Class System they must meet the required Coexistence Masks for the listed Deployment Class System.

8.3 Full Coverage Ranges

8.3.1 Table 4 lists the Full Coverage ranges, including for Cat 3 Cable, in dB at 3.75 MHz for Vectored and non-Vectored realisations of the VDSL2 Deployment Classes. For these calculations, Vectored Systems only employ Vectoring at frequencies above 0.75 MHz.

TABLE 4

Maximum ranges in dB at 3.75 MHz on Cat 3 Cable for VDSL2 Deployment Class Systems to fulfil Full Coverage requirements at specified rates.

Deployment Class System	Maximum attenuation (in dB at 3.75MHz) for a Network or Campus System	Maximum attenuation (in dB at 3.75MHz) for a Building System
VDSL2 17.6 MHz Non-Vectored	37.6	8.7
VDSL2 17.6 MHz low split Non-Vectored	25.4	1.69
VDSL2 17.6 MHz high split Non-Vectored	6.8	1.12
VDSL2 17.6 MHz Vectored	54.9	30.2
VDSL2 17.6 MHz low split Vectored	42.8	16.0
VDSL2 17.6 MHz high split Vectored	22.15	4.4

NOTE:

Rate requirements to qualify for Full Coverage are 25 Mbit/s or 50 Mbit/s Layer 2 rate Downstream with the Deployment Class System operating in Vectored or non-Vectored mode, under specified conditions of 1% worst case power sum crosstalk with 8 like disturbers within a 10 pair subunit.

8.3.2 Table 5 lists the Full Coverage ranges, including for Cat 3, Cat 5 or Cat 6 Cable, in dB at 30 MHz for Vectored and non-Vectored realisations of the G.fast-SM Deployment Class.

TABLE 5

Maximum range in dB at 30 MHz for G.fast Deployment Class Systems to fulfil Full Coverage requirements at specified rates.

Deployment Class System	Maximum attenuation (in dB at 30 MHz)
G.fast-SM	28

NOTES:

1. The rate requirement to qualify for Full Coverage is 225 Mbps, being the sum of Downstream plus Upstream G.fast data rates.
2. The approximate Layer 2 rate of a G.fast service is determined by summing of the Attainable Net Data Rate Downstream and the Attainable Net Data Rate Upstream reported by the equipment.

8.3.3 Table 6 lists the Full Coverage ranges, for Cat 5 or Cat 6 Cables, in dB at 3.75 MHz for Vectored and non-Vectored VDSL2 realisations of the Deployment Classes. For these calculations, Vectored Systems only employ Vectoring at frequencies above 0.75 MHz.

TABLE 6

Maximum ranges in dB at 3.75 MHz on Cat 5 or Cat 6 Cable for Deployment Class Systems to fulfil Full Coverage requirements at specified rates.

Target Minimum Layer 2 Rate	Maximum attenuation (in dB at 3.75MHz) for a Network or Campus System	Maximum attenuation (in dB at 3.75MHz) for a Building System
VDSL2 17.6 MHz Non-Vectored	61	36.4
VDSL2 17.6 MHz low split Non-Vectored	51.6	25.1
VDSL2 17.6 MHz high split Non-Vectored	29.5	7.7
VDSL2 17.6 MHz Vectored	61.1	37.8
VDSL2 17.6 MHz low split Vectored	52.4	29
VDSL2 17.6 MHz high split Vectored	30.15	17.8

NOTE:

Rate requirements to qualify for Full Coverage are 25 Mbit/s or 50 Mbit/s Layer 2 rate Downstream with the Deployment Class System operating in Vectored or non-Vectored mode, under specified conditions of 1% worst case power sum crosstalk with 8 like disturbers within a 10 pair subunit.

9 REFERENCES

Publication	Title
Australian/Communications Alliance Standards	
AS/ACIF S043.1:2015	Requirements for Customer Equipment for connection to a metallic local loop interface of a Telecommunications Network
AS/ACIF S043.2:2016	
AS/ACIF S043.3:2015	Part 1: General http://commsalliance.com.au/Documents/all/Standards/s043.1 Part 2: Broadband http://commsalliance.com.au/Documents/all/Standards/s043.2 Part 3: DC, low frequency AC and voiceband http://commsalliance.com.au/Documents/all/Standards/s043.3
Industry Codes	
C559:2012	Unconditioned Local Loop Service (ULLS) Network Deployment http://commsalliance.com.au/Documents/all/codes/c559
Industry Guidelines	
G671:2023	G.fast Deployment on Customer Cabling https://commsalliance.com.au/Documents/all/guidelines/g671
International Telecommunications Union Recommendations	
G.993.2 (02/2019)	Very high speed digital subscriber line transceivers 2 (VDSL2) https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13747&lang=en
G.993.5 (02/2019)	Self-FEXT cancellation (Vectoring) for use with VDSL2 transceivers https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13748&lang=en
G.9700 (07/2019)	Fast access to subscriber terminals (G.fast) - Power spectral density specification https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13832&lang=en
G.9701 (03/2019)	Fast access to subscriber terminals (G.fast) - Physical layer specification https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13772&lang=en

K.50 (01/2018) Safe limits of operating voltages and currents for telecommunication systems powered over the network
<https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13445>

Legislation

Competition and Consumer Act 2010

<https://www.legislation.gov.au/Series/C2004A00109>

Telecommunications Act 1997

<https://www.legislation.gov.au/Series/C2004A05145>

Other Government Publications

*Statement of Expectations
(for NBN Co Ltd)*

<https://www.infrastructure.gov.au/department/media/publications/nbn-co-limited-statement-expectations-december-2022>

*Telecommunications Regulatory and Structural Reform
(Government policy paper)*

<https://www.communications.gov.au/publications/telecommunications-regulatory-and-structural-reform>

Independent cost-benefit analysis of broadband and review of regulation

Statutory review under section 152EOA of the Competition and Consumer Act 2010

<https://www.communications.gov.au/departmental-news/government-responds-vertigan-reviews>

Other Publications

nbn Wholesale Broadband Agreement

<https://www.nbnco.com.au/sell-nbn-services/supply-agreements/wba.html>

Australian Eastern Standard Time

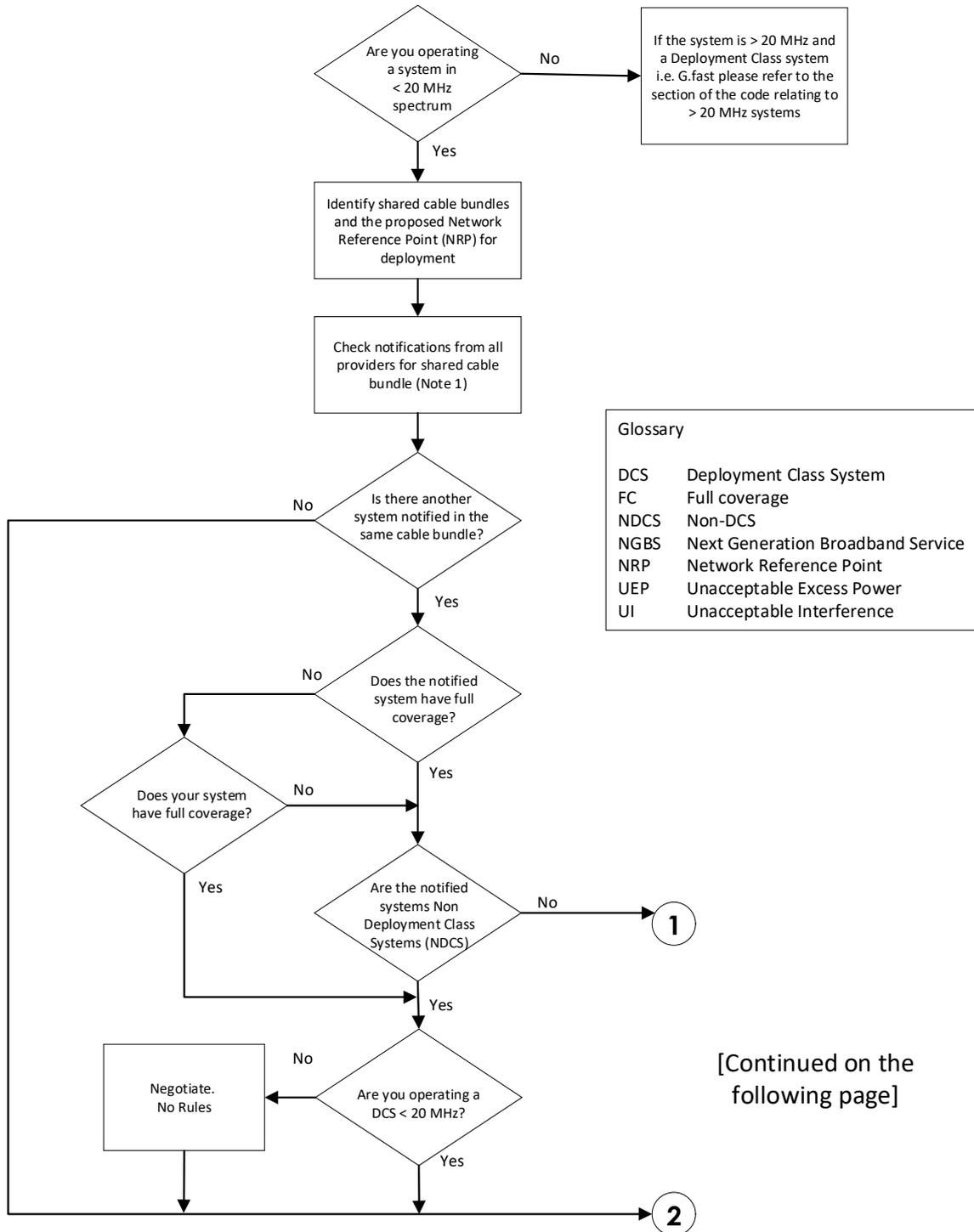
<https://www.australia.gov.au/about-australia/facts-and-figures/time-zones-and-daylight-saving>

APPENDIX

A PROCESS FLOWS (INFORMATIVE)

The following diagrams illustrate the process flows from the perspective of a Provider. While they assist in understanding and may help to clarify the text in earlier sections, that text defines the Code requirements.

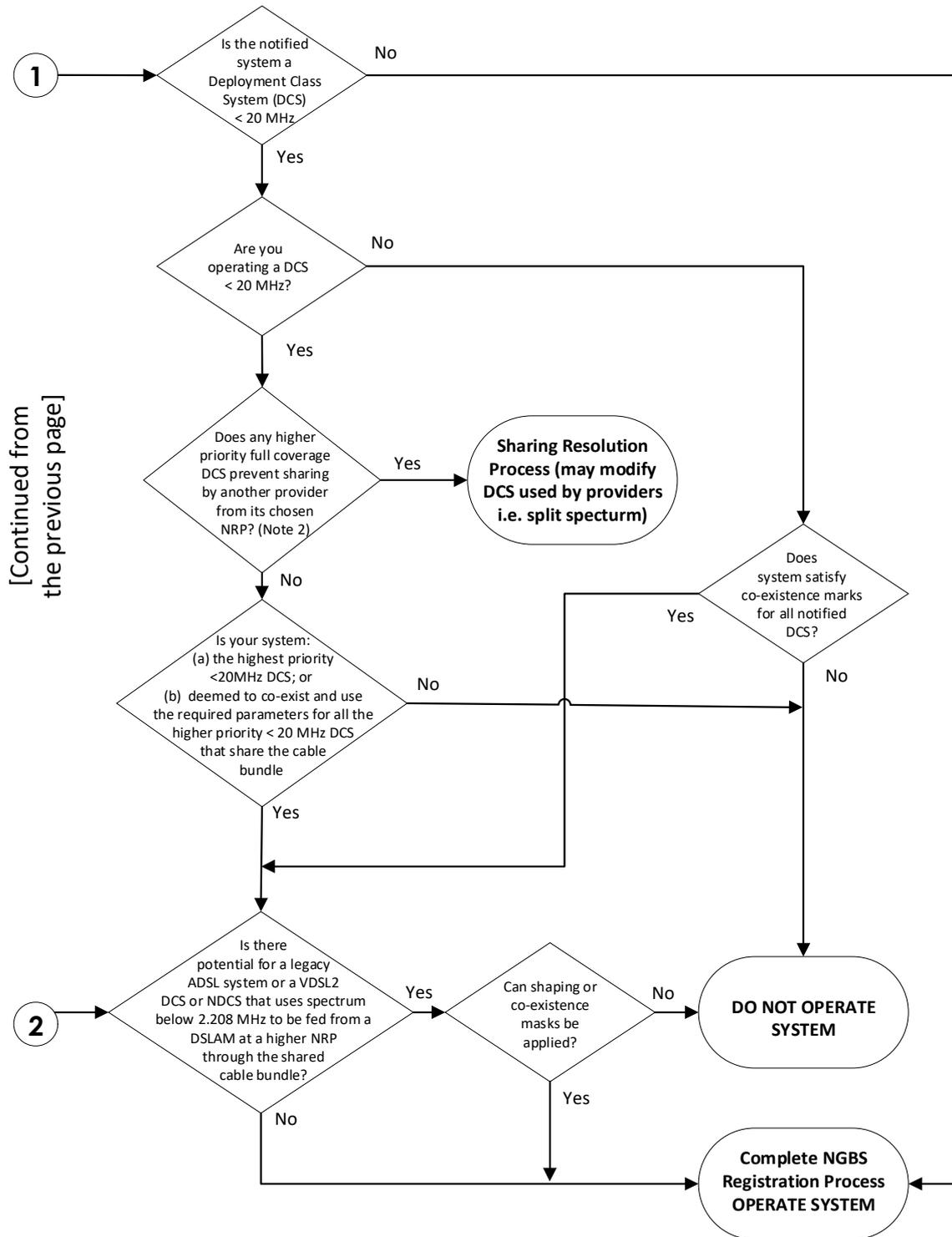
A1 Compliance process for a System to Deploy



Note 1: This includes bulk notifications by NBN Co for Node Servicing Areas
 Note 2: Carrier needs to determine which system is the "blocking" system

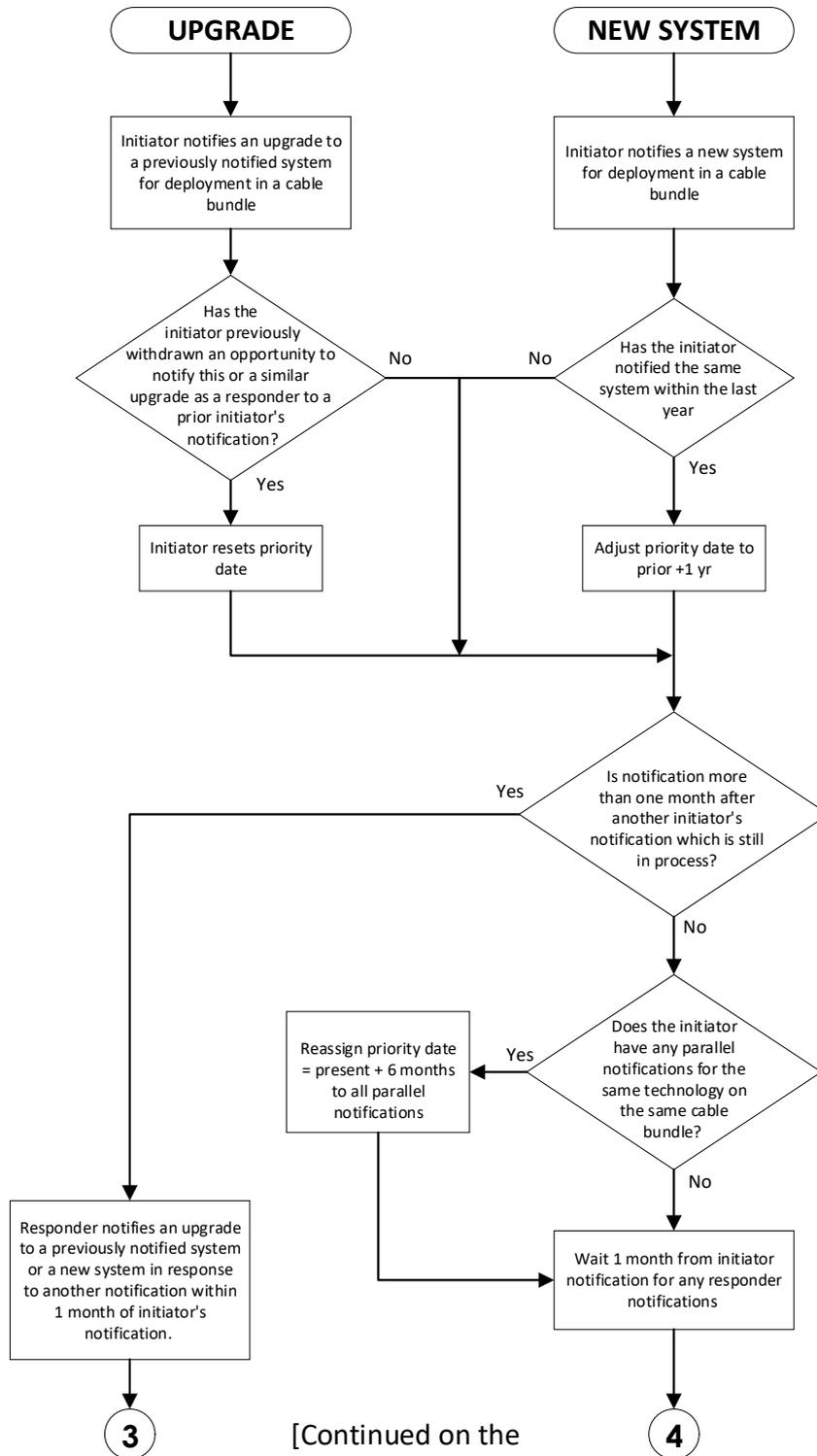
A1 Compliance process for a system to deploy less than 20 MHz

[Continued on the following page]



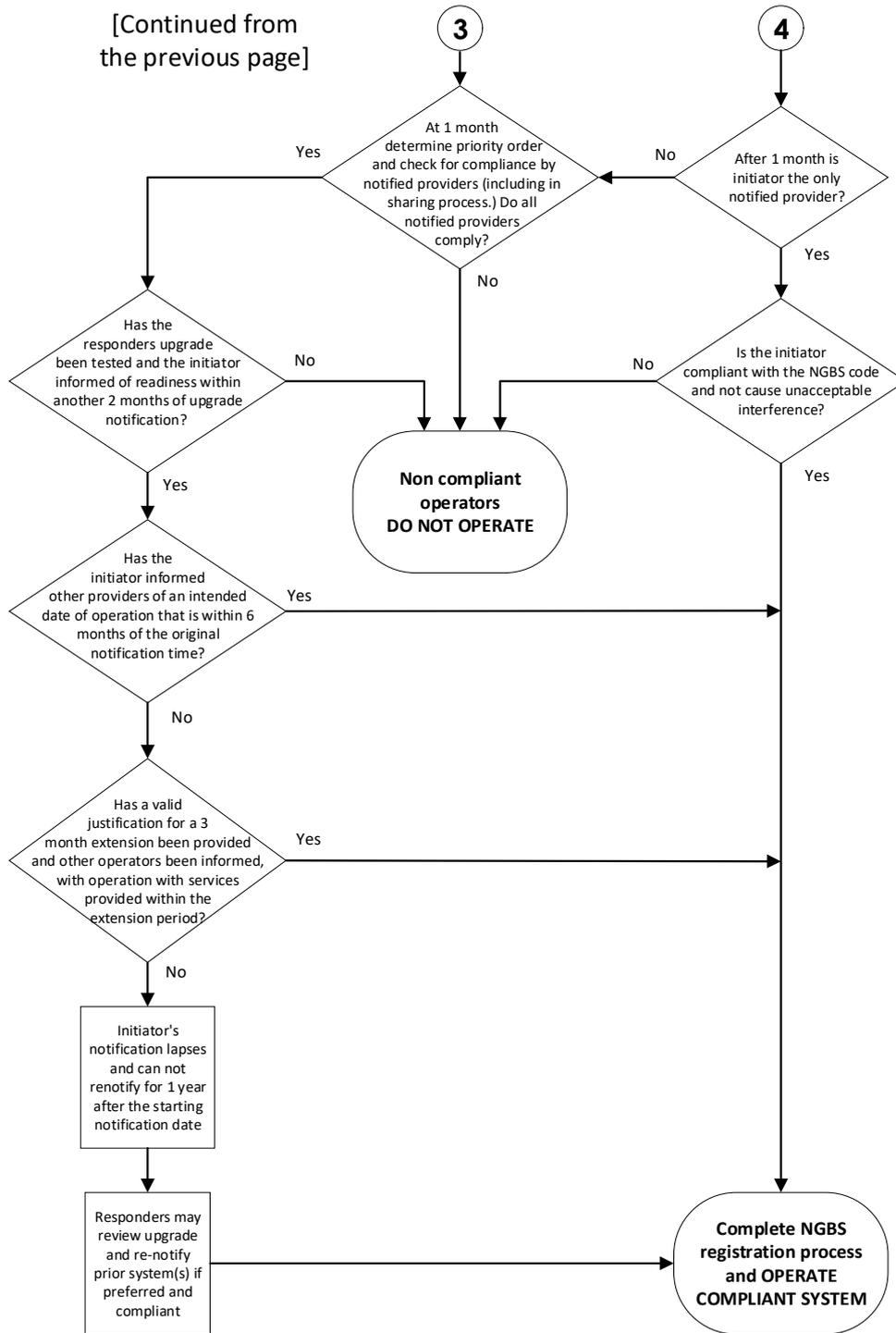
A1 Compliance process for a system to deploy less than 20 MHz (continued)

A2 Notification and Upgrade Process



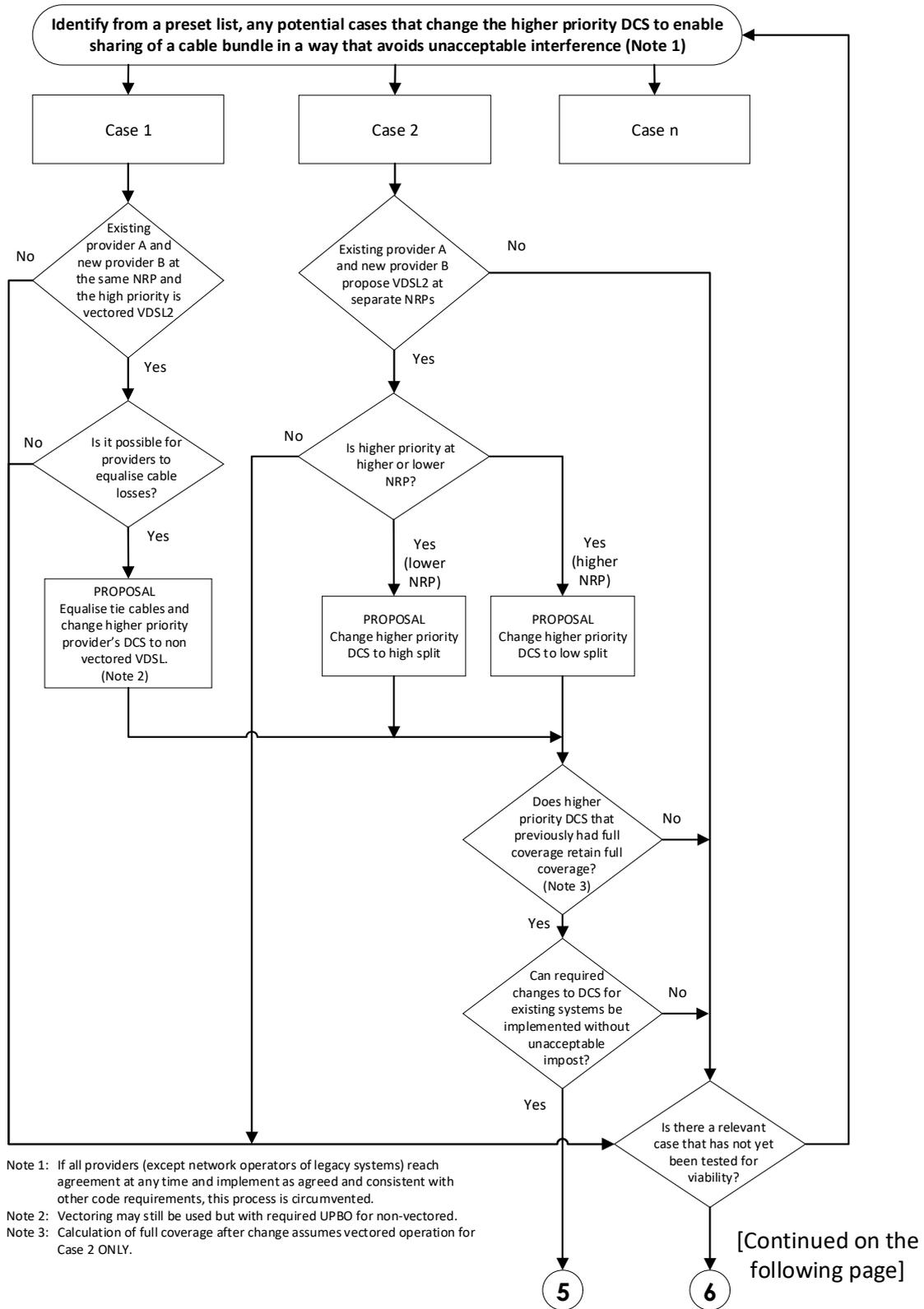
[Continued on the following page]

A2 Notification and Upgrade Process



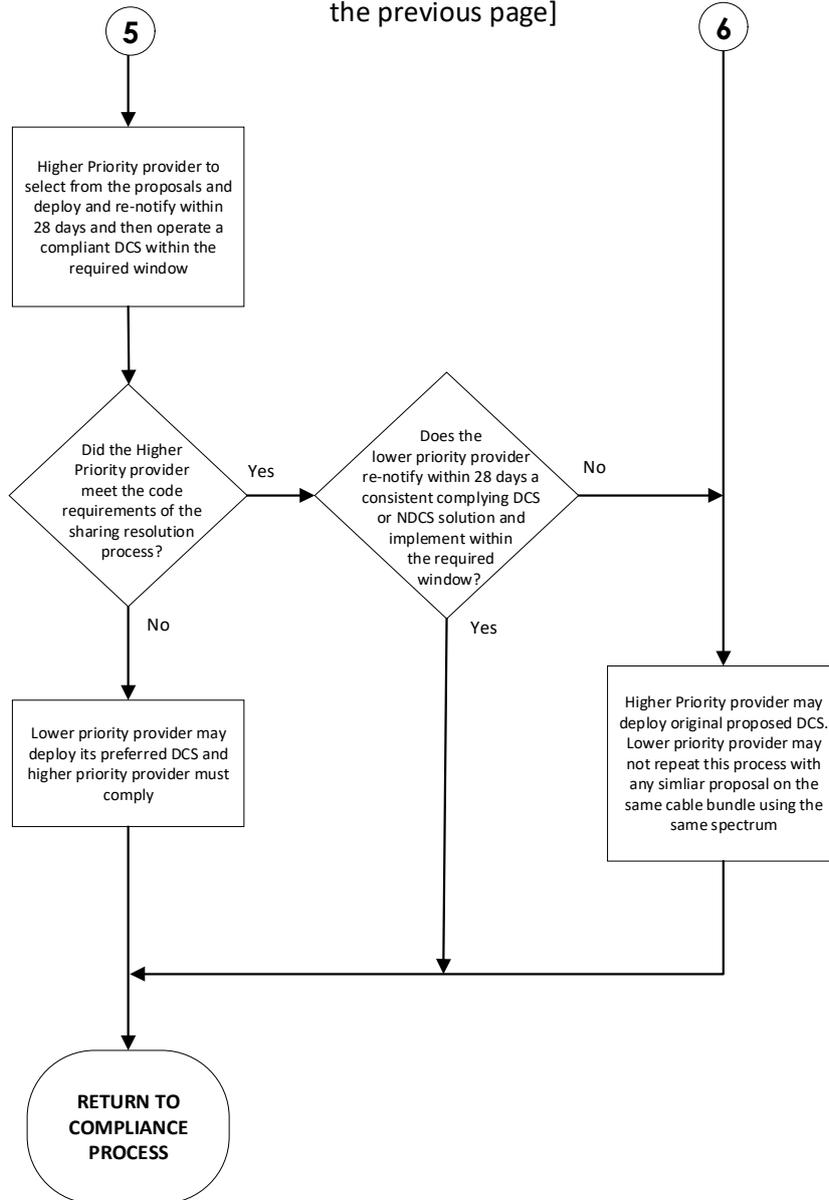
A2 Notification and Upgrade Process (continued)

A3 Sharing Resolution Process



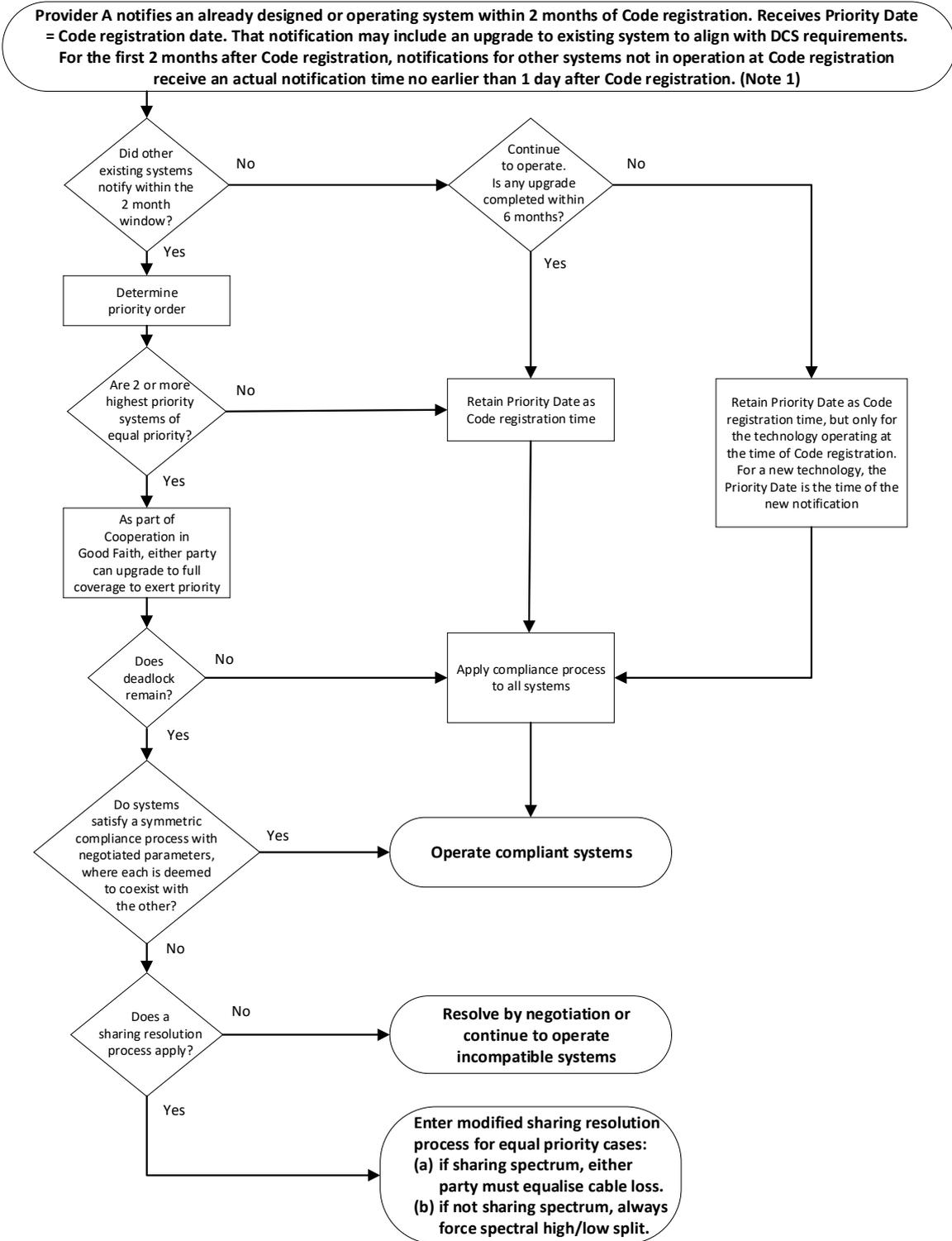
A3 Sharing Resolution Process

[Continued from the previous page]



A3 Sharing Resolution Process (continued)

A4 Code Startup Process



Note 1: This process resolves cases of equal priority resulting from allocation of identical priority dates for new systems that notify within 2 months of Code registration.

A4 Code Startup Process

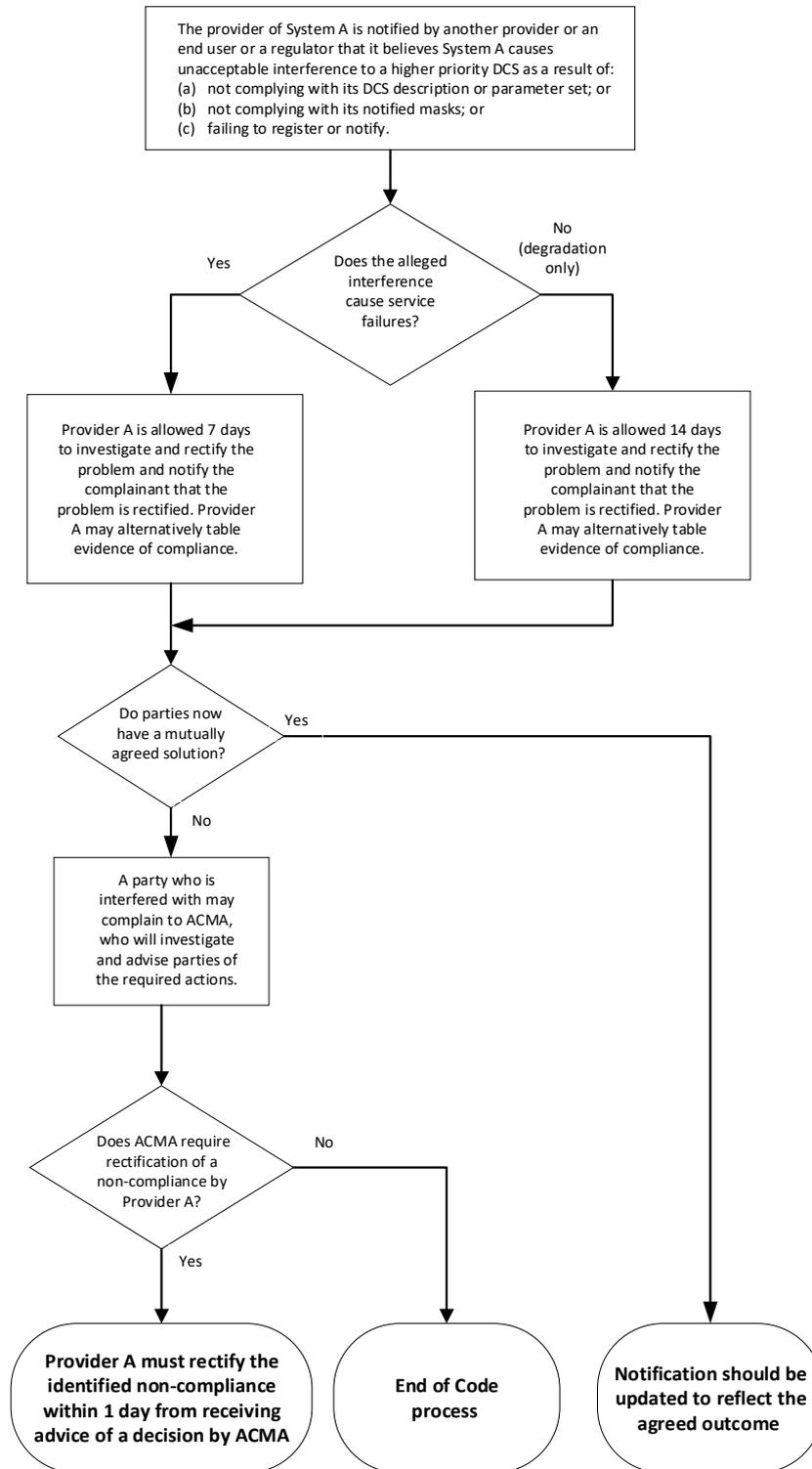
A5 Non-Compliance with Processes

TABLE A5

Scenarios for Non-Compliance with Processes.

Item	Scenario	Cause of delay	Delay validated	Action
1 a)	New service provider fails to meet 6 month window for new system or upgrade	External circumstances beyond the control of the service provider and has a properly documented extension notice of up to 3 months which has been sent to stakeholders	Yes	Continue with compliance and other processes using new dates
1 b)	New service provider fails to meet 6 month window for new system or upgrade	External circumstances beyond the control of the service provider and has a properly documented extension notice of up to 3 months which has been sent to stakeholders	No	Notification and priority date lapse and any future notification for the same system type on the same shared cable bundle receives a priority date > 6 months in the future
2	Upgrade notification has lapsed	A service provider has notified an upgrade within 1 month in response to a notification of a system by another provider, but fails to implement the upgrade and notify the first provider of the readiness to operate within a further 2 months	N/A	The upgrade lapses and the prior notification can continue without reference to the upgrade. The provider that notified the upgrade loses its early priority date which now reverts to the present time
3	Failure of the sharing resolution process by a higher priority service provider	A higher priority service provider is required to comply with a sharing resolution process requirement to change deployment class, but fails to do so in the required time	N/A	The higher priority provider must defer to the lower priority provider. That is achieved by resetting the priority time for the higher priority provider to the present time
4	Failure of the sharing resolution process by a lower priority service provider	Failure of the sharing resolution process by a lower priority service provider unable to deploy a system within 6 months that required a change of deployment class of a higher priority service that has complied with the sharing process	N/A	Higher priority provider may re-notify its prior system and immediately deploy without any opportunity for upgrade by others Lower priority provider that forced the sharing resolution process may not, while the higher priority system continues to operate, re-notify any system using the same spectrum as the system it failed to implement
5	Failure of a higher priority provider to comply with a sharing process within required time	Failure of higher priority provider to comply with a sharing process requirement to change deployment class, but fails to do so within the required 2 month limit	N/A	The high priority provider must defer to the lower priority provider. That is achieved by resetting the priority time for the high priority provider to the present time

A6 Non-Compliant Interference



A6 Non-Compliant Interference

PARTICIPANTS

The Working Committee that developed the Code consisted of the following organisations and their representatives:

Organisation	Membership	Representative
ACCC	Non-Voting	James Park
ACMA	Non-Voting	Cuong Nguyen
Adtran Networks	Voting	Ben Liew
Adtran Networks	Non-Voting	Alex Grigoruk
Casa Systems	Voting	Anitha Parthasarathy
Gigacomm	Voting	Wayne Crace
Gigacomm	Non-Voting	Andrew Buckis
Gigacomm	Non-Voting	Rowena Jarvis
nbn	Voting	Stefan Keller-Tuberg
nbn	Non-Voting	Nathan Stathis
nbn	Non-Voting	Peter Burr
Nokia	Voting	Evan Stanbury
Telstra	Voting	Giulio Consiglio
TPG Telecom	Voting	Stephanie Phan
TPG Telecom	Non-Voting	Selvan Eswaralingam
Individual	Non-Voting	Phil Potter

This Working Committee was chaired by Peter Cooke. James Duck of Communications Alliance provided project management support.

Communications Alliance was formed in 1997 to provide a unified voice for the Australian communications industry and to lead it into the next generation of converging networks, technologies and services.

In pursuing its goals, Communications Alliance offers a forum for the industry to make coherent and constructive contributions to policy development and debate.

Communications Alliance seeks to facilitate open, effective and ethical competition between service providers while ensuring efficient, safe operation of networks, the provision of innovative services and the enhancement of consumer outcomes.

It is committed to the achievement of the policy objective of the *Telecommunications Act 1997* - the greatest practicable use of industry self-regulation without imposing undue financial and administrative burdens on industry.



**Published by:
COMMUNICATIONS
ALLIANCE LTD**

**Level 25
100 Mount Street
North Sydney
NSW 2060 Australia**

**Correspondence
PO Box 444
Milsons Point
NSW 1565**

**T 61 2 9959 9111
E info@commsalliance.com.au
www.commsalliance.com.au
ABN 56 078 026 507**

Care should be taken to ensure the material used is from the current version of the Standard or Industry Code and that it is updated whenever the Standard or Code is amended or revised. The number and date of the Standard or Code should therefore be clearly identified. If in doubt please contact Communications Alliance