

Draft



**INFOCOMM DEVELOPMENT AUTHORITY OF
SINGAPORE**

**GUIDELINES FOR THE PROVISIONING OF
CO-AXIAL CABLE HOME NETWORKING
SOLUTIONS**

2 SEPTEMBER 2011

DISCLAIMER

The information contained in this document is intended to provide guidance to telecommunication licensees that intend to provide co-axial cable home networking solutions within homes.

IDA does not make any representation or warranty, express or implied, in relation to the accuracy or completeness of the information contained in this document. This document does not purport to contain all the obligations and requirements that telecommunication licensees should comply with under the Telecommunications Act (Cap. 323) and/or any regulations, codes of practice, directions and standards of performance issued by IDA.

Nothing in this document is intended to create or impose any binding legal obligations whatsoever on IDA, whether expressed or implied. IDA reserves the right to change its policy and/or to update, amend, delete and/or supplement any of the information in this document without prior notice at any time in its sole and absolute discretion.

Contents

1	Introduction	4
2	Installation Guidelines	6
2.1	Typical Coaxial Cable Home Networking Solution.....	6
2.2	Suitability of Home Configurations and Minimum Conditions for Deployment of CCHN Solution	6
2.3	General Setup Process	7
3	Responsibilities of BCS Operators and Grant of Access to BCS Facilities	10
3.1	General Obligations	10
3.2	Grant of Access to Facilities Managed or Controlled by BCS Operators in Common Areas.....	10
4	Resolution of Disputes	11
4.1	Workmanship Disputes between the End User and the Solution Provider	11
4.2	Interference Dispute between Solution Provider and BCS Operators	11

1 Introduction

- 1.1. This set of Guidelines for the Provisioning of Coaxial Cable Home Networking Solutions (hereafter referred to as the “**Guidelines**”) is published in conjunction with the IDA Reference Specification for Coaxial Cable Home Networking, Issue 1, 2011 (hereinafter referred to as the “**IDA RS CCHN**”) which sets out the technical requirements for equipment recommended for the coaxial cable home networking solution. Reference should be made to both documents when installing home networking solutions using in-home coaxial cables.
- 1.2. The Guidelines set out the –
 - (a) processes, procedures and workmanship practices that should be observed by telecommunication licensees providing home networking solutions using in-home coaxial cables (hereinafter referred to as “**Solution Providers**”) so as to –
 - (i) ensure that the coaxial cable home networking solution and associated equipment (hereinafter collectively referred to as the “**CCHN Solution**”) deployed by Solution Providers will perform satisfactorily in accordance with the IDA RS CCHN; and
 - (ii) ensure the continued performance of existing services (e.g. free-to-air TV transmission, cable TV and broadband Internet access) that are operating over the Broadband Coaxial System (“**BCS**”) with minimal service disruption.
 - (b) approach to be adopted by Solution Providers and telecommunication licensees having management or control of access to BCS facilities located within common areas where access to such facilities is required by Solution Providers for the installation of equipment used for the provision of CCHN Solutions;
 - (c) responsibilities of telecommunication licensees that are delivering services and/or operating over the BCS in relation to deployed CCHN Solutions; and
 - (d) approach to be adopted by Solution Providers and telecommunication licensees in relation to the resolution of disputes arising from the provision of CCHN Solutions.
- 1.3. The Guidelines have been developed taking reference from the following:
 - (a) the IDA RS CCHN;
 - (b) the Code of Practice for Infocomm Facilities in Buildings 2008 (COPIF); and
 - (c) the Guidelines for Info-communications Facilities in Buildings, 2008 (COPIF Guidelines).

- 1.4 The Guidelines are subject to revision to keep abreast with technological advancements and/ or changes in IDA's regulatory policy.

2 Installation Guidelines

2.1 Typical Coaxial Cable Home Networking Solution

2.1.1 A typical CCHN Solution is shown in Figure 1.

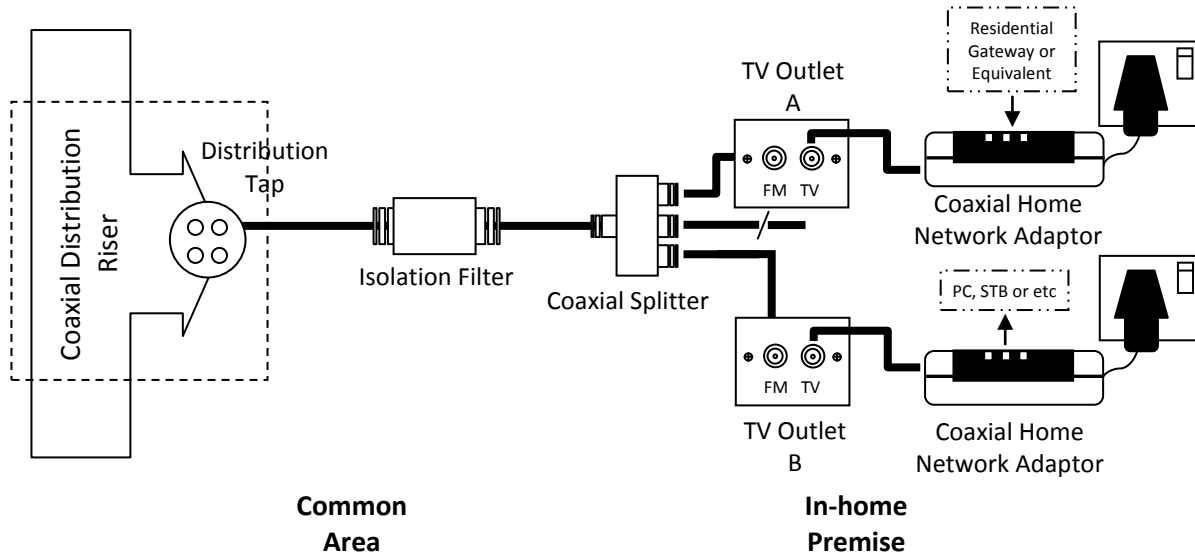


Figure 1: Typical coaxial cable home networking solution

2.2 Suitability of Home Configurations and Minimum Conditions for Deployment of CCHN Solution

2.2.1 The typical layouts of in-home coaxial cable systems that are suitable for installation of the CCHN Solution are as illustrated below.

S/N	Illustration	Description
1		Typical setup for most housing types. Access to distribution tap is needed.
2		Where access to the distribution tap is not possible, the isolation filter may be installed at the in-home splitter box where feasible.

2.2.2 Solution Providers should ensure that only in-home coaxial cables distributed via a single coaxial splitter are used for the CCHN Solution.

2.2.3 Where the layout of the in-home coaxial cable system does not conform to the illustrations in Section 2.2.1, the home will be considered unsuitable for the CCHN Solution and Solution Providers should not proceed with the installation.

2.2.4 The following illustration is an example of a layout that is not suitable for installation of the CCHN Solution.

S/N	Illustrations	Descriptions
X1		CCHN Solution will not work between Point X and Y in the home due to the decoupling of the in-home coaxial cables.

2.2.5 Solution Providers should also conduct a thorough inspection of the BCS system within the customer's home and verify its condition. Generally, the inspection should include the following aspects:

- a) Coaxial distribution riser;
- b) Coaxial distribution tap box in the riser;
- c) Coaxial splitter box housing the 1st coaxial splitter (if applicable);
- d) Layout of BCS in home; and
- e) TV outlets in home

2.2.6 If the condition of the in-home coaxial cable system does not meet the requirements specified in section 13.2 (Performance Requirements for Systems Operating between 5 MHz to 824 MHz) of the COPIF, Solution Providers should not proceed with the installation of the CCHN Solution and should inform the end user that the in-home coaxial cable system is not suitable for such installation. Where the end user is prepared to accept the possible degradation to the services delivered to him over the BCS, Solution Providers may proceed with the installation of the CCHN Solution subject to the Solution Provider obtaining the clear written consent of the end user confirming his acknowledgement and acceptance of such possible degradation.

2.2.7 Solution Providers should ensure that documented records are prepared and retained in respect of the abovementioned pre-installation verification, which shall at minimum address the following parameters:

- (a) cable impedance;
- (b) carrier levels at system outlets; and
- (c) random noise (carrier-to-noise ratio).

IDA may audit the documented records at any time for the purpose of ascertaining the observance of these Guidelines by Solution Providers.

2.3 General Setup Process

- 2.3.1 Prior to installation of the CCHN Solution, Solution Providers should obtain the written consent of the end user and inform the end user of the following:
- a) any cable TV programmes and/or other services delivered over the BCS in the same frequency band used by the CCHN Solution will not be available after the installation of the CCHN Solution;
 - b) the end user should not remove the isolation filter to prevent interference (if any) caused by the CCHN Solution; and
 - c) the end user should inform any party that conducts any future maintenance, alteration or upgrading works on the in-home co-axial cables of the installation of the CCHN Solution at his premises.
- 2.3.2 Solutions Providers should also obtain the written consent of the relevant owner of the in-home coaxial cables (if different from the home-owner) before installing the CCHN Solution using the in-home coaxial cables.
- 2.3.3 Solution Providers should ensure that the installation of the CCHN Solution is only carried out by competent persons that:
- (a) are proficient in handling the BCS with good knowledge and skill in such practices and technical specifications as specified in Chapter 13 of the COPIF and Appendix 7 of the COPIF Guidelines;
 - (b) are proficient in identifying the existing in-home coaxial cable layout and are able to provide the appropriate configuration for deployment of the CCHN Solution;
 - (c) are equipped with the necessary testing equipment or tools to conduct testing activities indicated in the Guidelines, including:
 - (i) coaxial signal measurement tool; and
 - (ii) coaxial spectrum analyser; and
 - (d) possess the relevant knowledge and skills to carry out the installation activities for the CCHN Solution in accordance with these Guidelines and industry best practice.
- 2.3.4 Solution Providers should ensure that they, and any persons whom they engage, do not cause any damage or degradation to the existing coaxial cable services when carrying out the installation activities for the CCHN Solution.
- 2.3.5 Solution Providers should ensure that all CCHN equipment used, including the isolation filters, conform to the requirements set out in the IDA RS CCHN. Solution Providers should ensure that the isolation filter is properly installed at or between the coaxial distribution tap (leading to the in-home coaxial cable distribution) and the coaxial splitter, prior to the installation of the coaxial home network adaptors. Where access to **the distribution tap box** is required for purposes of installing the isolation

filer, Solution providers should observe the procedure set out in Section 3 of these Guidelines.

- 2.3.6 Solution Providers should install coaxial home network adaptors at the identified TV outlets and ensure that all coaxial connectors are properly secured and tightened to avoid possible ingress or leakage of signals.
- 2.3.7 Additional coaxial splitters may be required for re-configuration of the BCS that is used for existing coaxial services.
- 2.3.8 Solution Providers should conduct the post-installation verification process set out in Appendix B to assess the condition of the existing coaxial cable services after the installation of CCHN Solution.
- 2.3.9 Solution Providers should promptly resolve any interference caused by the CCHN Solution.
- 2.3.10 Solution Providers should ensure that there is no disruption to the BCS serving the neighbouring residential units in the course of any installation activities.
- 2.3.11 Solution Providers should maintain proper documentation of all installation activities, including the relevant consent obtained from end users, for future audit and management of potential disputes.
- 2.3.12 Solution Providers shall serve as the single point of contact for any performance, interference issues or disputes which may arise from the implementation of the CCHN Solution.
- 2.3.13 In the event that any requirements in these Guidelines are not observed by any Solution Provider, IDA may require the Solution Provider to completely uninstall the CCHN Solution and reinstate the in-home coaxial cable system to its original condition and/ or to remove/ replace any CCHN equipment which it has deployed.

3 Responsibilities of BCS Operators and Grant of Access to BCS Facilities

3.1 General Obligations

- 3.1.1. BCS Operators should ensure that the CCHN Solutions installed in any home are not disrupted or degraded when they carry out any installation, upgrading or maintenance works to the BCS subsequent to the installation of the CCHN Solution. In particular, the BCS Operators should not alter or disconnect the CCHN configuration at the BCS riser, telecom riser, or common corridor in the course of such works.
- 3.1.2. BCS Operators shall remain responsible for handling and resolving end-user issues pertaining to the provisioning of their own coaxial cable services, e.g. cable TV services or BCS services, outside of the spectrum band specified for the provisioning of CCHN Solutions in the IDA RS CCHN.

3.2 Grant of Access to Facilities Managed or Controlled by BCS Operators in Common Areas

- 3.2.1. Where a Solution Provider requires access to BCS facilities located in common areas (hereinafter referred to as the “BCS Facilities”), which are under the control or management of a BCS Operator, for the purpose of installation or maintenance of an isolation filter in a coaxial tap box or coaxial splitter box, the Solution Provider and the relevant BCS Operator shall seek to reach an agreement in good faith for the grant of access to the BCS Facilities.
- 3.2.2. For the purposes of Section 3.2.1, the BCS Operator should not impose any requirements or conditions, save in relation to the grant of physical access to the BCS Facilities (e.g. the unlocking and locking of the co-axial tap box or co-axial splitter box) or the related on-site attendance for such purposes.

4 Resolution of Disputes

4.1 Workmanship Disputes between the End User and the Solution Provider

4.1.1. The following procedure should be followed if there is any workmanship dispute between the end user and the Solution Provider:

4.1.1.1. The Solution Provider should check the operational status of the broadband services which are distributed within the home through the CCHN Solution installed by the Solution Provider before asking the end user to sign the delivery or work order to accept the completed installation work. The Solution Provider should also check the other existing services carried by the in-home coaxial cables to ensure that these services are not affected by the CCHN Solution. In the event that the end user subsequently discovers that reception of the cable TV services (except the TV programmes transmitted within the 52 to 68 MHz frequency band which are blocked by the CCHN solution) or operation of cable telecommunication services within the home is unsatisfactory, the end user may request the Solution Provider to re-check the CCHN Solution that has been installed at the in-home premises.

4.1.1.2. Where the Solution Provider is unable to resolve any service degradation issue, the Solution Provider should uninstall the CCHN Solution from the in-home premise and restore the in-home coaxial cables to their original configuration. The Solution Provider should seek to amicably resolve the cancellation of the service order with the end user pursuant to the removal of the CCHN Solution arising from such service degradation.

4.2 Interference Dispute between Solution Provider and BCS Operators

4.2.1. The following procedure should be followed if there is any dispute between the Solution Provider and BCS Operators related to interference:

4.2.1.1. In the event that the services provided by the Solution Provider or the BCS Operator are affected by interference (“Interfered Party”), the Interfered Party should first check its own telecommunication system to confirm that the interference is not caused by its own equipment or the customer premises equipment provided by the Interfered Party.

4.2.1.2. The Interfered Party should attempt to identify any external sources of interference responsibly through industry best practice (e.g. an isolation process) to narrow down the possible sources of interference as far as possible.

- 4.2.1.3. Where the likely source of interference has been identified by the Interfered Party, the Interfered Party may request the other party whose service, equipment or network is suspected of causing interference (“Suspected Interfering Party”) to carry out the necessary checks to confirm that the source of interference is within the Suspected Interfering Party’s service and/or network.

- 4.2.1.4. In the event that the Suspected Interfering Party is unable to confirm that the source of interference is within its service and/or network, the Interfered Party may request a joint investigation with the Suspected Interfering Party to resolve the interference issue.

Appendix A **Definitions**

In these Guidelines, unless the context otherwise specifies –

“**broadband coaxial cable system**” or “**BCS**” means a wide-area wired system of coaxial cables which connects to television outlets installed within a building for the transmission of cable services;

“**building**” excludes any temporary building or structure;

“**cable**” means a cable, wire or line used or intended to be used for telecommunications;

“**cable distribution system**” means a network of cable trays, cable ladders, trunking, conduits, and/or underfloor ducts, which enable cables to be laid from one point to another within a building or a development;

“**coaxial distribution riser**” means the location where the distribution tap and coaxial distribution cables are housed;

“**coaxial home network adaptor**” means a device used to transpose data signal from RJ45 to coaxial F-connectors;

“**coaxial splitter**” means a passive device used to distribute coaxial signals to multiple TV outlets;

“**common area**” means the areas between the interface point and the in-home premises;

“**distribution tap**” means a shared access point for the distribution of coaxial shared services such as free-to-air channels or broadband over coaxial or cable television services which may be provisioned by a telecommunication or broadcast licensee;

“**IDA**” means the Info-communications Development Authority of Singapore constituted under the Info-communications Development Authority of Singapore Act (Cap. 137A);

“**in-home coaxial cable**” means the portion of the broadband coaxial cable system located within the end user’s premises;

“**in-home premises**” means premises owned by a private end user, whether so occupied by the said homeowner;

“**installation or plant**” includes all structures, machinery, equipment, cables, poles and lines used or intended for use in connection with telecommunications;

“**interface point**” means the point of access to the coaxial distribution tap;

“**isolation filter**” means a band-block filter installed between the coaxial distribution tap and the in-home distribution coaxial splitter to allow non-interfered coaxial home networking;

“**telecommunication licensee**” means a Facilities-based Licensee or a Service-based Licensee to which IDA has granted a licence to provide Facilities-based Operations or Services-based Operations under Section 5 of the Telecommunications Act;

“**TV outlet**” means a coaxial outlet found within homes from where coaxial or terrestrial signals may be accessed;

Appendix B **Post-Installation Verification Process**

1. TV channels (CNR and Signal Level Measurements Table)

- a) Before installing the Isolation Filter (IF) and Coaxial Home Network adaptors, measure the Carrier-to-Noise Ratio (CNR) and video signal levels within the frequency spectrum from 5 MHz to 824 MHz;
- b) After installing the IF and Coaxial Home Network adaptors, measure the CNR and video signal levels within the frequency spectrum from 5 MHz to 824 MHz;
- c) Ensure that the deviations for CNR and video signal levels from the standards specified in COPIF are no more than 4 dB respectively; and
- d) Conduct a visual inspection on the quality for any available TV channels (such as Channel 5, Channel 8, Suria, Channel U, Vasantham, OKTO and Channel News Asia) for the following assessments, to ascertain whether there is any degradation of quality after the installation:
 - i. V.Line - Vertical Line;
 - ii. H.Line - Horizontal Line;
 - iii. D.Line - Diagonal Line;
 - iv. Ghost - Ghosting/Double image; and
 - v. Grainy - Grainy Picture.

2. Quality of Experience for Cable TV and VOIP Services (where applicable)

- a) Verify that existing cable TV services remain accessible;
 - i. Launch and navigate through the Electronic Program Guide for the Cable service; and
 - ii. Launch and navigate through value added services such as Video On Demand and Karaoke On Demand; and
- b) Verify that any existing “VOIP over coaxial” services subscribed by the customer remain accessible.

3. Quality of Experience for Cable Broadband Services (where applicable)

- a) Conduct an Internet data test, for example, via www.speedtest.net
- b) Ensure that the following conditions are met:
 - i. Deviation in the measured throughput before and after installation is no more than 10% of the measured throughput before the installation; and
 - ii. Deviation in packet drops before and after installation is no more than 10% of the measured packet drops before installation.

4. For more detailed instructions, reference can be made to Section 13.2 of the COPIF (Performance Requirements for Systems Operating between 5 MHz to 824 MHz).