



**INFOCOMM DEVELOPMENT AUTHORITY OF  
SINGAPORE**

**CODE OF PRACTICE FOR THE  
PROVISIONING OF COAXIAL CABLE  
HOME NETWORKING SOLUTIONS**

**21 July 2014**

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**TELECOMMUNICATIONS ACT**  
**(CHAPTER 323)**  
**CODE OF PRACTICE FOR THE PROVISIONING OF COAXIAL CABLE HOME**  
**NETWORKING SOLUTIONS**

In exercise of the powers conferred by section 26(1)(a) of the Telecommunications Act (Cap. 323), the Info-communications Development Authority of Singapore hereby issues the following Code of Practice:

## **Chapter 1 Preliminary**

### **1.1 Citation and commencement**

This Code may be cited as the Code of Practice for the Provisioning of Coaxial Cable Home Networking Solutions 2014 and shall come into operation on 21 August 2014.

### **1.2 Definitions**

In this Code, unless the context otherwise specifies –

“Act” means the Telecommunications Act (Chapter 323);

“adjacent frequency bands” means the frequency bands of 68MHz – 85MHz and 42MHz – 52MHz immediately above and below the frequency band used by the CCHN Solution;

“BCS Facilities” means facilities of the BCS which are located in common areas;

“BCS Operators” means recognised telecommunication licensees that are delivering services and/or operating over the BCS;

“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;

“cable service” means any telecommunication or broadcasting service which is provided over a broadband coaxial cable system;

“CCHN equipment” means coaxial cable home networking devices or adaptors, including an associated isolation filter, that comply with the technical specifications IDA TS CCHN;

“CCHN Frequency Band” means the frequency bands of 52MHz – 68MHz that is used for the CCHN Solution;

“CCHN Solution” means the coaxial cable home networking solution and associated equipment;

“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;

“COPIF” means the Code of Practice for Info-communication Facilities in Buildings 2013 (or such other version as may be applicable);

“Dealer” means a holder of a Dealer’s Individual Licence or a Dealer’s Class Licence granted under Section 5 of the Telecommunications Act read with the Telecommunications (Dealers) Regulations;

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

“downstream of the isolation filter” refers to the section of the entire configuration of equipment used in the provisioning of the CCHN Solution, from the isolation filter to the CCHN equipment as shown in Figure 1.1 below;

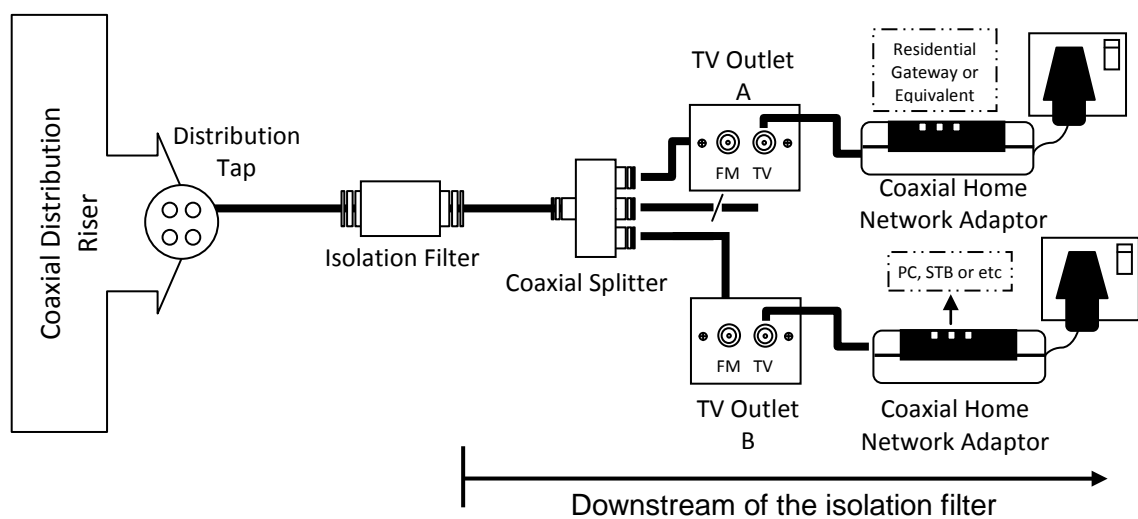


Figure 1.1 Diagram showing the section that is “downstream of the isolation filter”

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

“IDA TS CCHN” means the IDA Technical Specification for Coaxial Cable Home Networking, Issue 1 of 2012 (or such later version as may be issued by IDA from time to time);

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

“in-home premises” means premises owned by a home owner, where a CCHN Solution is to be installed;

“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 that serves two functions: (a) to ensure network separation between different in-home premises and (b) to isolate the coaxial cable home network from the coaxial cable broadband network;

“Licensee” means any entity to whom IDA grants or who is deemed to have been granted a licence under section 5 of the Telecommunications Act;

“recognised telecommunication licensee” means a Facilities-based Licensee or a Service-based Licensee to which IDA has granted a Facilities-Based Operator licence or Services-Based Operator licence under section 5 of the Telecommunications Act;

“Solution Provider” means a recognised telecommunication licensee providing home networking solutions using in-home coaxial cables; and

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

### **1.3 Purpose of this Code**

1.3.1 This Code is published in conjunction with the IDA TS CCHN which sets out the technical requirements for equipment recommended for the coaxial cable home networking solution. Reference shall be made to both documents when installing home networking solutions using in-home coaxial cables.

1.3.2 This Code sets out the:

- (a) processes, procedures and workmanship practices that shall be complied with by Solution Providers so as to –
  - (i) ensure that the CCHN Solution deployed by Solution Providers will perform in accordance with the IDA TS 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 cable system (“**BCS**”) and the avoidance of interference or disruption to the said services, except where the services operate within the CCHN Frequency Band or adjacent frequency bands;
- (b) approach to be adopted by Solution Providers and recognised 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 recognised telecommunication licensees that are delivering services and/or operating over the BCS in relation to deployed CCHN Solutions;
- (d) responsibilities of Dealers in relation to the sale or letting for hire of CCHN equipment; and
- (e) approach to be adopted by Solution Providers and recognised telecommunication licensees in relation to the resolution of disputes arising from the provision of CCHN Solutions.

## **1.4 Application of the Code**

- 1.4.1 Every Licensee must comply with the applicable provisions of this Code.
- 1.4.2 If any provision of this Code is held to be unlawful, all other provisions will remain in full force and effect.

## **1.5 Exemption and waiver**

Where good cause is shown, IDA may grant exemptions from specific provisions of this Code. Such exemptions may be applied to individual Licensees or specific categories of Licensees. An exemption may be permanent, temporary (either for a fixed period or effective until the occurrence of a specific event) or on a one-time basis. Where appropriate, IDA may grant exemptions subject to compliance with specific conditions.

## **1.6 Variation**

IDA may at any time review, add to, vary or revoke this Code in accordance with section 26(1) of the Act.

## **1.7 Enforcement Measures for Breach of Code**

Enforcement actions for contravention of this Code can be brought by IDA, either at the request of a private party or on its own motion. IDA has discretion to determine whether it will conduct any enforcement action.

## Chapter 2 Installation Practices

### 2.1 Suitability of Home Configurations and Minimum Conditions for Deployment of CCHN Solution

2.1.1 The layouts of in-home coaxial cable systems that are suitable for installation of the CCHN Solution are illustrated in Figures 2.1 and 2.2 below.

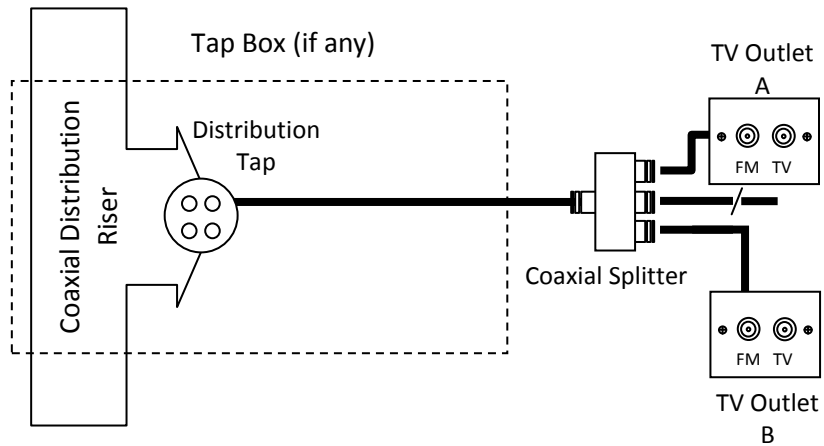


Figure 2.1 In-home coaxial cable system where the coaxial splitter is within home

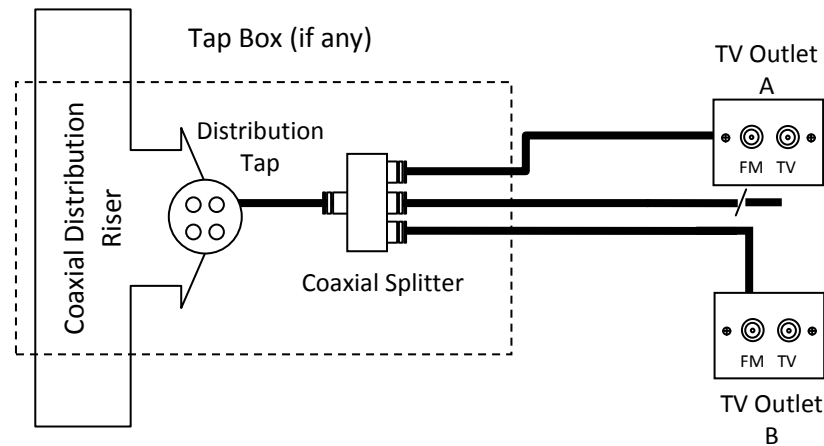


Figure 2.2 In-home coaxial cable system where the coaxial splitter is at a distribution tap



2.1.2 Subject to Section 2.1.3 of this Code, the Solution Provider shall install an isolation filter complying with the technical specifications stated in IDA TS CCHN at the distribution tap outside of the residential premise as shown in Figure 2.3 below.

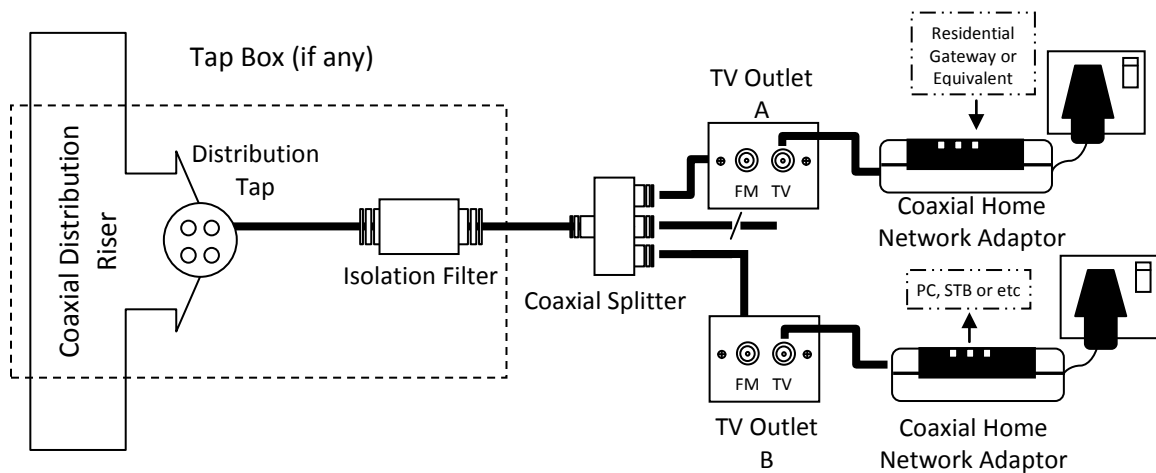


Figure 2.3 Location of the isolation filter at the distribution tap

2.1.3 In the event that it is not feasible for the isolation filter to be installed at the distribution tap (e.g. due to insufficient physical space in the tap box) or the Solution Provider is unable to obtain reasonable access from the relevant BCS Operator to access the distribution tap, the isolation filter may be installed within the residential premises. A typical in-home point where the isolation filter may be installed is at the utility closet (where the coaxial splitter has been installed) as shown in Figure 2.4. Other appropriate in-home points between the coaxial splitter and the distribution tap may be selected by the Solution Provider for such installation.

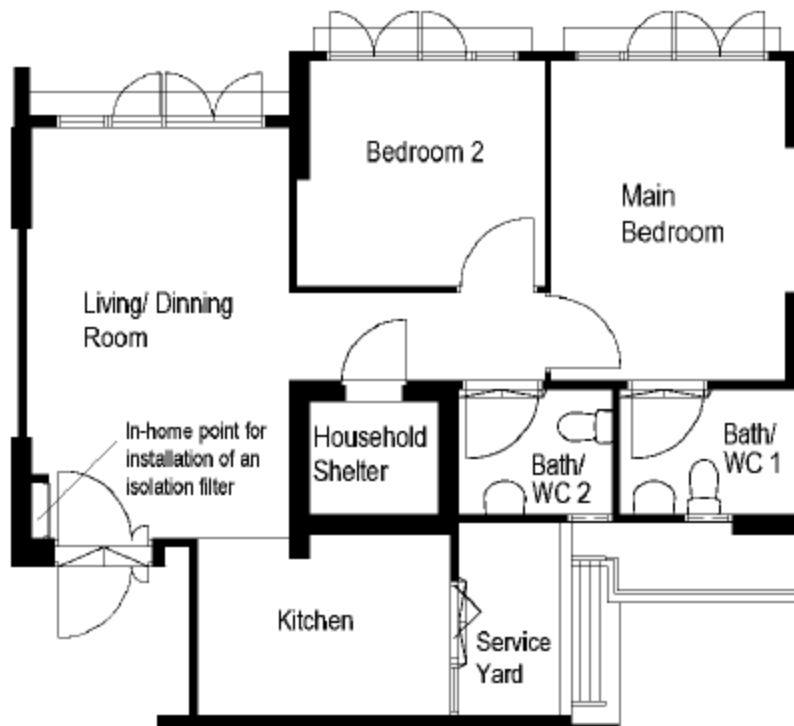


Figure 2.4 An in-home point where the isolation filter may be installed

- 2.1.4 Solution Providers shall ensure that all the CCHN equipment is deployed over in-home coaxial cables connected to the same series of coaxial splitters which are downstream of the isolation filter. The coaxial splitters may be located within the home, at the BCS riser, telecommunication riser, or in a splitter box at the common corridor (as the case may be).
- 2.1.5 Where the layout of the in-home coaxial cable system does not conform to Figures 2.1 or 2.2, the home will be considered unsuitable for the CCHN Solution and Solution Providers shall not proceed with the installation.
- 2.1.6 Solution Providers shall also conduct a thorough inspection of the points of attachment of the CCHN Solution to the BCS system within the customer's home and verify their condition. The inspection shall include the following aspects:
- (a) Coaxial splitter box housing the coaxial splitter (if applicable);
  - (b) TV outlets in the home (where CCHN equipment will be installed);
  - (c) Coaxial distribution riser (refer to Section 3.2.1 on access coordination); and
  - (d) Coaxial distribution tap in the riser (refer to Section 3.2.1 on access coordination).
- 2.1.7 If the condition of the in-home coaxial cable system does not meet the technical requirements specified in Chapter 14 (Requirements for Proper Installation of a Broadband Coaxial Cable System) of the COPIF, Solution Providers shall not proceed with the installation of the CCHN Solution and shall inform the end-user that the in-home coaxial cable system is not suitable for such installation.

## **2.2 General Setup Process**

- 2.2.1 Solution Providers shall obtain the permission of the relevant owner(s) of the in-home coaxial cables before installing the CCHN Solution.
- 2.2.2 Where access to the distribution tap is required for the purposes of installing the isolation filter, Solution Providers shall obtain the permission of the relevant owner of the distribution tap to install the isolation filter. Where such distribution tap belongs to a BCS Operator, Solution Providers shall engage the BCS Operator in accordance with Section 3.2.1 of this Code to access the distribution tap for the purposes of installing the isolation filter.
- 2.2.3 Prior to installation of the CCHN Solution, Solution Providers shall inform the end-user of, and procure the end-user's written acknowledgment that the end-user has been informed of, the following:
- (a) that any cable TV programmes and/or other services delivered over the BCS in the CCHN Frequency Band will not be available after the installation of the CCHN Solution;

- (b) that any cable TV programmes and/or other services delivered over the BCS in the adjacent frequency bands may not be available after the installation of the CCHN Solution;
- (c) that the removal of the isolation filter should not be done without the Solution Provider as it might affect cable services provided to other users; and
- (d) that if the CCHN Solution causes interference to the cable services provided to other users and the interference cannot be resolved, the Solution Provider will uninstall the CCHN Solution from the in-home premises and restore the in-home coaxial cables to their original configuration.

Solution Providers shall keep a record of such written acknowledgement by the end-user.

2.2.4 BCS Operators shall, upon the request of the Solution Provider, make available to the Solution Provider in a timely manner a list of cable TV programmes and/or services delivered over the BCS in the CCHN Frequency Band as well as the adjacent frequency bands. The BCS Operators shall ensure that such a list is kept up to date.

2.2.5 Solution Providers shall remove the isolation filter and reinstate the in-home BCS to its original condition if the end-user ceases to use the CCHN Solution.

2.2.6 Solution Providers shall 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 14 (Requirements for Proper Installation of a Broadband Coaxial Cable System) of the COPIF;
- (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 the installation verification activities as set out in Appendix A; and
- (d) possess the relevant knowledge and skills to carry out the installation activities for the CCHN Solution in accordance with this Code.

2.2.7 Solution Providers shall ensure that they, and any persons whom they engage, do not cause any damage or degradation to the existing coaxial cables, or services carried over the co-axial cables, when carrying out installation activities for the CCHN Solution.

2.2.8 Solution Providers shall ensure that all CCHN equipment used, including the isolation filters, conform to the requirements set out in the prevailing version of the IDA TS

CCHN at the time of installation. Solution Providers shall 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.

- 2.2.9 Solution Providers shall deploy isolation filters with the overall length and diameter not exceeding 56mm and 21mm respectively at the distribution tap so that future work at the distribution tap will not be impeded by these isolation filters.
- 2.2.10 Solution Providers shall 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.
- 2.2.11 Solution Providers shall conduct the installation verification process set out in Appendix A to assess the condition of the existing coaxial cable services before and after the installation of the CCHN Solution. Solution Providers shall keep a record of the tests conducted under the installation verification process. If the installation verification process indicates that the CCHN Solution affects the existing coaxial cable services, the Solution Provider shall inform the end-user. Where the end-user decides to remove the CCHN Solution, the Solution Provider shall promptly uninstall the CCHN Solution from the in-home premises and restore the in-home coaxial cables to their original configuration.
- 2.2.12 Solution Providers shall promptly resolve any interference caused by the CCHN Solution.
- 2.2.13 Solution Providers shall ensure that there is no disruption to the BCS serving the neighbouring residential units in the course of any installation, maintenance or upgrading activities related to the CCHN Solution.
- 2.2.14 Where an isolation filter has been installed within a residential premise under Section 2.1.3 of this Code, the Solution Provider shall notify the relevant BCS Operator(s) of the address of such installation to enable such BCS Operator(s) to identify possible sources of interference in the event that their services carried by the BCS are affected.
- 2.2.15 Solution Providers shall serve as the single point of contact for any performance and interference issues or disputes which may arise from the implementation of their respective CCHN Solutions, including coordinating and resolving such issues or disputes among all the relevant parties.

## **Chapter 3 Responsibilities of Recognised Telecommunication Licensees that are delivering services over the BCS and Access to BCS Facilities**

### **3.1 General Obligations**

- 3.1.1 BCS Operators shall ensure that CCHN Solutions installed in any home are not disrupted or degraded when they carry out any installation, maintenance or upgrading works to the BCS after the installation of the CCHN Solution. Where there is a need to alter or disconnect the CCHN configuration at the BCS riser, telecommunication riser, or common corridor in the course of such works, the BCS Operators and the relevant Solution Providers shall co-operate in good faith and in a reasonable manner in relation to such alteration or disconnection 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 in the IDA TS CCHN for the provisioning of CCHN Solutions.

### **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, which are under the control or management of a BCS Operator, for the purpose of installation or maintenance of an isolation filter at a distribution tap, the Solution Provider and the relevant BCS Operator shall act in good faith to reach a commercial agreement for the terms of access to the BCS Facilities.

## **Chapter 4 Responsibilities of Dealers in relation to Sale or Letting for Hire of CCHN Equipment**

### **4.1 General Obligations**

Dealers that are dealing in CCHN Equipment shall not sell or let for hire CCHN Equipment to any person who is not a recognised telecommunication licensee in Singapore, except where approved by IDA.

## **Chapter 5 Resolution of Issues and Disputes**

### **5.1 Disputes between the End-user and the Solution Provider relating to service degradation issues arising from the installation or use of the CCHN Solution**

5.1.1 Where the end-user discovers, during or after the installation of the CCHN Solution, that reception of the cable TV services (except the TV programmes transmitted within the CCHN Frequency Band or the adjacent frequency bands) or operation of any cable telecommunication services within the home (including services which are distributed through the CCHN Solution) is unsatisfactory, and the end-user has submitted a request to the Solution Provider to re-check the CCHN Solution that has been installed at the in-home premises, the following procedure shall be followed:

- (a) The Solution Provider shall check the operational status of the services which are distributed within the home through the CCHN Solution installed by the Solution Provider;
- (b) The Solution Provider shall 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;
- (c) Where the Solution Provider is unable to resolve any service degradation issue arising from the installation or use of the CCHN Solution, the Solution Provider shall inform the end-user; and
- (d) Where the end-user decides to uninstall the CCHN Solution, the Solution Provider shall uninstall the CCHN Solution from the in-home premise and restore the in-home coaxial cables to their original configuration. The Solution Provider shall act in good faith to resolve the cancellation of the service order pertaining to the CCHN Solution with the end-user.

### **5.2 Disputes between the Solution Provider and BCS Operators relating to interference issues arising from the installation or use of the CCHN Solution**

5.2.1 The following procedure shall be followed if there is any dispute between the Solution Provider and BCS Operators relating to interference issues arising from the installation or use of the CCHN Solution:

- (a) In the event that the services provided by the Solution Provider or any BCS Operator ("Interfered Party") over the in-home coaxial cables are affected by interference suspected to be caused by the services, equipment or network of the other party ("Suspected Interfering Party"), the Interfered Party shall first check its own telecommunication system to confirm that the interference is

not caused by its own equipment or the equipment provided by the Interfered Party at the end-user's premises.

- (b) The Interfered Party shall attempt to identify any external sources of interference through industry best practice (e.g. an isolation process) to narrow down the possible sources of interference as far as possible.
- (c) Where the likely source of interference has been identified by the Interfered Party to be caused by the services, equipment or network of the Suspected Interfering Party, the Interfered Party may request the Suspected Interfering Party to carry out the necessary checks to confirm whether the source of interference is caused by the services, equipment or network of the Suspected Interfering Party. If such request is reasonable, the Suspected Interfering Party shall carry out the necessary checks.
- (d) In the event that the Suspected Interfering Party assesses that the source of interference is not caused by the services, equipment or network of the Suspected Interfering Party, the Interfered Party and the Suspected Interfering Party shall reasonably cooperate and act in good faith in a joint investigation to resolve the interference issue.
- (e) Where the parties are unable to resolve the interference issue and it is affecting the cable services of:
  - (i) the end-user whose premises have been installed with the CCHN Solution; or
  - (ii) other users,the Solution Provider shall inform the end-user whose premises have been installed with the CCHN Solution.
- (f) Where the parties are unable to resolve the interference issue and where:
  - (i) the end-user is the only affected user, and the end-user decides to remove the CCHN Solution, the Solution Provider shall promptly uninstall the CCHN Solution from the in-home premises and restore the in-home coaxial cables to their original configuration; or
  - (ii) other users are affected, the Solution Provider shall promptly inform the owner of the premises where the CCHN Solution is installed, of such interference and uninstall the CCHN Solution from the in-home premises and restore the in-home coaxial cables to their original configuration.
- (g) Where the parties are unable to resolve the interference issue and the Solution Provider uninstalls the CCHN Solution from the in-home premises,



the Solution Provider shall act in good faith to resolve the cancellation of the service order pertaining to the CCHN Solution with the end-user.

### **5.3 Disputes between the Solution Provider and BCS Operators relating to access to BCS Facilities for the installation or use of the CCHN Solution**

- 5.3.1 The Solution Provider and the BCS Operators have a duty to co-operate, in good faith and in a reasonable manner, in implementing the terms of their commercial agreement relating to the access to the BCS Facilities, avoiding unnecessary disputes and resolving disputes promptly and fairly.
- 5.3.2 The Solution Provider and the BCS Operators shall resolve their disputes in accordance with the dispute resolution provisions of their agreement or, in the absence of such dispute resolution provisions, through good-faith commercial negotiation.

## Appendix A Installation Verification Process

1. For end-users who:
  - (a) do not subscribe to any cable TV, cable broadband and/or VoIP services over the BCS, the Solution Provider shall perform the installation verification processes set out under paragraph 2 of this Appendix A; or
  - (b) subscribe to any cable TV, cable broadband and/or VoIP services over the BCS, the Solution Provider shall perform the installation verification procedures set out under paragraphs 3 and 4 of this Appendix A.
  
2. For TV channels (Carrier-to-Noise Ratio and Signal Level Measurements Table):
  - (a) Before installing the CCHN Solution, the Solution Provider shall 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 CCHN Solution, the Solution Provider shall measure the CNR and video signal levels within the frequency spectrum from 5 MHz to 824 MHz. The Solution Provider shall ensure that there are no deviations for CNR and video signal levels from the standards specified in COPIF.
  - (c) The Solution Provider shall conduct a visual inspection on the quality for free-to-air 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.
  
3. Quality of Experience for Cable TV and VOIP Services (where applicable):

After installing the CCHN Solution, the Solution Provider shall verify that existing cable TV services remain accessible, by conducting the following tests:

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

4. Quality of Experience for Cable Broadband Services (where applicable):
- (a) Before installing the isolation filter and CCHN Solution, the Solution Provider shall conduct an Internet data test to measure the throughput and the packet drops; and
  - (b) After the installing the isolation filter and CCHN Solution, the Solution Provider shall conduct an Internet data test and ensure that the following conditions are met:
    - (i) Deviation in the measured throughput after installation is no more than 10% of the measured throughput before the installation; and
    - (ii) No deviation in packet drops before and after installation.