



C3000 DOSCIS 3.0 CMTS

User Guide

Revision B

ACT 1RU C3000 DOSCIS 3.0 CMTS User Guide

ACT Document Number: C3000 CMTS UG Revision B

Copyright © 2014 Ascent Communication Technology Limited.

All rights reserved. Reproduction in any manner whatsoever without the express written permission of Ascent Communication Technology is strictly forbidden.

This document is produced to assist professional and properly trained personnel with installation and maintenance issues for the product. The capabilities, system requirements and/or compatibility with third-party products described herein are subject to change without notice.

For more information, contact ACT: <u>Sales@ascentcomtec.com</u>



Revision History

| Revision | Date | Reason for Change | | | |
|----------|------------|-------------------|--|--|--|
| А | 08/01/2013 | Initial Release | | | |
| В | 05/02/2014 | Section Updates | | | |

Packaging Instructions

Thank you for choosing the C3000 cable modem termination system (CMTS) equipment series. In order to ensure equipment proper operation for a longer life cycle, please read this user manual before use.

Warning: When installing the C3000, always connect the grounding first and disconnect it last when working with power cables. During the equipment operation, do not unplug the coaxial cable from the CMTS equipment to avoid loss of data and other important information.

Tips: Please pay special attention to the implications of the words in bold-face and regular script below when you read this manual.

Complete packaging list of CMTS equipment

When you open the packaging carton of the CMTS equipment, please confirm your CMTS equipment is complete and intact. If there is any appearance defect or parts shortage, please contact your distributor as soon as possible.

| S/N | Name | Content Description | Quantity |
|-----|----------------------------|-------------------------------------|----------|
| 1 | Device | C3000 CMTS | 1 |
| 2 | Power cable | | 1 |
| 3 | Twisted pair cable | 1000M/100MBase-T twisted pair cable | 1 |
| 4 | Serial port cable | RJ-45 to RS232 (DB9 female) | 1 |
| 5 | Compact disc (optional) | Online version available | 1 |

List of major files in the CD/Online

| S/N | File Name | Description |
|-----|--------------------|---|
| 1 | C3000-NMS APP | Setup program of CMTS network management system |
| 2 | C3000 Manual Guide | User manual of C3000 CMTS equipment and network |
| 2 | C3000 Manual Guide | management software |

About This Guide

This document explains the essential Step of installation, operation and troubleshooting of Ascent C3000 CMTS in a DOCSIS compatible environment.

Scope

This document applies to cable service providers and system administrators who configure and operate the CMTS.

It is assumed that the reader has been acquainted with the routine operation and maintenance that is based on TCP/IP protocol and hybrid fiber coaxial (HFC) cable network.

Content

This manual includes the following:

The command line (CLI) manages the CMTS, describing the CLI interface for managing and configuring the CMTS as well as all debug commands.

Implications in the manual

This manual uses multiple fonts and symbols to distinguish the interface display text and user selection and input text:

| Highlights | Usage | Use Case |
|-------------|---|-------------------|
| Boldface | Key word: the text to be entered word by word when the | C3000>exit |
| | CLI prompt pops up | |
| Italic | The parameters to be replaced by the actual values as | Ping [IP address] |
| | indicated in the command | |
| | Parameters in CLI command: the parameters included in | Ping [IP address] |
| Brackets | square brackets [] are the optional parameters, and the | |
| | ones contained in braces {} are essential parameters. | |
| IP Address | IP address: the IP address is entered in the format of | 192.168.0.254 |
| | dotted decimal notation. | |
| Mac Address | MAC address: MAC address is divided by ":" or ".". | 00:a0:73:1e:3f:89 |
| Tab | Automatic command completion | |

| About This Gu | ıide | · iii |
|-----------------------|--|--------|
| Scope | | • iii |
| Content | | • iii |
| Chanter 1 | About C3000 | 8 |
| | | 0 0 |
| 1.1 Overview | | 0 |
| 1.2 Introduct | ion to Equipment Appearance | 8 |
| 1.3 Features | | 9 |
| 1.4 Specifica | tion | 9 |
| 1.5 Factory | Default | ·11 |
| 1) Network I | nterface | ·11 |
| 2) Built-in D | HCP server | 11 |
| 3) RE Param | notar | . 12 |
| 3.1 Down | stream Channel ····· | 12 |
| 3.2 Upstre | am Channel ····· | 12 |
| 4) System Pa | ırameter ····· | 12 |
| 1.6 Typical A | pplication | 13 |
| 1.6.1 Head | l-end | 13 |
| 1.6.2 Depl | loyed at the Head-end with RFoG return | 13 |
| 1.0.3 Dep | loyed at the sub Head-end | 14 |
| Chapter 2 | Installations ····· | 15 |
| 2.1 Preparat | ion | 15 |
| 2.1.1 Prep | aration of HFC Network | 15 |
| 2.1.1.1 | Main Parameters | 15 |
| 2.1.1.2 2.1.2 Prep | aration of IP Network ······ | 15 |
| 2.1.3 Prep | aration of Server | 16 |
| 2.1.4 Prep | aration for Power Supply Safety | 16 |
| 2.1.5 Prep | aration of Cable, Connector and Connecting Cable | 16 |
| 2.2 Installati | on of fixing device | 16 |
| Ch | Contract Strengt | 17 |
| Chapter 3 | | 1/ |
| 3.1 Testing o | f CMTS Equipment | 17 |
| Step 1 ····· | | 17 |
| Step 5 | | 17 |
| Step 4 | | 18 |
| Step 6 ····· | | 18 |
| Step 7···· | | 18 |
| Step 8 ····· | | 18 |
| Step 9····· | | 19 |
| Step 10 · · · | | 20 |
| Step 11 | | 23 |
| 3.2 Access to | actual network | 23 |
| 3.2.1 Co | onnection to the HFC Network | 23 |
| 3.2.1.1 | Different Access Points | 23 |
| 3.2.1.2 | About the Upstream Port Connection | 24 |
| 3.2.2 Con | action to the IP Network | 25 |

Contents

| Chapter 4 | Management CMTS by CLI ····· | 26 |
|--------------------|---|----------|
| 4.1 Summ | ary ····· | 26 |
| 4.1.1 A | bout the CLI (Command Line Interface) Operation Grades | 26 |
| 412H | ow to Use CLI | 26 |
| 412 | 2 1 CLI Rules | 26 |
| 4.1.2 | 2.2 CLI Input Rules | 26 |
| | | |
| 4.2 Mana | ge CMTS by CLI | 27 |
| 4.2.1 C | onnect Configuration Serial Port | 27 |
| 4.2.2 C | hecking CMTS Hardware/software version | 27 |
| 4.2.3 C | witching User Management Mode | 21 |
| 4.2.4 3 | witching Oser Management Mode | 20 |
| 4.2.3 S | estore the factory default configuration | 20 |
| 427R | eboot CMTS system ······ | 29 |
| 4 2 8 M | Indify Password | 29 |
| 4 2 9 N | Iodify CMTS Host Name | 30 |
| 120 0 | | 20 |
| 4.3 Config | gure CMTS Parameters by CL1 | 30 |
| 4.3.1 C | onfigure GIGE Port IP Address | 31 |
| 4.3.2 C | onligure Roule | 32 22 |
| 4.3.3 C | oningure US channel Interface Parameters | 52 24 |
| 4.3.4 C | onfigure DHCP Server | 34 |
| 4.3.5 C | onfigure VI AN | 36 |
| 4370 | onfigure built-in DHCP Server Action Scone ······ | 37 |
| 438C | onfigure DHCP Relay | 38 |
| 4.3.9 C | onfigure DHCP GIADDR Main Mode | 39 |
| 4.3.10 | Configure Inserting DHCP Option 82 ····· | 39 |
| 4.3.11 | Configure L2VPN | 39 |
| 4.3.12 | Configure Access Control List (ACL) | 40 |
| 4.3.13 | Configure CMTS network mode | 42 |
| 4.3.14 | Configure cable modem remote-quest ····· | 42 |
| 4.3.15 | Configure cable flap-list ····· | 43 |
| 4.3.16 | Configure CMTS subnet exchanging visit controlling | 43 |
| 4.3.17 | Configure DHCP IP address smooping | 43 |
| 4.3.18 | Configure CMTS US/DS Channel Loading Balancing | 44 |
| 4.3.19 | Configure CPE CLASS | 46 |
| 4.3.20 | Configure SNMP read-write group name | 4/ |
| 4.3.21 | Configure Network Time Protocol (NTP) service | 47 |
| 4.3.22 | Set the CMTS static anchor | 47 |
| 4 3 24 9 | Set the CMTS TELNET or WEB login time-out | 48 |
| Set the | SSH or WEB login timeout under the privileged administrator mode: | 48 |
| 4.3.25 | Set the CM access control | 48 |
| 4.3.26 | Set the CM IPv4, IPv6 support mode | 49 |
| 4.3.27 | Set upstream channel automatic frequency hopping | 49 |
| 4.3.28 | Set command alias | 50 |
| 4.4 Check | CMTS system by CLI | 51 |
| 4.4.1 C | heck CMTS ARP List ····· | 51 |
| 4.4.2 C | heck CMTS warning log ······ | 52 |
| 4.4.3 C | heck CMTS bridge list | 52 |
| 4.4.4 C | heck CMTS built-in DHCP server scope ····· | 52 |
| 4.4.5 C | heck cable flap-list statistics | 53 |
| 4.4.6 C | heck cable flap-list configuration | 53 |
| 4.4.7 C | heck DHCP server IP address (helper-address) ······ | 53 |
| 4.4.8 C | heck cable modem status | 53 |
| 4.4.9 C | neck cable modem remote- query configuration | 54 54 |
| 4.4.10 | Check caule modem remote- query Status | 54 55 |
| 4.4.11 | Check CDE class Configuration | 55 55 |
| 4.4.12 4 4 13 1 | Check DHCP Parameter | 55 55 |
| 4.4.14 | Check CMTS GIGE IPAddress Parameters ······ | 56 |

| 4.4.15 Check CMTS GIGE Statistics | · 56 |
|---|--------------|
| 4.4.16 Check DS channel (qam) configuration | · 56 |
| 4.4.17 Check US channel Configuration | · 57 |
| 4.4.18 Check VLAN | · 58 |
| 4.4.19 Check CMTS load balancing configuration | · 58 |
| 4.4.20 Check CMTS load balancing status | · 59 |
| 4.4.21 Check CMTS system log | · 59 |
| 4.4.22 Check CMTS Nutricasting statistics and activity dialogue | · 60 |
| 4.4.25 Check CM15 Network Mode | . 61 |
| 4.4.2.4 Check Static Route | · 61 |
| 4 4 26 Check CMTS subnet exchanging visiting control status | · 62 |
| 4.4.27 Check Current Running Configuration Parameters | · 62 |
| 4.4.28 Check the prohibition for accessing network CM MAC table | · 65 |
| 4.4.29 Check the SSH or WEB login timeout | · 65 |
| 4.4.30 Check the current CM static multicast | · 65 |
| 4.4.31 Check the current CM ip-provision-mode | · 65 |
| | |
| Chapter 5 Management CMTS by Embed Web | · 66 |
| 5.1 Summary | 66 |
| 5.1.1 About Ember Web ····· | · 66 |
| 5.1.2 Setting Common Operations | · 66 |
| 5.2 System Management | 66 |
| 5.2.1 Running Status: | · 66 |
| 5.2.2 Change Password ······ | · 68 |
| 5.2 Natural Interface Catting | 60 |
| 5.3.1 IP Address Setting | ·· 08 |
| 5.3.2 Static Router Setting | - 60 |
| 5.3.3 Strategy Route Setting | · 69 |
| 5.3.4 Built-in DHCP Scope Setting | · 70 |
| 5.3.5 Network Parameters Setting | · 70 |
| 5.3.6 CPE Class Setting | · 71 |
| 5.3.7 VLAN Setting | · 72 |
| 5.3.8 ACL Setting | · 73 |
| 5 4 RF Interface Setting | 74 |
| 5.4.1 US Channel Setting | · 74 |
| 5.4.2 DS Channel Setting | · 74 |
| 5.4.3 Spectral Analysis | · 75 |
| 5.5 CM Management | 75 |
| 5.5 CM Management | . 75 |
| 5.5.2 CM & CPE Status | · 76 |
| | 70 |
| 5.6 CMTS Management | ·· /0 |
| 5.6.1 Configuration Management | · /0 . 77 |
| 5.0.2 Software Opgrading | // |
| Chapter 6 Management CMTS by NMS ······ | · 78 |
| | 70 |
| 0.1 Overview ····· | /8 |
| 6.2 Features ····· | 78 |
| 63 Functions | 79 |
| 6.3.1 CMTS Management | . 79 |
| 6.3.2 CM Management | · 80 |
| 6.3.3 Network parameter | · 82 |
| 6.3.4 RF Parameters | · 85 |
| 6.3.5 Statistical Graphs | · 87 |
| 6.3.6 Spectrum Analysis ····· | · 89 |
| 6.3.7 Operation Log | · 89 |
| 6.3.8 Information Output | · 90 |

Chapter 1 About C3000

1.1 Overview

All C3000 CMTS series from ACT are developed based on DOCSIS3.0 and C-DOCSIS protocols. There are other product types with different form factor such as outdoor and DOCSIS-node.

C3000 series adopts DOCSIS3.0 channel binding technology, for downstream (DS), there are 16 QAM channels which has 1.1Gbps data rate; for upstream, there are 4 QPSK/QAM channels which could reach up to 160Mbps. C3000's downstream can be configured to data channels or IP QAM channel, for data port, there are 1000Mbps power port (RJ45) and 1000Mbps optical port (SFP). With layer 3 routing function and QoS, the unit can meet various working conditions and requirements from different operators.

The C3000 CMTS is suitable for IPTV or VOD, and other video service. It is cost effective to add value added services to the traditional HFC network.

There are three ways to manage C3000: use CLI after log in via serial port Telnet, use web GUI and use network management software based on OAM.

C3000 series CMTS are compatible with DOCSIS3.0/2.0 cable modem.

C3000 CMTS is in a 19 inch 1U standard chassis, it is tailor made for Headend deployment. It has wide coverage and high efficiency. Isolated upstream channels can reduce the funnel noise by 8dB.

1.2 Introduction to Equipment Appearance



Back



1.3 Features

• Compatible with DOCSIS3.0, C-DOCSIS standard, work with all cable modem based on DOCSIS, support both EURO DOCSIS and DOCSIS.

■ 16 DS channels bound, 64/256/1024QAM modulation mode optional. Data rate could reach up to 1.1Gbps@1024QAM.

• 4 US channels bound, could be configured to QPSK, 3-8 grade QAM mode, data rate could reach up to 160Mbps.

• Flexible on channels bound quantity set for operator's convenient planning and use of channel resource.

■ Layer 3 routing functions, support static route, VLAN,NAT and DHCP relay agent.

- There are 1000M RJ45 port and SFP on data port, convenient and flexible.
- Built-in DHCP/TFTP server, support PPPoE.
- Load balancing.
- Support IPV6, multicast function.
- QoS based on service flow ensures bandwidth needs for various services.

• Ensure network transmit safety via various kinds of methods such as BPI+, CM identification, anti-DOS attack, user isolation and IP source checking.

• Real time upstream spectrum analysis function which helps to check US channel signal and noise status rapidly.

• Configuration parameters and running status can be checked directly from the large screen display on the panel, it can show real time upstream channels frequency spectrum.

• Support three management ways: use CLI after log in via serial port Telnet, use CLI to realize remote log in via web and network management software based on SNMP.

1.4 Specification

| | | Downs [.] | tream | | | | | | | |
|-----------------------------------|---------------------|--|----------------------|-----------------------------|------------------------------------|---------------------|---------------------------------|-----------|------------|--|
| | | Euro- DOCSIS | DOCSIS | | | Up | Upstream | | | |
| Modulation Mode | | 64QAM/256Q/ | AM/1024QAM | 25 | 256QAM/64QAM/32QAM/16QAM/8QAM/QPSK | | | | | |
| Frequency Range(MHz) | | 112~1002 adjustable | 91∼857 adjustable | 5~65 | | ~65 (8 | i(85 Optional) | | | |
| Single channel bandwidth (MHz) | | 8 | 6 | Single chan bandwidth (I | nel MHz) | | 6. 4 | 3. 2 | 1.6 | |
| Binding cha quantity | annel | 10 | 5 | | | | 4 | | | |
| Max.total bandwidth | data (Mbps) | 1100 | 857 | | | | 160 | | | |
| | 640AM | 41 | 27 | | 256QAM | | 40.96 | 20. 48 | 10. 24 | |
| Single channel | 04yaw | 41 | 27 | | 128QA | М | 35. 84 | 17. 92 | 8. 96 | |
| data rate (Mbps) | 05/044 | 55 | 20 | Single | 64QAI | N | 30. 72 | 15. 36 | 7. 68 | |
| | 256QAM | 55 | 38 | channel data rate | 32QAI | N | 25. 60 | 12. 80 | 6. 40 | |
| | | | | (Mbps) | 16QAI | N | 20. 48 | 10. 24 | 5. 12 | |
| | | $45\sim58$ adjustable | | | 8QAM | | 15. 36 | 7. 68 | 3. 84 | |
| Output lev | Output level (dBmV) | | oping | | QPSK | | 10. 24 | 5. 12 | 2. 56 | |
| | | | | Receiving level (dBmV) | | -1~+29 | -4~+26 | -7~+23 | | |
| Single channel | 64QAM | 6. 952 | 5. 056941 | Single chanr | el baud r | ate | 5 12 | 2 54 | 1 28 | |
| baud rate (Msymps) | 256QAM | 6. 952 | 5. 360537 | (Msymps) | | | 5.12 | 2. 50 | 1.20 | |
| RF port nu | mber | 1 | | | | | 1 | | | |
| Reflection | loss(dB) | > ` | 14 | > 14 | | | | | | |
| Output impe | edance(Ω) | 75 | | Input impedance (Ω) | | | 75 | | | |
| Supported protocols | | Euro-DOCSIS/DOCSIS2.0/1.1/1.0, TCP/IP, ARP, RIPv2, ICMP, VLAN, multicast DHCP, TFTP, SNMP, PPPoE, DHCP relay agent, Telnet Etc. | | | | | st, OSPF, | | | |
| Physical parameters | | | | | | | | | | |
| | | 1000M SFP fib | er (SC/APC) | Input voltage AC1 | | AC1 | AC100~240V, DC-48V customizable | | | |
| Network Port | | 1000M RJ45 p | ort | Consumed po | Consumed power < 50W | | | | | |
| RF port | | F type plug | | Net weight | | 2. 5 | 0Kg | | | |
| Controllin | g port | 2 COM | | Working con | ditions | Tem | perature O^ | ∼40°C;hum | idity <90% | |
| Status displ | ay | HD LCD displ | ay | Dimension W43 | | W430mm H44mm D285mm | | | | |

1.5 Factory Default

1) Network Interface

| Network Interface | IP | | ısk | Gateway | |
|--------------------|-------------------------|--------------|---------------------------|----------------|--|
| CMTS WAN Port | 192. 168. 0. 254 | 255. 255. 25 | 55.0 | 192. 168. 0. 1 | |
| | Parameter | | Value | | |
| | Default DHCP server | | 192.168.0.254 | | |
| | CM DHCP server | | 192.168.0.254 | | |
| | CPE DHCP server | | 192.168.0.254 | | |
| Network Parameters | CM network mode | | bridge (layer 2 bridging) | | |
| | CPE network mode | | bridge (layer 2 bridging) | | |
| | DHCP safety certificate | | Start | | |
| | Default Route | | 192.168.0.1 | | |

2) Built-in DHCP server

| Scope Name | IP | Mask | Start Ad | ldress | Ending | Gateway | |
|------------|------------------|------------------|----------|-------------|------------------|-------------|--|
| | | | | | Address | | |
| Default | 192. 168. 0. 0 | 255. 255. 255. 0 | 192.168. | 0.2 | 192. 168. 0. 252 | 192.168.0.1 | |
| Scope | | | | | | | |
| CM Scope | 192. 168. 0. 0 | 255. 255. 255. 0 | 192.168. | 0.2 | 192. 168. 0. 100 | 192.168.0.1 | |
| CPE Scope | 192. 168. 0. 0 | 255. 255. 255. 0 | 192.168. | 0.101 | 192. 168. 0. 252 | 192.168.0.1 | |
| | | Parameter | | Value | | | |
| DNS Server | Primary DNS Se | rver Address | | 192.168.0.1 | | | |
| | Backup DNS Ser | ver Address | | 0.0.0.0 |) | | |
| | | Parameter | | | Value | | |
| | Boot File Name | | | | 1 | | |
| Public | Boot Server Name | | | | 58.0.254 | | |
| Parameter | Lease Expire | | | | | | |

3) RF Parameter

3.1 Downstream Channel

| Channel No. | Status | Center Frequency (KHZ) | Standard | Modulation Mode | Output Frequency (dbmv) | Interleav e Depth |
|----------------|--------|------------------------------|----------|--------------------|-------------------------------|----------------------|
| 1 | DOCSIS | 440000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 2 | DOCSIS | 448000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 3 | DOCSIS | 456000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 4 | DOCSIS | 464000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 5 | DOCSIS | 472000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 6 | DOCSIS | 480000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 7 | DOCSIS | 488000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 8 | DOCSIS | 496000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 9 | DOCSIS | 504000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 10 | DOCSIS | 512000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 11 | DOCSIS | 520000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 12 | DOCSIS | 528000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 13 | DOCSIS | 536000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 14 | DOCSIS | 544000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 15 | DOCSIS | 552000 | ANNEX: A | 64QAM | 45 | I12-17 |
| 16 | DOCSIS | 560000 | ANNEX: A | 64QAM | 45 | I12-17 |

3.2 Upstream Channel

| Channel Number | Status | Center Frequency (KHz) | Channel | Modulation Mode | Channel Bandwidth (KHz) | Channel Power (dbmV) |
|-------------------|--------|------------------------------|---------|--------------------|-------------------------------|----------------------------|
| 1 | ON | 28000 | ATDMA | 16QAM | 3200 | 0 |
| 2 | ON | 32000 | ATDMA | 16QAM | 3200 | 0 |
| 3 | ON | 36000 | ATDMA | 16QAM | 3200 | 0 |
| 4 | ON | 40000 | ATDMA | 16QAM | 3200 | 0 |

4) System Parameter

| Parameter | Value |
|----------------------|-----------|
| User name | admin |
| Password | admin |
| CM authority control | forbidden |

1.6 Typical Application

1.6.1 Head-end



- One CMTS shall be configured within the coverage of the optical transmitter.
- Generally 1000 ~ 2000 households can be covered.
- Four return paths can be physically isolated, in order to reduce the adding return noises.

• 1.1Gbps DS data bandwidth, to support the IPTV, VOD and other video services and meet the requirements of NGB.



1.6.2 Deployed at the Head-end with RFoG return

FEATURES

- The 1550nm optical transmission network is used, and the RFoG optical node.
- The 1.1Gbps data bandwidth can meet the requirements of NGB.
- The mixed input port is chosen for the CMTS upstream.

1.6.3 Deployed at the sub Head-end



FEATURES

- It is suitable for the secondary Headend, optical transmission HFC system
- Each transmitter will have its own DS channels.
- Four return paths can be physically isolated to reduce the return noise.

• The 1.1Gbps data bandwidth is adequate to support the IPTV, VOD and other video services.

Chapter 2 Installations

2.1 Preparation

2.1.1 Preparation of HFC Network

2.1.1.1 Main Parameters

The HFC network must be bidirectional. The upstream frequency range is 5~65MHz, or 5~42MHz, or 5~85MHz; and the downstream is 88~860MHz (or 1000MHz), or 54~857MHz (or 1000MHz).

In the downstream direction, before the signal gets into the optical transmitter, an interface shall be reserved for the input of CMTS downstream signal. Through adjusting the downstream output level of CMTS, the digital television signal (QAM) at the mixed output port shall be consistent with the downstream signal level of CMTS. At the end (terminal) of the HFC transmission, the downstream signal level shall be within -15~+15dBmV (no higher than 30dBmV), carrier to noise ratio (C/N) shall be not less than 30.5dB.

In the upstream direction, the receiving level at the CMTS upstream port is 0dBmV as default. We recommend that the upstream link loss design should be between 30 and 40dB to ensure the signal and noise entering the CMTS upstream port is balanced.

The design, construction, debugging and maintenance of HFC bi-directional transmission network shall comply with the relevant industry technical standards, such as Technical Specifications of HFC Network Physical Upstream Transmission Path (GY/T 180-2001), Technical Specification of CATV Broadcasting System (GY/T 106-1999), etc.

2.1.1.2 Frequency Planning

Because the C3000 downstream binds 16 channels, it is necessary to arrange 16 consecutive channels for it. Of course, if you don't need to bind so many channels, you can turn off those channels which can leave closed at the CMTS, and only the channels to be occupied by the CMTS can be reserved in the HFC.

We strongly recommend that the entire upstream frequency range be measured by a spectrum analyzer before the upstream signals is accessed to the CMTS, to observe the noise distribution. The upstream frequency points of CMTS shall be set at the bands without obvious noise interference. In general, the bands below 20MHz are subject to interference by various signals, especially shortwave radio which generates strong interference in the night, so we shall not use any frequency below 20MHz as conditions permit.

2.1.2 Preparation of IP Network

It is required to prepare a 1000M Ethernet port for WAN interface of CMTS, either port or electrical port (RJ-45). Assign an IP address to CMTS.

2.1.3 Preparation of Server

DHCP/TFTP/NMS Server, etc.

2.1.4 Preparation for Power Supply Safety

The room or rack used for the CMTS installation must be grounded in line with national standards.

The AC power supply is 90~240V, 50/60Hz, and the supply connecting lines and sockets must be capable of withstanding the power higher than 150W.

| Connecting line | Description | Type of connector |
|--------------------|--|--------------------------------|
| Coaxial cable | SYWV-75-5, RG-59 or RG-6 | Туре F |
| Internet cable | Twisted-pair cable | RJ-45 |
| Fiber optic jumper | Used in the optical fiber connection | SC/APC |
| Serial port line | Connect CMTS panel, Console Interface, RJ-45 Joint, random distribution | RJ-45 Interface /RS232 plug |

2.1.5 Preparation of Cable, Connector and Connecting Cable

2.2 Installation of fixing device

Install CMTS equipment onto the rack that is well earthed, and fix it by screws firmly.

The grounding pile behind the C3000 must be connected to the grounding plate of the rack by the copper conductor.

Chapter 3 Getting Start

3.1 Testing of CMTS Equipment

Before accessing to the HFC network, it is required to test the CMTS equipment by connecting to the power and set up relevant parameters.

Before starting the following Step, please refer to Appendix B: Ex-factory Default Setup

Step 1

Connect the equipment according to the diagram below, and make sure the data port of CMTS has been connected into the switch before CMTS device is powered up.



CMTS Quick Test Structural Figure

Step 2

Turn on all equipment power supplies indicated in the connecting drawing, and the startup period of CMTS is about 2 minutes.

Step 3

Modify the console PC IP address: 192.168.0.1/24.

Step 4

Open the hyper terminal of console PC, with the configured baud rate of 115200, 8bit data,

none parity check and 1 stop bit. Connect the hyper terminal, the "C3000>" pops up, and then the startup of prompt CMTS is completed.

Step 5

CMD ping 192.168.0.254, check if the network connection status is in normal condition as shown:

```
C:\WINDOWS\system32\cmd.exe
                                                                            - 🗆 🗙
Microsoft Windows XP [版本 5.1.2600]
<C>版权所有 1985-2001 Microsoft Corp.
C:\Documents and Settings\Administrator>
C:\Documents and Settings\Administrator>cd \
C: >ping 192.168.0.254
Pinging 192.168.0.254 with 32 bytes of data:
Reply from 192.168.0.254: bytes=32 time=1ms TTL=128
Reply from 192.168.0.254: bytes=32 time<1ms TTL=128
Reply from 192.168.0.254: bytes=32 time<1ms TTL=128
Reply from 192.168.0.254: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.0.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
   Minimum = Oms, Maximum = 1ms, Average = Oms
C: \>_
```

Step 6

Configure the IP address of server-pc at 192.168.0.253/24, at the same time ping 192.168.0.254 to check the state of the network connection, configure the scope option of DHCP server, start the TFTP server and edit the CM configuration file.

(This step is optional, and the CMTS built-in server shall be used in default, which can be ignored. If it is necessary to use the external server, it shall be configured.)

Step 7

Confirmed step 5 OK, login the super terminal CMTS by telnet or console-pc, telnet login user name and password are admin, console, Login as below:

```
* Welcome to Headend (CMTS) System command line interpreter *
* Press < ENTER > to connect and config this system *
C3000>
C3000>
```

Step 8

The ex-factory default configuration of CM and CPE can be normally accessed to the network, the assigned IP address of CM is 192.168.0.2~192.168.0.100, and the assigned IP address of CPE is 192.168.0.101~192.168.0.252. The accessed terminal equipment of CMTS network can be seen through command show cm / show cp, as shown below:

C3> C3>show cable modem CPES MacAddress IpAddress sid Ver BPI Enb Status US DS 00:1f:a4:93:85:28 192.168.0.2 1 v3.0 Online 3 5 1 N/A total cm: 1; online cm: 1; offline cm: 0; other cm: 0 C3>show cable modem cpe IpAddress Cm-IpAddress dev-type MacAddress Cm-MacAddress bc:ee:7b:4d:c0:9d 192.168.0.101 00:1f:a4:93:85:28 192.168.0.2 host total cpe: 1

Step 9

Use an external server, verify Step 6 is OK, modify CM/CPE DHCP server address to the external IP server through the command, and remove the default IP of DHCP server;

no-helper-address 192.168.0.254

no-helper-address 192.168.0.254 cm

no-helper-address 192.168.0.254 cpe

Add an external DHCP server IP: helper-address 192.168.0.253 Note: the DHCP server can be configured with multiple IPs, and the terminal type can be designated, with the built-in CMTS given the priority. If it is necessary to use the external server, the IP address of built-in DHCP server must be deleted first, as shown below:

C3(config)#show cable helper-address helper-address 192.168.0.254 cable-modem 192.168.0.254 host C3(config)#show built-in-dhcp-server IP Scope : cable-modem starting address : 192.168.0.2 end address : 192.168.0.100 netmask : 255.255.255.0 gateway address : primary dns address : 192.168.0.1 0.0.0.0 secondary dns address : 0.0.0.0 bootserver address : 192.168.0.254 bootfile name cm.bin log server address : 0.0.0.0 tod server address : 0.0.0.0 lease time : 7200 IP Scope : host starting address : 192.168.0.101 end address : 192.168.0.252 255.255.255.0 netmask : gateway address : 192.168.0.1 primary dns address : 192.168.0.1 secondary dns address : 0.0.0.0 bootserver address : 0.0.0.0 bootfile name : log server address : tod server address : 0.0.0.0 0.0.0.0 lease time : 7200

C3(config)#no cable helper-address 192.168.0.254 cable-modem C3(config)#no cable helper-address 192.168.0.254 host C3(config)#cable helper-address 192.168.0.253 cable-modem C3(config)#cable helper-address 192.168.0.253 host C3(config)#show cable helper-address helper-address 192.168.0.253 cable-modem 192.168.0.253 host

Step 10

Set the CM/CPE at the mode of L3 (route).

Set the address of CM and CPE subnet interface, and use the command IP-address 172.16.0.1 255.255.255.0 cm to set the CM IP interface address, and use the command ip-address 172.17.0.1 255.255.255.0 cpe to set the CPE IP interface address.

| CB(config)# CB(config)#interfac | e gige | | |
|---|---|----------------------------------|---|
| CB(conf-if-gige)#ip | address 172.16.0.1 | 255.255.255.0 cable-modem | 3 |
| CB(conf-if-gige)#ip | address 172.17.0.1 | 255.255.255.0 host | |
| C3(conf-if-gige)#sh MacAddress: Fiber: ip address 192.168.0.254 1/2.16.0.1 172.17.0.1 | ow interface gige 00:02:5e:00:01:a auto negotiate netmask 255.255.255.0 255.255.255.0 255.255.255.0 | 1 gige cable-modem bost | |

Set the CM and CPE network mode at L3 mode, use the command of net-mode route cm to set up CM network mode at L3 routing mode, and use net-mode route the command of net-mode route cpe to set up the CPE network mode at L3 routing mode.

C3(config)#network-mode cable-modem route

C3 (config) #network-mode host route

| C3(config)#show netmode cable modem net mode route cpe net mode route | |
|---|---------|
| bootserver address : bootfile name : | 0.0.0.0 |
| log server address : | 0.0.0.0 |
| tod server address : lease time : | 0.0.0.0 |
| | |

If the external server is used, verify the scope is well configured in Step 6; if the built-in DHCP server is used, the built-in DHCP scope shall be modified by using the command, as shown below:

Modify the CM scope: ip-scope cm -s 172.16.0.2 -e 172.16.0.254 -m 255.255.255.0 -g 172.16.0.1

Modify the CPE scope: ip-scope cpe -s 172.17.0.2 -e 172.17.0.254 -m 255.255.255.0 -g 172.17.0.1

Note: DNS, lease time and startup option parameters must be configured by reference.

| c3:#show_built_in_dhcp_server | cable-modem |
|-------------------------------|---------------|
| IP Scope : | cable-modem |
| starting address : | 192.168.0.2 |
| end address : | 192.168.0.100 |
| netmask : | 255.255.255.0 |
| gateway address : | 192.168.0.1 |
| primary dns address : | 0.0.0.0 |
| secondary dns address : | 0.0.0.0 |
| bootserver address : | 192.168.0.254 |
| bootfile name : | cm.bin |
| log server address : | 0.0.0.0 |
| tod server address : | 0.0.0.0 |
| lease time : | 7200 |
| bootserver address : | 192,168,0,254 |
| bootfile name : | cm.bin |
| log server address : | 0.0.0.0 |
| tod server address : | 0.0.0.0 |
| lease time : | 7200 |
| AN ANALYSIA COMPANY AND AN | |

Set the L3 mode at the static routing. If the external server is used, the static routing must be configured on the server. For example:

The setting of "route add 172.16.0.0 mask 255.255.255.0 192.168.0.254" is oriented to the default gateway of CM network, CMTS WAN IP.

The setting of "route add 172.17.0.0 mask 255.255.255.0 192.168.0.254" is oriented to the default gateway of CPE network, CMTS WAN IP.

| C:\WINDOWS\syst | ten32\cnd.exe | | | - 🗆 × |
|-----------------------|--------------------|-------------------|------------------|-------------|
| C: \> | | | | ^ |
| C: > route add 172. | .16.0.0 mask 255.2 | 55.255.0 192.168. | 0.254 | |
| C:\>route add 172. | 17.0.0 mask 255.2 | 55.255.0 192.168. | 0.254 | |
| Carlo and a second at | | | | |
| G: Vroute print | | | | |
| Interface List | | | | |
| Øx1 | MS | TCP Loopback inte | rface | 1 |
| 0x200 22 19 fa | 06 fc Rea | ltek RTL8102E Fam | ily PCI-E Fast E | thernet NIC |
| - 数据包计划程序微 | (型端口 | | | |
| | | | | |
| Active Routes: | | | | |
| Network Destination | n Netmask | Gateway | Interface | Metric |
| 0.0.0.0 | 0.0.0.0 | 192.168.18.1 | 192.168.18.222 | 20 |
| 127.0.0.0 | 255.0.0.0 | 127.0.0.1 | 127.0.0.1 | 1 |
| 172.16.0.0 | 255.255.255.0 | 192.168.0.254 | 192.168.18.222 | 1 |
| 172.17.0.0 | 255.255.255.0 | 192.168.0.254 | 192.168.18.222 | 1 |
| 192.168.0.0 | 255.255.255.0 | 192.168.0.1 | 192.168.18.222 | 20 |
| 192.168.0.1 | 255.255.255.255 | 127.0.0.1 | 127.0.0.1 | 20 |
| 192.168.0.255 | 255.255.255.255 | 192.168.0.1 | 192.168.18.222 | 20 |
| 192.168.18.0 | 255.255.255.0 | 192.168.18.222 | 192.168.18.222 | 20 |
| 192.168.18.222 | 255.255.255.255 | 127.0.0.1 | 127.0.0.1 | 20 |
| 192.168.18.255 | 255.255.255.255 | 192.168.18.222 | 192.168.18.222 | 20 |
| 224.0.0.0 | 240.0.0.0 | 192.168.18.222 | 192.168.18.222 | 20 |
| 255.255.255.255 | 255.255.255.255 | 192.168.18.222 | 192.168.18.222 | 1 |
| Default Gateway: | 192.168.18.1 | | | |
| | | | | |
| Persistent Routes | | | | |
| None | | | | |
| C:>> | | | | |
| | | | | - |
| | | | | |

Step 11

Set up the required upper and lower channel parameters (refer to the section of CLI interpretation).

3.2 Access to actual network

After the testing and configuration of relevant CMTS parameters, the CMTS can be accessed to the actual network. There are two types of access ports:

The RF port: connecting to the HFC network

IP network ports: connecting to the Ethernet (1000M optical or electrical port)

3.2.1 Connection to the HFC Network

3.2.1.1 Different Access Points

According to the different CMTS installation locations, there are several access methods as follows:

(1) Master front end room of small-sized HFC



(2) Master front end room of large-sized HFC



(3) Sub-front end room at CATV



(4) In a small-sized CATV room (pure coaxial cable network)



3.2.1.2 About the Upstream Port Connection

With four upstream channels at C3000, there are two configurations for the input port: in the first configuration, 4 channels share one input receiving port, and the single port configuration must be used when it is necessary to realize the upstream channel binding; and in the second configuration, the four upstream channels correspond to the four independent input receiving ports, which is conducive to reduce the influx noise generated by the mixing of multiple-channel return signals. Indeed, independent input cannot achieve the channel binding function. The default upstream input configuration of C3000 CMTS-D-1-AC is single-port input.



3.2.2 Connection to the IP Network



There are two WAN ports of C3000, SPF and RJ45. Both are 1000M, and can be chosen according to the type of IP network port available in the headend. The default interface is RJ45, and SFP optical transceiver module shall be purchased by the customer separately according to the actual needs.

Note: make sure the CMTS equipment is well grounded.

Note: make ensure that the CMTS equipment is connected to the HFC network and IP network before connecting to the power supply.

Chapter 4 Management CMTS by CLI

4.1 Summary

4.1.1 About the CLI (Command Line Interface) Operation Grades

For convenient management, Ascent C3000 series CMTS offers 3 user modes at different operation grades including normal mode, admin mode and super user mode. All configurations can only be set at the super admin mode. The normal mode can only be used for operation viewing. By the command "enable", it can be switched to super mode, which could be confirmed by password. By the CLI interface, the setting of the CMTS network parameters, RF parameters and Ascent's unique functions can be completed, and the information about the system operation, CM and CPE can be checked.

4.1.2 How to Use CLI

| Usage | Notes | Example |
|------------------------------|------------------------|---------------------|
| Automatically completion of | Use TAB | |
| commands and parameters | | |
| | CMTS recognize | example: |
| | incomplete character | copy run start |
| Commands Automatically | stringcommand | replace |
| Identification | parameters, | copy running-config |
| | automatically matching | start-config |
| | complete commands | |
| History Commands | Use the up and down | |
| Thistory Commands | keys | |
| Show commands and parameters | use ? or TAB | |
| | { } affirmatively | |
| {} | chosen item | |
| [] | [] optinal | |
| | needs to be filled | |
| | by actural value | |

4.1.2.1 CLI Rules

4.1.2.2 CLI Input Rules

CLI Input Command Parameters, separated by" "(space)

| IP Address | IP Address Dot-decimal notation | 192.168.1.1 |
|-------------|------------------------------------|---|
| MAC Address | Hexadecimal [":" "." "-"] interval | 00.01.02.03.04.05 00-01-02-03-04-05 00:01:02:03:04:05 |

4.2 Manage CMTS by CLI

Functions for CMTS Management are as following:

- Connect Configuration Serial Port
- Check CMTS Hardware/software Version
- Check System Running Configuration
- Switch User Management Mode
- Saving Configuration or replacing starting Configuration
- Restore the factory default configuration
- Reboot CMTS System
- Change Password
- Modify CMTS Host Name

4.2.1 Connect Configuration Serial Port

Start console pc hyperterminal, Baud rate (115200), data bits(8bit), parity check (none), stop bits(1). Connect hyperterminal.

4.2.2 Checking CMTS Hardware/software Version

Use"show version" after any prompt, check the CMTS hardware/software version.

| Step | Command | show version |
|------------|----------|---|
| | Notes | Show current CMTS hardware/software version |
| 1 Examples | | C3000>show version |
| | Examples | Running image:R.v4.2.14.0904+C.v4.3.0.r2.3218.14.0904 |
| | | HW version: BCM93218.AP.v3.10 |

4.2.3 Checking System Running Configuration

Checking current CMTS system running configuration parameters by "show running-config" after C3000# prompt.

| Step | Command | Show running-config |
|---------------|----------------------------|--|
| | Notes | Show current CMTS running configuration parameters |
| | | C3000#show running-config |
| 1 Examples | interface upstream channel | |
| | upstream channel: 1 | |
| | channel 1 status enable | |
| | channel 1 frequency 30000 | |
| | channel 1 bandwidth 3200 | |
| | | channel 1 profile 10 |
| | | channel 1 type ATDMA |
| | | channel 1 power 0 |

| | channel 1 docsis-30-enhanced-mode disable |
|--|---|
| | |
| | |

4.2.4 Switching User Management Mode

There are three operation grades for CMTS:

Common administrator/administrator/privilege administrator

Log in via connecting serial port or TELNET, CMTS will default it as common user mode, C3000> prompt, enter the privilege user mode, C3000# prompt, use Enable command (need password, the defaulted password is "admin").

| Step | Command | enable |
|------|---------|---|
| | Notes | Shift from common user mode to privilege user mode (need password verification), by "C3000#" |
| 1 | Example | C3000>enable password:***** C3000# |

| Step | Command | config | |
|------|---------|---|--|
| 2 | Notes | Shift from privilege user mode to privilege user configure mode by "C3000(config)#" | |
| | Example | C3000#config | |
| | | C3000(config)# | |

| Step | Command | exit | |
|------|----------|---------------------------------|--|
| 3 | Notes | Exit current configuration mode | |
| | F | C3000(config)#exit | |
| | Example | C3000# | |

4.2.5 Saving Configuration or replacing starting Configuration Parameters

There will be no instant saving for CLI revising configuration for CMTS system, use "copy" to save the current running configuration to specified config files name (Max. 32 characters [aA-zA] or [0-9]) or system start configuration.

| Step | Command | copy [<filename> running-config] [start-config <filename>]</filename></filename> | |
|------|---------|--|--|
| 1 | Notes | <pre><filename>] Save current running configuration parameters to disc, filename> Max. 32 characters or use those config files which has been saved to replace the CMTS start configurations.If need to enter privilege configuration mode, use"C3000 (config) #" prompt. [<filename> running-config]</filename></filename></pre> | |

| | | <filename></filename> | File name for those configfiles which has been saved on that disc |
|--|---------|--|---|
| | | running-config | Current running configuration parameters |
| | | [start-config <filename>]</filename> | |
| | | start-config | CMTS system starting running configuration |
| | | <filename></filename> | File names for those config files saved on that disc |
| | Example | C3000(config)#copy running-config start-config | |
| | | C3000(config)#copy running-config test-cfg | |
| | | C3000(config)#copy test-cfg start-config | |

4.2.6 Restore the factory default configuration

Restore CMTS factory default configuration or password by "system reset" after"C3000#".

| Step | Command | system reset [password config] | | |
|------|----------|----------------------------------|---------------------------------------|--|
| | Notes | Restore factory default pas | sword or running configuration | |
| | | [password config] | | |
| | | password | Restore default password | |
| 1 | | config | Restore default running configuration | |
| | Examples | C3000#system reset password | | |
| | | C3000#system reset config | | |

4.2.7 Reboot CMTS system

Use "system reboot" to reboot CMTS after "C3000#"

| Step | Command | system reboot | |
|------|----------|---------------------|--|
| | Notes | Reboot CMTS | |
| 1 | Examples | C3000#system reboot | |

4.2.8 Modify Password

Use "password" command to modify privilege mode password or use "console-password" to modify telnet log in password.

| Step | Command | password |
|------|---------|--------------------------------|
| 1 | Notes | modify privilege mode password |

| | 1 | |
|---|-----------|-------------------------------|
| | | C3000#password |
| | Evenenies | Current Passwd:**** |
| | Examples | new Passwd:***** |
| | | ack Passwd:***** |
| 2 | Command | console-password |
| | Notes | Modify telnet log in password |
| | | C3000# console-password |
| | Examples | Current Passwd:**** |
| | | new Passwd:***** |
| | | ack Passwd:***** |

4.2.9 Modify CMTS Host Name

Use "hostname" to modify CMTS host name after"C3000#", the factory default name is C3000.

| Step | Command | Hostname <string></string> | |
|------|----------|----------------------------|---|
| 1 | Notes | Modify CMTS Host Name | |
| | | <string></string> | Customized Host name, Max. 32 haracters |
| | Examples | C3000#hostname c-cmts | |
| | | c-cmts# | |

4.3 Configure CMTS Parameters by CLI

There are several functions for CMTS configuration:

- Configure GIGE port IP address
- Configure Static Route
- Configure QAM (DS Channel) RF Port Parameters
- Configure US Channel Port Parameters
- Configure DHCP Server
- Configure VLAN
- Conigure built-in DHCP server scope
- Configure DHCP relay
- Configure DHCP GIADDR main mode
- Configure inserting DHCP OPTION 82 option
- Configure L2VPN
- Configure Access Control List(ACL)
- Configure CMTS network mode
- Configure cable modem remote-quest
- Configure cable flap-list

- Configure CMTS subnets interactive visiting control
- Configure DHCP IP address peek
- Configure load balancing for both US and DS channels
- Configure CPE CLASS
- Configure SNMPLiteracy group name
- Configure network time protocol Service
- Configure CMTS system time
- Configure upstream channel automatic frequency hopping

4.3.1 Configure GIGE Port IP Address

Configure CMTS GIGE access and subnet IP parameter under privilege administrator mode

Step1 Enter into privilgege configuration mode ("C3000(config)#")

Step2 Enter into GIGE Port Configuration Mode ("C3000 (conf-if-gige) #")

Step3 Set GIGEor subnet IP Address ("C3000 (conf-if-gige) #")

Step4 Set GIGE optical module forced 1000M or auto negotiation (only connected SFP effectively)

| Step | Commands | interface gige | | |
|------|----------|---|---|--|
| 1 | Notes | Enter into GIGE Port Configuration Mode | | |
| | Examples | C3000(config)#interface gige C3000(conf-if-gige)# | | |
| | Command | [no] ip address {[dhcp <ipaddress> <netmask>]} [<strings> cable-modem host mta secondary]</strings></netmask></ipaddress> | | |
| | | Set access IP address parame | ters | |
| | | {[dhcp <ipaddress> <netmas< td=""><td>sk>]}</td></netmas<></ipaddress> | sk>]} | |
| | Notes | dhcp | The WAN Interface IP Address will be obtained from DHCP automatically | |
| | | <ipaddress> <netmask></netmask></ipaddress> | IP address and subnet mask | |
| 2 | | [<strings> cable-modem host mta secondary]</strings> | | |
| - | | | Default Value WAN Interface | |
| | | <strings></strings> | CPE-CLASS Name, basedon customized definition | |
| | | cable modern | Cable modem subpat | |
| | | Cable-modelin | | |
| | | host | subnet | |
| | | mta | VOIP subnet | |
| | | secondary | sub-access | |

Step5 Exit Current Access

| | Examples | C3000(conf-if-gige)#ip address 192.168.0.254 255.255.255.0 C3000(conf-if-gige)#ip address 192.168.1.1 255.255.255.0 cable-modem C3000(conf-if-gige)#no ip address 192.168.0.254 255.255.255.0 | |
|---|----------|--|--|
| | Command | [no] auto-negotiate | |
| 3 | Notes | Set GIGE optical module forced 1000M or auto negotiation (only connected SFP effectively) | |
| | Examples | C3000(conf-if-gige)# auto-negotiate C3000(conf-if-gige)# no auto-negotiate | |
| | Command | Exit | |
| 4 | Notes | Exit current configuration interface mode | |
| | Examples | C3000(conf-if-gige)#exit C3000(config)# | |

4.3.2 Configure Route

Configure CMTS static route or strategy route under privilege administrator mode

Notes: Strategy route based on source IP and mask

Step1 Enter into privilege configuration mode ("C3000#")

Step2 Set CMTS Route

| Step | Commands | [no] route {[host net policy]} { <ipaddress> [<netmask>]} gw <gateway></gateway></netmask></ipaddress> | |
|------|----------|--|--|
| | | Set CMTS Route | |
| | | {[host net policy]} | |
| | | host | Specific IP Address Host |
| | | net | Destination Network |
| | Notes | policy | Strategy Route |
| | | { <ipaddress> [<netmask>]}</netmask></ipaddress> | |
| 1 | | <ipaddress></ipaddress> | Destination IP or network number, strategy route based on source IP |
| | | [<netmask>]</netmask> | IP mask, host ignore this option |
| | | <gateway></gateway> | Gateway (the next jump) IPAddress |
| | | C3000#route host 192.168.2.1 gw 192.168.1.1 | |
| | Evenetee | C3000#route net 192.168.2.0 255.255.255.0 gw 192.168.1.1 | |
| | Examples | C3000#route policy 192.168.2.0 255.255.255.0 gw 192.168.1.1 | |
| | | C3000#no route net 192.168.2.0 255.255.255.0 gw 192.168.1.1 | |

4.3.3 Configure QAM (DS channel) RF Interface Parameter

Configure CMTS DS channel RF parameter under privilege administrator mode:

Step1 Enter into privilege configure mode"C3000 (config) #")

Step2 Enter into QAM access configure mode"C3000 (conf-if-qam) #")

Step3 Set QAM channel RF parameter"C3000 (conf-if- qam) #")

Step4 Apply QAM channel configuration

Step5 Exit current access

| Step | Command | interface qam | | | | | |
|------|----------|---|---|--|-----------------------|---------------|--|
| | Notes | Enter into QAM access configuration mode | | | | | |
| 1 | Examples | es C3000(config)#interface qam | | | | | |
| | Command | Channel {<0-16> <1,2,3,>} {frequency modulation annex power interleaver status} {value} | | | | | |
| | | Setup QAM channel RF parameter | | | | | |
| | | {<0-16> <1, 2, | 3,>} | | | | |
| | | <0-16> | DS channel NO. 1~16,0 ,all channel | | | | |
| | | <1, 2, 3,> | > Assign many channels, use "," to separate them | | | | |
| | | {frequency mc | dulation annex | power i | interle | eaver status} | |
| | Notes | frequency | DS channel output center frequency, the channel no. is 0, the frequency will increase by 8Mhz or 6 Mhz according to annex | | | | |
| | | | {value} Khz | | <88000-1000000> | | |
| | | modulation | DS channel m | odulatio | n moc | le | |
| 2 | | | | | 64QAM | | |
| | | | {value} | 256QAM | | QAM | |
| | | | | 1024QAM | | | |
| | | annex | DS Channel D | OCSIS Sta | andar | d | |
| | | | {value} | A | | Euro DOCSIS | |
| | | | (*****) | B DOCSIS | | DOCSIS | |
| | | power | {value} | <45-60> dbmv | | | |
| | | | | The max. value will adjust automatically according to channel quantity | | | |
| | | interleaver | Interleave depth | | | | |
| | | | {value} | If EURO DOCSIS, ignore this item | | | |
| | | status | Channel Status | | | | |
| | | | {value} | DOCS | DOCSIS DOCSIS channel | | |
| | | | | ipqar | qam IPQAM | | |

| | | | | channel | | |
|---|----------|--|----------|---------------------|--|--|
| | | | shutdown | Turnoff channels | | |
| | Examples | C3000(conf-if-qam)#channel 0 frequency 387000 | | | | |
| | | C3000(conf-if-qam)#channel 1,2,3,4 modulation 64qam | | | | |
| | Command | application qam | | | | |
| 3 | Notes | QAM channel parameter configuration is not immediately effect, use this command apply RF configuration parameter | | | | |
| | Examples | C3000# application qam | | | | |
| | Command | Exit | | | | |
| 4 | Notes | Exit current configuration access mode | | | | |
| | Examples | C3000(conf-if-qam)#exit | | | | |
| | | C3000(config)# | | | | |

4.3.4 Configure US channel Interface Parameters

Configure CMTS US Channel RF Parameter under privilege administrator mode:

Step1 Enter into privilege configure mode"C3000 (config) #")

Step2 Enter into US channel port configure mode ("C3000 (conf-if-ups) #")

Step3 Set US Channel RF Parameter"C3000 (conf-if- ups) #")

Step4 Apply US channel configure

Step5 Exit current access

| Step | Command | interface upstream | | |
|------|----------|---|--|--|
| | Noted | Enter into US channel access configure mode | | |
| 1 | Examples | C3000(config)#interface upstream | | |
| | | C3000(conf-if-ups)# | | |
| | | channel {<0- | 4> <1,2,3,>} | |
| | Command | {frequency bandwidth profile type power docsis-30-enhanc ed-mode status} {value} | | |
| | Notes | Set US channel RF parameter | | |
| | | {<0-4> <1,2,3,>} | | |
| 2 | | <0-4> | US channel NO.1~4,0 all channel | |
| | | <1,2,3,> | Assign many channels, use "," to separate channels | |
| | | {frequency bandwidth profile power type docsis-30-enhanced-mode status} | | |
| | | frequency | US channel center frequency, the channel No. is 0, the frequency will increase according to channel bandwidth, default as 3.2Mhz | |

| | | | {value} Khz | <5 | 000-65000 | > | |
|---|----------|---|---|------------------------------------|---|------------------------|---------------|
| | | | US channel bandwidth | | | | |
| | | bandwidth | | 1600 | | | |
| | | | {value} Khz | 32 | 00 | | |
| | | | | 64 | 6400 | | |
| | | | Downstream D | OCSIS | 5 Standard | | |
| | | profile | {value} | <0 acco type | -16>, will c ording to ch e:ATDMA/S | hoose nanne SCDM | 2 4 |
| | | | US channel rec | eiving | g power | | |
| | | power | {value} | <-1 | <-13-23> db | | |
| | | | Channel Type | <u></u> | | | |
| | | type | (uplue) | ATDMA | | | |
| | | | {value} | SCDMA hance mode, enable this item | | | |
| | | | DOCSIS3.0 enh | | | is item | |
| | | enhanced-m ode | Docsis2.0 cable modem can not be used | | | | |
| | | | {value} | En | Enable ON | | |
| | | | () | shutdown | | OFF | |
| | | | Channel Status | 5 | | | |
| | | status | {value} | | Enable | | ON |
| | | | | | shutdown | | OFF |
| | | spectrum-ru | Frequency hopping rules {value} 1-40 | | | | |
| | | le | | | | | |
| | Examples | C3000(conf-if- C3000(conf-if- | 3000(cont-it-ups)#channel 0 trequency 20000 3000(conf-if-ups)#channel 1,2,3 bandwidth 3200 | | | | |
| | Command | application up | ostream | | | | |
| 3 | Notes | US channel parameter configuration is not immediate effect, use this command to apply RF configuration parameter | | | | | |
| | Examples | C3000# application upstream | | | | | |
| | Command | Exit | | | | | |
| 4 | Notes | Exit current configure access mode | | | | | |
| | Examples | C3000(conf-if-ups)#exit C3000(config)# | | | | | |

4.3.5 Configure DHCP Server

Configure helper-address(DHCP server IP address) under privilege administrator mode:

Step1 Enter into privilege configure mode"C3000 (config) #")

Step2 Set DHCP server parameter ("C3000 (config) #")

| Step | Command | [no] cable helper-address { <ipaddress>}</ipaddress> |
|------|---------|--|
|------|---------|--|

| | | [<strings> cable-modem host mta]</strings> | | |
|---|----------|---|---|--|
| | Notes | Set DHCP Server IP address | | |
| | | { <ipaddress>}</ipaddress> | DHCP Server IPAddress | |
| | | choose specified subnet | | |
| | | [<strings> cable-modem host mta]</strings> | | |
| 1 | | | Default all subnet sharing that DHCP server | |
| | | <strings></strings> | CPE-CLASS name, based on user defined, | |
| | | | option 60 parameter | |
| | | cable-modem | Cable modem subnet | |
| | | host | Cable modem downlink to host subnet | |
| | | mta | VOIP subnet | |
| | Examples | C3000(config)#cable helper-address 192.168.1.1 cable-modem | | |
| | | C3000(config)#no cable helper-address 192.168.1.1 cable-modem | | |

4.3.6 Configure VLAN

Set VLAN scope 2-3700, the vlan can assign subnet access including cable mode, host, MTA and CPE-class ,VLAN tag mode including gige(out from CMTS WAN), DOCSIS(HFC DS) and both (double way tag). CMTS could support Max. 255 VLANs, if enabled L2VPN, you will need adding corresponding VLAN.

Configure CMTS VLAN under privilege administrator configure mode:

Step1 Enter into privilege configure mode"C3000 (config) #")

Step2 Enter into VLAN access configure mode"C3000 (conf-if-vlan <num>) #")

Step3 Set VLAN Parameter ("C3000 (conf-if-vlan <num>) #")

Step4 Set VLAN IP network address(prompt "C3000(conf-if-vlan <num>)#")

| Step | Command | interface vlan <num></num> | | |
|---------|----------|---|--|--|
| 1 | Notes | Enter into VLAN interface configure mode | | |
| | Examples | C3000(config)#interface vlan 100 | | |
| | | C3000(conf-if-vlan 100)# | | |
| Command | | Vlan port { <strings> cable-modem host mta}</strings> | | |
| | Notes | Set the VLAN interface, a VLAN can be assigned to mutiple subnets interfaces, and each sub network can only in a VLAN | | |
| 2 | | [<strings> cable-modem host mta]</strings> | | |
| 2 | | <strings></strings> | CPE-CLASS name, basedon user defined option 60 parameter | |
| | | cable-modem | Cable modem subnet | |
| | | host | Cable modem downlink to host subnet | |

Step5 Exit current Access
| | | mta | VOIP subnet |
|---|---------------|--|--|
| | European la c | C3000(conf-if-vlan | 100)#vlan port cable-modem |
| | Examples | C3000(conf-if-vlan 100)#vlan port host | |
| | Command | Vlan tag { outbound inbound both} | |
| | | Set vlan tag | |
| | | { outbound inbound | both } |
| 2 | Notos | outbound | Data packet OUT CMTS WAN insert tag |
| 5 | Notes | inbound | data packet to DS (HFC) insert tag |
| | | Both | IN/OUT CMTS data packet bidirectional inserting tag |
| | Examples | C3000(conf-if-vlan 100)#vlan tag outbound | |
| | Command | [no] ip address <ip addr=""> <mask></mask></ip> | |
| | Notes | Set the VLAN IP network address, a VLAN can configure mutiple IP networks, and each IP network only on a VIAN | |
| | | <pre><in addr=""> <mask></mask></in></pre> | |
| 4 | | <ip_addr></ip_addr> | IP network number for the specified VLAN |
| | | <mask></mask> | IP network mask for the specified VLAN |
| | | C3000(conf-if-vlan | 100)#ip address 10.1.1.0 255.255.255.0 |
| | Examples | C3000(conf-if-vlan 100)#no ip address 10.1.1.0 255.255.255.0 | |
| | Command | Exit | |
| - | Notes | Exit current configurat | ion port mode |
| 5 | | C3000(conf-if-vlan 100 |)#exit |
| | Examples | C3000(config)# | |

4.3.7 Configure built-in DHCP Server Action Scope

CMTS has built-in DHCP server, Max. 32 scopes. You may configure appointed action scope based on IP subnet including starting address, ending address, subnet mask, gateway, DNS, starting server, starting file name, lease time, log server and TOD server. If using built-in DHCP server, you will need pointing the subnet DHCP server IP to CMTS WAN IP.

Configure CMTS built-in DHCP server under privilege administrator mode:

Step1 Enter into privilege configure mode" C3000 (config) #")

Step2 Set DHCPAction scope Parameter ("C3000 (config) #")

| | | built-in-dhcp-server { <string> default cable-modem host mta}</string> | |
|------|---------|--|--|
| Step | Command | {start-ip end-ip netmask gateway lease-time dns boot-server | |
| | | log-server[tod-server] {value} [value] | |
| | Notes | Set DHCP subnet Action scope | |
| 1 | | { <string> default cable-modem host mta}</string> | |
| | | <string></string> | Cpe-class user define subnet, based on |

| | | | option 60 parameter | |
|--|----------|---|--|---|
| | | default | Default Action scope | |
| | | cable-modem | Cable modem subnet Action scope | |
| | | host | Host subnet Action scope | |
| | | mta | Voip subnet Action scope | |
| | | {start-ip end-ip n log-server tod-ser | etmask gateway lease-t ver} | ime dns boot-server |
| | | | Action scope starting | IP address |
| | | start-ip | {value} | <a.b.c.d></a.b.c.d> |
| | | | Action scope ending I | P address |
| | | end-ip | {value} | <a.b.c.d></a.b.c.d> |
| | | | Action scope subnet r | nask |
| | | петтаяк | {value} | <a.b.c.d></a.b.c.d> |
| | | | Action scope subnet gateway IP address | |
| | | gateway | {value} | <a.b.c.d></a.b.c.d> |
| | | lease-time | Action scope address | lease time |
| | | | {value} | <1-65535> |
| | | dns | Action Scope DNS IP address and spare DNS IP address | |
| | | | {value} [value] | <a.b.c.d> [<a.b.c.d>]</a.b.c.d></a.b.c.d> |
| | | boot-server | Action Scope starting file name | server IP and starting |
| | | | {value} [value] | <a.b.c.d> <string></string></a.b.c.d> |
| | | 1 | Action scope log serve | er IP |
| | | log-server | {value} | <a.b.c.d></a.b.c.d> |
| | | tod conver | Action scope TOD serv | ver IP |
| | | loo-server | {value} | <a.b.c.d></a.b.c.d> |
| | Examples | C3000(config)#built-in-dhcp-server cable-modem start-ip 192.168.0.2 | | nodem start-ip |

4.3.8 Configure DHCP Relay

CMTS default doing Bridge passthrough to those DHCP message for subnets, enable DHCP relay function, CMTS will relay DHCP message to appointed DHCP server.

Set DHCP relay under privilege administrator mode

Step1 Enter into privilege configure mode ("C3000 (config) #")

Step2 Set DHCP relay ("C3000 (config) #")

| Step | Command | [no] dhcp relay |
|------|----------|--------------------------|
| 4 | Notes | Enable/disableDHCP relay |
| L | Examples | C3000(config)#dhcp relay |

| | |
|-----------------------------|--|
| C3000(config)#no dhcp relay | |

4.3.9 Configure DHCP GIADDR Main Mode

CMTS default using CM subnet interface and host subnet interface IP inserting giaddr fields as relay, enable giaddr main mode, CMTS will distinguish terminal type and use matching subnet interface IP inserting DHCP message giaddr fields.

Set DHCP relay under privilege administrator mode

Step1 Enter into privilege configuration mode ("C3000 (config) #")

Step2 Set DHCP GIADDR main mode ("C3000 (config) #")

| Step | Command | [no] dhcp-giaddr-primary | |
|------|----------|--|--|
| | Notes | Enable/disable DHCP relay GIADDR main mode | |
| 1 | Examples | C3000(config)#dhcp-giaddr-primary | |
| | | C3000(config)#no dhcp-giaddr-primary | |

4.3.10 Configure Inserting DHCP Option 82

CMTS defaults not insert OPTION 82, if enable this function, CMTS will insert OPTION 82 parameters, and the remote id: is CMTS MAC address, CircuitID: vid :< num>/cm-mac:

<xx:xx:xx:xx:xx:xx>/cpe-mac: <xx:xx:xx:xx:xx>, CMTSCapability id 9 "cdocsis3.0 v1.1 16-downstreams 4-upstreams"

Set insert DHCP OPTION 82 under privilege administrator mode

Step1 Enter into privilege administrator mode ("C3000 (config) #")

Step2 Set DHCP GIADDR main mode"C3000 (config) #"

| Step | Command | [no] dhcp option 82 | |
|------|----------|---|--|
| | Notes | Enable/disableDHCP relay agent insert OPTION 82 | |
| 1 | Examples | C3000(config)#dhcp option 82 | |
| | | C3000(config)#no dhcp option 82 | |

4.3.11 Configure L2VPN

CMTS default has no 802.1q analysis HFC US data, if enable it, the CMTS will insert vlan tag on those data of L2VPN from CM configure files out of WAN interface, for those L2VPN data entered into WAN interface, the CMTS will strip the VLAN tag.

Set L2VPN under privilege administrator mode

Step1 Enter into privilege configuration mode ("C3000 (config) #")

Step2 Set DHCP GIADDR main mode ("C3000 (config) #")

| Step | Command | [no] cable l2-vpn-service dot1q | |
|------|----------|--|---|
| 1 | Notes | Enable/disable L2VPN | |
| | Examples | C3000(config)#cable l2-vpn-service dot1q | |
| | | Examples C3 | C3000(config)#no cable l2-vpn-service dot1q |

4.3.12 Configure Access Control List (ACL)

CMTS support ACL control, it can support Max.100 ACL rules, and each rule can be assigned to different interface

Set visit control list under privilege administrator mode:

Step1 Enter into privilege configuration mode C3000 (config) #"

Step2 Enter into privilege configuration ACL rule mode"C3000 (conf-ip-acl-rule <num>) #")

Step3 Set ACL rule C3000 (conf-ip-acl-rule <num>) #")

Step4 Set ACL rule priority"C3000 (conf-ip-acl-rule <num>) #")

Step5 Enter into ACL Interface ("C3000 (conf-ip-acl-if <string>) #")

Step6 Assign ACL Interface Rule ("C3000 (conf-ip-acl-if <string>) #")

Step7 Enable or disable ACL ("C3000 (config) #")

| Step | Command | [no] ip access-rule <num></num> | |
|------|----------|--|---|
| | | Create or delete ACL rules | |
| | Notes | <num></num> | Rule ID,1~255 |
| T | E | C3000(config)#ip access-r | rule 10 |
| | Examples | C3000(config)#no ip acce | ss-rule 10 |
| | Comment | Permit deny rule-vlan ru {sourceIP Mask any } | ule-policy-route <protocol_name> all</protocol_name> |
| | Command | {destIP Mask any } {source End any } | cePortStart End any |
| | | Select Rules | |
| | | Permit deny rule-vlan rule-policy-route | |
| | Notes | Permit | allow |
| | | deny | forbid |
| 2 | | rule-vlan | Vlan rules, matching rules inserting vlan tag |
| | | rule-policy-route | Policy route rules, matching rules, use policy route |
| | | Specified Protocols | |
| | | <protocol_name> all</protocol_name> | |
| | | all | All IP data package |
| | | <protocol_name></protocol_name> | Assign IP protocol type data packet including icmp、igmp、ftp、tftp、snmp、 |

| | | | telnet,etc. |
|---|----------|--|---|
| | | Assign source IP and mas | k or any source IP |
| | | {sourceIP Mask any } | · · · · |
| | | sourceIP Mask | <a.b.c.d> <m.m.m></m.m.m></a.b.c.d> |
| | | any | Any source IP |
| | | Assign destination IP and | mask or any destination network |
| | | {destIP Mask any } | |
| | | destIP Mask | <a.b.c.d> <m.m.m></m.m.m></a.b.c.d> |
| | | any | Any destination network |
| | | Assign source port scope or any source port | |
| | | {sourcePortStart End any | · · · · · · · · · · · · · · · · · · · |
| | | sourcePortStart End | <start> <end>,the fixed port for start and end are the same</end></start> |
| | | any | Any source port |
| | | Assign destination port so | cope or any destination port |
| | | {destPortStart End any } | |
| | | destPortStart End | <start> <end>, the fixed port will be the same for both start and end</end></start> |
| | | any | Any destination Port |
| | | C3000(conf-ip-acl-rule 10 |)#permit all any any any any |
| | Examples | C3000(conf-ip-acl-rule 10 255.255.255.0 any any any |)#permit icmp 192.168.1.1 |
| | Command | rule-priority <num></num> | |
| 2 | Notos | Set rule priority | |
| 3 | Notes | <num></num> | Rule Priority 0(Min.)-255(Max.) |
| | Examples | C3000(conf-ip-acl-rule 10)#rule-priority 255 | |
| | Command | ip access-list host gige d | ocsis-mac |
| | | Enter ACL assign interface | |
| | | host gige docsis-mac | |
| Δ | Notes | host | CMTS host identity |
| 4 | | gige | CMTS WAN Interface |
| | | docsis-mac | CMTS DS HFC Interface |
| | Examples | C3000(config)#ip access-list host C3000(conf-ip-acl-if host)# | |
| | Command | [no] access-rule <num></num> | |
| | | Assign ACLrules to the ac | cess |
| 5 | Notes | <num></num> | ACL rule ID |
| | | C3000(conf-ip-acl-if host) | #access-rule 10 |
| | Examples | C3000(conf-ip-acl-if host)#no access-rule 10 | |
| | Command | [no] ip access-control | |
| 6 | Notes | Enable or disable ACL | |

| | Examples | C3000(config)# ip access-control |
|----------|------------------------------------|----------------------------------|
| Examples | C3000(config)#no ip access-control | |

4.3.13 Configure CMTS network mode

CMTS support L2 brige connection, L3 route and L2, L3 mixture network mode. L2 bridging mode, CMTS will passthough all passed data message and only deal with those data packet enabled DHCP relay or L2 VPN, for L3 route mode, CMTS will transmit data packet based on L3 IP protocols. CMTS default transmitting L2, L3 network mode for CM and CPE sunbet.

Set CMTS network mode under privilege administrator mode:

Step1 Enter into privilege configuration mode"C3000 (config) #")

| Step | Command | network-mode cable-modem host bridge route | |
|------|----------|---|-----------------------|
| 1 | Notes | Set cable modem subnet or CPE subnet network mode | |
| | | cable-modem host | |
| | | cable-modem Cable modem subnet | |
| | | Host CPE subnet | |
| | | bridge route | |
| | | bridge Layer 2 bridging mode | |
| | | route | Layer 3 bridging mode |
| | Examples | C3000(config)#network-mode cable-modem bridge | |

Step2 Set CMTS network mode network mode"C3000 (config) #")

4.3.14 Configure cable modem remote-quest

CMTS support cable modem remote query, set query period and SNMP read group name.

CMTS will obtain seasonal online CM parameters remotely including US/DS receiving/transmitting power and DS reference micro level parameter.

Set CMTS network mode under privilege configuration mode:

Step1 Enter into privilege configuration mode"C3000 (config) #")

Step2 Set CMTS network mode ("C3000 (config) #")

| Step | Command | cable modem remote-query <num> <string> <string></string></string></num> | | |
|------|---------|--|---|--|
| 1 | Notes | Set CMTS checking cable modem running parametersperiod and SNMP reading group name | | |
| | | <num></num> | Query period 300~1800 second, 0 Disable query | |
| | | <string></string> | SNMP read group name, Max. 50 characters, default as public | |
| | | <string></string> | NMP write group name, Max. 50 characters, | |

| | default as private |
|----------|--|
| Examples | C3000(config)# cable modem remote-query 600 public private |

4.3.15 Configure cable flap-list

CMTS support cable flap real time statistics, cable flap is mainly used for disgnose HFC network signal quality, offers reference for HFC network failure, setting flap statistics to save intervals.

Set cable flap deadtime under privilege administrator mode:

Step1 Enter into privilege configuration mode"C3000 (config) #"

| Step | Command | cable flap-list aging <num></num> | |
|------|----------|--|--|
| | Notes | Set cable flap statistics dead time, if exceeded, zero clearing, it will start recounting. | |
| 1 | | <num></num> | Cable flap statistic dead time, 15~43200 mintutes, default as 60 minutes0 forbid flap statistics |
| | Examples | C3000(config)# cable flap-list aging 60 | |

Step2 Set CMTS network mode ("C3000 (config) #")

4.3.16 Configure CMTS subnet exchanging visit controlling

CMTS defaults prohibiting HFC subnet exchanging visit, if disable this item; the exchanging visit can be functioned.

Set CMTS network mode under privilege configuration mode:

Step1 Enter into privilege configuration mode"C3000 (config) #"

| $Slop2$ Set CWITS hetwork mode C3000 (comig) π |
|--|
|--|

| Step | Command | [no] subnet-isolation | |
|------|----------|--|--|
| | Notes | Enable/disable CMTS subnet exchange visiting control | |
| 1 | E | C3000(config)# subnet-isolation | |
| | Examples | C3000(config)#no subnet-isolation | |

4.3.17 Configure DHCP IP address smooping

CMTS default enable DHCP IP address snooping, those host with IP address assigned by illegal DHCP server or host with manual binding IP address can not be accessed into network.

Set DHCP IP address snooping under privilege administrator mode:

Step1 Enter into privilege configuration mode"C3000 (config) #"

Step2 Enter CMTS network mode ("C3000 (config) #")

| Step Command [no] ip snooping |
|-------------------------------|
|-------------------------------|

| | Notes | Enable/disable DHCP IP Address snooping |
|---|-----------|---|
| 1 | Evenneles | C3000(config)# ip snooping |
| | Examples | C3000(config)#no ip snooping |

4.3.18 Configure CMTS US/DS Channel Loading Balancing

CMTS defaults automatical balancing US/DS CM quantity, it will use DCC and UCC dynamic balancing CM to banlanced channels or groups according to realtime channel utilization rate periodically.

Set CMTS US/DS channel loading balancing under privilege administrator mode:

Step1 Enter into privilege configuration mode"C3000 (config) #")

Step2 Set CMTS US/DS channel loading balancing parameter"C3000 (config) #")

Step3 Set CMTS load balancing group"C3000 (conf-load-bal-group <num>) #")

Step4 Set CMTS eliminate load balancing"C3000 (config) #")

| Step | Command | load-balance method period overload difference init-tech { <value>}</value> | | | | |
|------|----------|---|---|-----------------------------------|---|-----------------------------|
| | | Set CMTS US/DS channel load balancing parameter | | | | |
| | | met | hod pe | riod overload | difference init-teo | h exclude |
| | | method | <v?< td=""><td>disable</td><td>Disable load Bal</td><td>ancing</td></v?<> | disable | Disable load Bal | ancing |
| | | | alue> | dynamic | Dynamic banlan channel utilizatio | cing bsed on n |
| | | | | static | Balancing based bandwidth | on Min. |
| | Notes | period | <value></value> | Balancing pe seconds | Balancing period, 60~3600 seconds, defauly 60 seconds | |
| 1 | | overload | <value></value> | Utilization po utilization exc | ercentage 1~100, eed , start dynamic | if the channel balancing |
| | | difference value Channel utilization difference value 1~100, if exceed, start dynamic balar | | alue percentage balancing | | |
| | | init-tech | <value></value> | DCC/DBC mode | | |
| | | | | broadcast-ranging Init-tech(1) | | Init-tech(1) |
| | | | | period-ranging Init-tech(2) | | Init-tech(2) |
| | | | | unicast-rang | ing | Init-tech(3) |
| | | | | direct | | Init-tech(4) |
| | Examples | C300 |)0(confi | g)#load-balance | e method dynamic | |
| 2 | Command | [no] | load-ba | lance docsis-gro | oup <num></num> | |

| | Notos | Setup or delete responsible balancing group | | |
|---|----------|--|--|--|
| | NOLES | <num> Balancing group ID, 1~255</num> | | |
| | | C3000(config)# load-balance docsis-group 1 | | |
| | Examples | C3000(conf-load-bal-group 1)# | | |
| | | C3000(config)# | no load-balance docsis-group 1 | |
| | Command | Channel downstream upstream <num> <num1,num2,> add remove</num1,num2,></num> | | |
| | | Add or delete US/DS channel to balancing group | | |
| | | downstream up | ostream | |
| | | downstream | DS channel | |
| | | upstream | US channel | |
| | | <pre></pre> | | |
| | Notes | <num></num> | DS channel <1-16>,US channel <1-4> | |
| 3 | | <num1.< td=""><td>Assign many channels, use "." to</td></num1.<> | Assign many channels, use "." to | |
| | | num2> | separate ,<1,2,> | |
| | | add remove | | |
| | | Add | add channel to balancing group | |
| | | Remove | delete channel from balancing group | |
| | | C3000(conf-load | d-bal-group 1)#channel upstream 1 add | |
| | Examples | C3000(conf-load-bal-group 1)#channel downstream 1,2,3,4 | | |
| | · | remove | | |
| | | cable-modem si | ngle-mac range-macs mac-oui | |
| | Command | <pre>{<mac_address></mac_address></pre> | [<mac_address>]}</mac_address> | |
| | | add remove | | |
| | | Add/delete cabl group | e modem MAC address scope to balancing | |
| | | single-mac ran | ge-macs mac-oui | |
| | | single-mac | Assigned MAC address cable modem | |
| 4 | Notes | range-macs | Cable modem MAC address scope address scope | |
| | | mac-oui | Cable modem MAC address OUI | |
| | | { <mac address=""> [<mac address="">]}</mac></mac> | | |
| | | <mac address<="" td=""><td>MAC address <xx.xx.xx.xx.xx.xx></xx.xx.xx.xx.xx.xx></td></mac> | MAC address <xx.xx.xx.xx.xx.xx></xx.xx.xx.xx.xx.xx> | |
| | | > | MAC OUI <xx.xx></xx.xx> | |
| | | [<mac_addres< td=""><td>MAC address <xx.xx.xx.xx.xx.xx>,</xx.xx.xx.xx.xx.xx></td></mac_addres<> | MAC address <xx.xx.xx.xx.xx.xx>,</xx.xx.xx.xx.xx.xx> | |
| | | s>] | range-macs required | |
| | | addlremove | | |
| | | add | add channel to balancing group | |
| | | remove | delete channel from balancing group | |
| | | load-balance ex | clude cable-modem single-macl range-macs | |
| 5 | Command | mac-oui | | |
| | | { <mac_address< td=""><td>> [<mac_address>]} add remove</mac_address></td></mac_address<> | > [<mac_address>]} add remove</mac_address> | |

| | | Add/delete cable modem MAC address scope to delete balancing group | | |
|------|----------|---|---|--|
| | | single-mac range-macs mac-oui | | |
| | | single-mac Assigned MAC address cable moden | | |
| | | range-macs Cable modem MAC address scope | | |
| | | mac-oui | Cable modem MAC address OUI | |
| | | { <mac_address> [<mac_address>]}</mac_address></mac_address> | | |
| Note | Notes | | MAC address <xx.xx.xx.xx.xx.xx></xx.xx.xx.xx.xx.xx> | |
| | | <mac_address></mac_address> | MAC OUI <xx.xx></xx.xx> | |
| | | [<mac_address< td=""><td>MAC address <xx.xx.xx.xx.xx.xx,< td=""></xx.xx.xx.xx.xx.xx,<></td></mac_address<> | MAC address <xx.xx.xx.xx.xx.xx,< td=""></xx.xx.xx.xx.xx.xx,<> | |
| | | >] | range-macs , required | |
| | | add remove | | |
| | | add | add channel to balancing group | |
| | | Remove | delete channel from balancing group | |
| | | C3000(config)#load-balance exclude cable-modem single-mac | | |
| | Examples | 1.1.1.1.1 add | | |
| | | C3000(config)#load-balance exclude cable-modem single-mac 1.1.1 removte | | |

4.3.19 Configure CPE CLASS

CMTS support uder defined CPE class subnet based on option 60 parameter, it can assign IP, VLAN to assigned CPE-class

Set CPE CLASS under privilege administrator mode:

Step1 Enter into privilege configuration mode ("C3000 (config) #")

Step2 Enter into CPE CLASS configuration mode (" C3000 (conf-cpe-class <string>) #")

|--|

| Step | Command | [no] cpe-class <string></string> | | |
|------|----------|--|---|--|
| | Notes | Add or delete cpe-class | | |
| | | <string></string> | User defined cpe-class name, Max. 50 characters | |
| 1 | | C3000(config)# cpe-class user-test | | |
| | Examples | C3000(conf-cpe-class user-test)# | | |
| | | C3000(config)#no cpe-class user-test | | |
| | Command | [no] dhcp option 60 <string></string> | | |
| 2 | | Add/delete DHCP option 60 parameters to cpe-class | | |
| | Notes | <string></string> | Option 60 character string, Max.50 characters | |
| | Examples | C3000(conf-cpe-class user-test)# dhcp option 60 stbtest | | |
| | | C3000(conf-cpe-class user-test)# no dhcp option 60 stbtest | | |

4.3.20 Configure SNMP read-write group name

Set CPE CLASS under privilege administrator mode:

Step1 Enter into privilege configuration mode ("C3000 (config) #")

Step2 Set SNMP read-write group name ("C3000 (config) #")

| Step | Command | <pre>snmp community <read_string> <write_string></write_string></read_string></pre> | | |
|------|----------|---|--------------------------------------|--|
| | | Set SNMP read-write | SNMP read-write group name | |
| 1 | Notes | < read_string > | Read group name, Max. 15 characters | |
| | | <write_string></write_string> | Write group name, Max. 15 characters | |
| | Examples | C3000(config)# snmp community public private | | |

4.3.21 Configure Network Time Protocol (NTP) service

Set NTP service, CMTS will get autosynchronous network time

Set NTP service under privilege administrator mode:

Step1 Enter into privilege configuration mode ("C3000 (config) #")

Step2 Network Time Protocol (NTP) service ("C3000 (config) #")

| Step | Command | ntp server <ip_address> scheck [<timezone>]</timezone></ip_address> | | |
|------|----------|---|---|--|
| | | Set network time Protocol (NTP) service | | |
| 1 No | | <ip_address></ip_address> | Time server IP address | |
| | Notes | scheck | Immediately execute time synchronization | |
| | | [<timezone>]</timezone> | Time zone:minutes -720~780, default Beijing time zone | |
| | Examples | C3000(config)# ntp server 1.1.1.1 480 | | |
| | | C3000(config)# ntp server scheck | | |

4.3.22 Set CMTS system time

Set CMTS system time under privilege mode

Step1 Enter privilege configuration mode ("C3000 (config) #")

Step2 Set CMTS system time ("C3000 (config) #")

| Step | Command | system clock <date_string> <time_string></time_string></date_string> | | |
|------|----------|--|------------------|--|
| | | Set CMTS system time | | |
| | Notes | <date_string></date_string> | Date: yyyy-mm-dd | |
| 1 | | <time_string></time_string> | Time: H:M:S | |
| | Examples | c3000(config)# system clock 2013-12-31 23:59:59 | | |

4.3.23 Set the CMTS static anchor

Set static multicast in privileged administrator mode:

The CMTS default automatic learning legal multicast address through the query message detection multicast router, and can also through the command manually add the legitimate multicast address.

Step 1: Enter the privileged mode (prompt"C3000(config)#")

Step 2: Add or remove static multicast (prompt"C3000(config)#")

| Step | Command | [no] cable igmp-static-group <ip_addr></ip_addr> | | | |
|------|---------|---|--------------------------------|--|--|
| | Notos | <ip_addr></ip_addr> | | | |
| 1 | notes | <ip_addr></ip_addr> | The multicast address is valid | | |
| 1 | Example | C3000(config)# cable igmp-static-group 239.1.1.1 | | | |
| | Example | C3000(config)# no cable igmp-static-group 239.1.1.1 | | | |

4.3.24 Set the CMTS TELNET or WEB login time-out

Set the SSH or WEB login timeout under the privileged administrator mode:

The CMTS default SSH and WEB login timeout 5 minutes, and it can be ordered through the custom timeout.

Step 1: Enter the privileged mode (prompt"C3000(config)#")

Step 2: Set the timeout period (prompt"C3000(config)#")

| Step | Command | Timeout {ssh webs} < Minutes > | | |
|------|---------|--------------------------------|--------------------|--|
| | | {ssh webs} < Minutes > | | |
| 1 | Notes | Ssh | telnet(ssh)timeout | |
| | | Webs | Webs timeout | |
| | | < Minutes > | Unit minutes | |
| | Example | C3000(config)# timeout ssh 60 | | |
| | | C3000(config)# timeout webs 60 | | |

4.3.25 Set the CM access control

Set the CM access network permissions in privileged administrator mode The CMTS default allows all CM access network, through the command to prohibit or allow to specify the CM access network.

Step 1: Enter the privileged mode (prompt"C3000(config)#")

Step 2: Set the specific CM network access permissions (prompt"C3000(config)#") Step 3: Set the CM access network accessing control model

| Sten | Command | [no] cable | modem { <ip_< th=""><th>addr> <mac_addr>}</mac_addr></th></ip_<> | addr> <mac_addr>}</mac_addr> | |
|------|--|-----------------------|---|-------------------------------|--|
| Sup | Command | disable-forwarding | | | |
| | { <ip_addr> <mac_addr>}</mac_addr></ip_addr> | | | | |
| | Notes | <ip_addr></ip_addr> | The specified CN | I IP address online | |
| | | <mac_addr></mac_addr> | The specified CN | A MAC address | |
| 1 | | C3000(config)#cabl | C3000(config)#cable modem 1.1.1.1 disable-forwarding | | |
| 1 | | C3000(config)#cabl | le modem | 00.01.02.03.04.05 | |
| | Exaple | disable-forwarding | | | |
| | | C3000(config)#no | cable modem | 00.01.02.03.04.05 | |
| | | disable-forwarding | | | |
| 2 | Command | cable modem | permit-mode | disable-forwarding | |
| 2 | Command | enable-forwarding | | | |
| | Notos | disable-forwarding | enable-forwarding | | |
| | INDIES | disable-forwarding | The default for | all CM prohibits | |

| | | access network, but only the CM with |
|---------|--------------------|--------------------------------------|
| | | the permissions can access the |
| | | Internet. |
| | | The default for all CM allows access |
| | enable-forwarding | network, but only the CM without |
| | _ | permissions can't access network. |
| Evennle | C3000(conf-if-gige |)#cable modem permit-mode |
| Example | enable-forwarding | |

4.3.26 Set the CM IPv4, IPv6 support mode

Set the CM IPv4, IPv6 support mode in privileged administrator mode Step 1: Enter the privileged mode (prompt"C3000(config)#") Step 2: Set the CM IPv4. IPv6 mode (prompt"C3000(config)#")

| Ct | C 1 | | | |
|------|---------|--|-----------------|--|
| Step | Command | cable ip-provisioning-mode {ipv4 ipv6 apm dpm} | | |
| | | {ipv4 ipv6 apm dpm} | | |
| 1 | Notes | ipv4 | IPv4 mode | |
| | | ipv6 | IPv6 mode | |
| | | apm | alternate mode | |
| | | dpm | dual-stack mode | |
| | Example | C3000(config)# cable ip-provisioning-mode ipv4 | | |

4.3.27 Set upstream channel automatic frequency hopping

Step 1: Enter the privileged mode (prompt"C3000(config)#")

Step 2: Set the frequency hopping group mode (prompt"C3000(config)#")

Step 3: The distribution of frequency hopping group to channel

| Step | 4: | Set | the | freq | iuenc | / hoi | oping | cvcl | e |
|-------|-----|-----|------|------|---------|-------|-------|------|---|
| occp. | ••• | 000 | circ | | 1960100 | , | 0 | | - |

| C. | C 1 | [no] spectrum rule <nu< th=""><th>um></th></nu<> | um> | | |
|------|----------|---|--|--|--|
| Step | Command | Create hopping rules | | | |
| | Notes | <num></num> | Frequency hopping rules 1-40 | | |
| 1 | Example | C3000(config)# spectrum rule 1 | | | |
| | Lxample | C3000(conf-spec-rule | 1)# no spectrum rule 1 | | |
| | | [no] frequency { <num< td=""><td>> band} [<start freq=""> <end freq="">]</end></start></td></num<> | > band} [<start freq=""> <end freq="">]</end></start> | | |
| | Command | Setting the frequency | hopping to the specified frequency or | | |
| | | frequency range | | | |
| | Notes | { <num> band}</num> | | | |
| | | <num></num> | The specified frequency, 5-65Khz | | |
| 2 | | Band | The frequency range, 5-65Khz | | |
| | | [<start freq=""> <end freq>]</end </start> | Suitable for using band | | |
| | | <start freq=""></start> | Start frequency, 5-65Khz | | |
| | | <end freq=""></end> | End frequency, 5-65Khz | | |
| | Evenuela | C3000(conf-spec-rule 1)#frequency 40000 C3000(conf-spec-rule 1)#frequency band 40000 49000 | | | |
| | Example | | | | |
| | Command | [no] channel-width <s< td=""><td>tart bandwidth> <end bandwidth=""></end></td></s<> | tart bandwidth> <end bandwidth=""></end> | | |
| 3 | Command | Set channel bandwidth | n hopping rules | | |
| | Notes | <start bandwidth=""> <end bandwidth=""></end></start> | | | |

| | | <start bandwidth=""></start> | Channel bandwidth | | |
|---|---------|---|--|--|--|
| | | <end bandwidth=""></end> | The pass band bandwidth | | |
| | Example | C3000(conf-spec-rule | 1)#channel-width 6400 3200 | | |
| | | [no] profile <num> sn</num> | r-threshold <snr> [<back snr="">]</back></snr> | | |
| | Command | Channel modulation | parameters are set according to the | | |
| | | channel SNR hopping | | | |
| | | <num></num> | Channel profile | | |
| | | | Channel SNR, below this value the | | |
| 4 | Natar | <snr></snr> | trigger frequency hopping | | |
| | Notes | | Channel SNR, higher than the value | | |
| | | <back snr=""></back> | of rebound the default back $snr > snr$ | | |
| | | | 3db rebound | | |
| | Example | C3000(conf-spec-rule | 1)#profile 11 snr-threshold 28 31 | | |
| | P | correctable-fec thresh | old <num></num> | | |
| | Command | According to the cha | annel error correcting data percentage | | |
| | | trigger frequency hoppi | ng | | |
| | | | The percentage of error correcting | | |
| 5 | Notes | <num></num> | data, 0-100, 0 do not trigger | | |
| | | | exceeding this the trigger frequency | | |
| | | | honning | | |
| | Example | C3000(conf-spec-rule 1)# correctable-fec threshold 10 | | | |
| | Command | uncorrectable-fec threshold <num></num> | | | |
| | | According to the channel error correcting data percentage | | | |
| | | trigger frequency hopping | | | |
| 6 | | | Not correcting data percentage, | | |
| | Notes | <num></num> | 0-100, 0 do not trigger exceeding this | | |
| | | | the trigger frequency hopping | | |
| | | uncorrectable-fec thre | shold <num></num> | | |
| | Command | According to the channel error correcting data percentage | | | |
| | 0000000 | trigger frequency hopping | | | |
| 6 | | | Not correcting data percentage, | | |
| Ŭ | Notes | <num></num> | 0-100. 0 do not trigger exceeding this | | |
| | 110105 | interin | the trigger frequency hopping | | |
| | Example | C3000(conf spec rule | 1)# uncorrectable_fec_threshold 10 | | |
| | Example | action frequency mod | ulation channel-width | | |
| | Command | Setting the frequency here | | | |
| | | frequency modulation | l channel_width | | |
| 7 | | frequency | Frequency priority | | |
| / | Notes | modulation | Modulation priority | | |
| | | channel width | Bandwidth priority | | |
| | Example | C3000(conf spac rula | 1)# action frequency modulation | | |
| | Блатріе | Application of fragm | $I_{j\pi}$ action inequency intoducation | | |
| 8 | Command | shown in the unstream | channel set | | |
| | Example | $C_{2000}(conf if unc) \# c$ | hannal 1 spectrum rule 1 | | |
| L | Блашріе | C3000(cont-tt-ups)#channel 1 spectrum-rule 1 | | | |

4.3.28 Set command alias

Step 1: Enter the privileged mode (prompt"C3000(config)#")

| Step 2. Set command ands (prompt coolog(commg)#) | | | | |
|---|-----------------------------------|---|------------------|--|
| Step | Command | alias <alias cmd=""> <command/></alias> | | |
| | <alias cmd=""> <command/></alias> | | | |
| 1 | Notes | <alias cmd=""></alias> | alias | |
| 1 | | <command/> | Compelte command | |
| | Example | C3000# alias scm show cable modem | | |

Step 2: Set command alias (prompt"C3000(config)#")

4.4 Check CMTS system by CLI

Check CMTS system by CLI, items are as following:

- Check CMTS ARP list
- Check CMTS warning log
- Check CMTS bridge list
- Check CMTS built-in DHCP server scope
- Check cable flap-list statistics
- Check cable flap-list configuration
- Check dhcp server IP address (helper-address)
- Check cable modem status
- Check cable modem remote- query configuration
- Check cable modem remote- query status
- Check CMTS system time
- Check cpe class configuration
- Check dhcp parameters
- Check CMTS GIGE IP address parameters
- Check CMTS GIGE statistics
- Check DS channel (qam) configuration
- Check US channel (upstream) configuration
- Check vlan
- Check CMTS loading balance configuration
- Check CMTS loading balance group status
- Check CMTS system log
- Check CMTS multicasting statistics and activity dialog
- Check CMTS network mode
- Check strategy route
- Check static route
- Check CMTS subnet exchanging visit control status
- Check current running configuration parameters

4.4.1 Check CMTS ARP List

| Step | Command | Show arp | | | |
|------|-----------|-------------------|-----------------|-----------|---------|
| | Notes | Show CMTS syster | n ARP list | | |
| | | C3000>show arp | | | |
| 1 | Everenies | MacAddress | IpAddress | interface | status |
| | Examples | f0:de:f1:40:97:57 | 192.168.0.253 | gige | capture |
| | | f0:de:f1:40:97:57 | 192.168.190.254 | gige | capture |

4.4.2 Check CMTS warning log

| Step | Command | show alarm |
|------|----------|------------------------------|
| | Notes | Show CMTS system warning log |
| 1 | Examples | C3000>show alarm |

4.4.3 Check CMTS bridge list

| Step | Command | Show bridge |
|------|----------|--|
| 1 | Notes | Show CMTS system bridge list |
| | | C3000>show bridge |
| | Examples | MacAddress IpAddress interface status tag sid dev-type |
| | | f0:de:f1:40:97:57 192.168.18.254 gige timeout 0 0 N/A |

4.4.4 Check CMTS built-in DHCP server scope

| Step1 | Enter | into | privile | ge moo | de ("C | 3000#") |
|-------|-------|------|---------|--------|--------|---------|
|-------|-------|------|---------|--------|--------|---------|

| Step | Command | show built-in-dhcp-server [<strings> ca</strings> | ble-modem host mta] |
|------|----------|--|---|
| | | Show CMTS built-in DHCP server scope | |
| | Notes | [<strings> cable-modem host mta]</strings> | Assigned scope name, defaukt display all scopes |
| | | C3000> show built-in-dhcp-server cable | -modem |
| | | IP Scope : | cable-modem |
| | | starting address : | 192.168.0.2 |
| | | end address : | 192.168.0.100 |
| 1 | | netmask : | 255.255.255.0 |
| | | gateway address : | 192.168.0.1 |
| | Examples | primary dns address : | 0.0.0.0 |
| | | secondary dns address : | 0.0.0.0 |
| | | bootserver address : | 192.168.0.254 |
| | | bootfile name : | cm.bin |
| | | log server address : | 0.0.00 |
| | | tod server address : | 0.0.0.0 |
| | | lease time : | 7200 |

4.4.5 Check cable flap-list statistics

| Step | Command | show cable flap- [<ip_address> <n [<channel>]</channel></n </ip_address> | list nac_ad | dress> d | ownstre | am up | stream] | |
|------|----------|--|--|-------------------|-----------|------------------|-----------|-------|
| | | Show cable flap- flap statistics | list sta | tistics, de | fault dis | play all | cable m | nodem |
| | | [<ip_address> <mac_address> downstream upstream]</mac_address></ip_address> | | | | | | |
| | | <ip_address></ip_address> | Ass | ign cable | modem | or hos | t IP add | ress |
| | Notes | <mac_address></mac_address> | | Assign address | cable m | odem | or host I | MAC |
| | | d a una atura a una | Assi | gn DS cha | nnel cat | ole moo | lem | |
| | | downstream | { <ch< td=""><td>annel>}</td><td>С</td><td>hannel</td><td>ID,<1~1</td><td>6></td></ch<> | annel>} | С | hannel | ID,<1~1 | 6> |
| | | unstroom | Assi | gn US cha | nnel cat | ole moo | dem | |
| 1 | | upstream | { <ch< td=""><td>annel>}</td><td>С</td><td colspan="3">Channel ID,<1~4></td></ch<> | annel>} | С | Channel ID,<1~4> | | |
| | | C3000#show cable flap-list | | | | | | |
| | | MacAddress Time | I | ns Hit | Miss | CRC | P-Adj | Flap |
| | | 00:13:71:dc:3d:9e | | 39 | 5 0 | 0 | 0 | 0 |
| | Examples | 1970-1-1 1:28:31 | | | | | | |
| | | 00:13:71:e0:28:a 1970-1-1 2:32:37 | a4 0 | 39. | 50 | 0 | 0 | 0 |
| | | 24:76:7d:06:8a:8 1970-1-1 1:29:1 | 32 0 | 41 | 20 | 0 | 0 | 0 |

4.4.6 Check cable flap-list configuration

| Step | Command | show cable flap-list config |
|------|-----------|------------------------------------|
| | Notes | Show cable flap-list configuration |
| 1 | Evenenies | C3000> show cable flap-list config |
| | Examples | flap-list aging interval: 60 |

4.4.7 Check DHCP server IP address (helper-address)

| Step | Command | show cable helper-add | ress |
|------|-----------|------------------------|-------------|
| | Notes | Show dhcp server IP ad | ldress |
| | | C3000> show cable hel | per-address |
| 1 | Fuerentee | helper-address | |
| | examples | 192.168.0.254 | cable-modem |
| | | 192.168.0.254 | host |

4.4.8 Check cable modem status

| Step Command Show cable modelin | Step | Command | show cable modem |
|---------------------------------|------|---------|------------------|
|---------------------------------|------|---------|------------------|

| | | [<ip_addre offline ver</ip_addre | ss> <mac_addr sion] [<value>]</value></mac_addr | ess> dowr | nstream u | ipstrea | am online |
|---|-------|---|---|--------------------|------------|---------|---------------------|
| | No | Show cable modem | status, default o | display all C | CM connec | cted to | CMTS |
| | ites | [<ip_address> <mac version]</mac </ip_address> | :_address> dow | vnstream u | upstream | online | e offline |
| | | <ip_address></ip_address> | Assign cable | modem or | host IP a | ddress | <a.b.c.d></a.b.c.d> |
| | | <mac_address></mac_address> | Assign cable <xx:xx:xx:xx:< td=""><td>modem or xx:xx></td><td>host MA</td><td>C addr</td><td>ess</td></xx:xx:xx:xx:<> | modem or xx:xx> | host MA | C addr | ess |
| | | d a constant a succession | Show assign | ed DS chan | nel cable | mode | m |
| | | downstream | [<value>]</value> | DS cha | nnel ID <1 | ~16> | |
| | | unstream | Assigned US | channel ca | ble mode | m | |
| | | upstream | [<value>]</value> | US cha | nnel ID <1 | ~4> | |
| | | online | Show online | cable mod | lem | | |
| | | offline | Show offline | e cable moc | lem | | |
| T | | | Show assign | ed version | cable mod | dem | |
| | | version | | V11 | Docsis | 1.1 | |
| | | Version | [<value>]</value> | V20 | Docsis 2.0 | | |
| | | | | V30 | Docsis | 3.0 | |
| | Exa | C3000#show cable n | nodem | | | | |
| | mples | MacAddress I CPEs BPI Enb | pAddress | Sid Ver | Status | Us | Ds |
| | | 00:13:71:dc:3d:9e 19 0 N/A | 92.168.18.207 1 | 2 v2.0 | Online | 3 | 4 |
| | | 00:13:71:e0:28:a4 19 0 N/A | 92.168.18.217 1 | l3 v2.0 | Online | 3 | 11 |
| | | 24:76:7d:06:8a:82 19 | 92.168.18.204 1 | L v2.0 | Online | 1 | 5 |

4.4.9 Check cable modem remote- query configuration

| Step | Command | show cable modem remote-query config | |
|------|----------|--|--|
| | Notes | Show cable modem remote- query configuration | |
| 1 | | C3000>show cable modem remote-query config | |
| 1 | Examples | remote-query interval(s): 300 | |
| | | SNMP community string: "public" | |

4.4.10 Check cable modem remote- query Status

| Step | Command | show cable modem [<ip_address> <mac_address> downstream upstream] [<channel>] remote-query</channel></mac_address></ip_address> |
|------|---------|---|
| 1 | Notes | Show cable modem remote- query Parameters |

| | [<ip_address> <ma< th=""><th>c_address> downstream up</th><th>ostream]</th></ma<></ip_address> | c_address> downstream up | ostream] | |
|----------|--|--|--------------------------|--|
| | <ip_address></ip_address> | Assign cable modem or host IP address | | |
| | <mac_address></mac_address> | Assign cable modem or host MAC address | | |
| | | Assigned DS channel cable | e modem | |
| | downstream | [<channel>]</channel> | DS channel ID, <1~16> | |
| | | Assigned US channel cable modem | | |
| | upstream | [<channel>]</channel> | US channel ID, <1~4> | |
| | C3000#show cable | modem remote-query | | |
| | MacAddress IpA | ddress Rx Us SNR Pwr Micr Ref | o Ds SNR Pwr Ref | |
| Examples | 00:13:71:dc:3d:9e 1 4 40.9 20 31 Or | .92.168.18.207 2.4 3 4(nline | 0.3 48.7 0 | |
| | 00:13:71:e0:28:a4 1 11 41 21.2 31 | .92.168.18.217 2.5 3 42 Online | 1.1 48.4 0 | |
| | 24:76:7d:06:8a:82 1 5 41.7 19.8 30 | .92.168.18.204 2.4 1 42 Online | 2.1 46.7 0 | |

4.4.11 Check CMTS System Time

| Step | Command | show clock | |
|------|----------|-----------------------|--------------------|
| | Notes | Show CMTS system time | |
| 1 | Examples | C3000>show clock | |
| | | system time: | 2013-9-11 12:48:39 |

4.4.12 Check CPE class Configuration

| Step | Command | show cpe-class | |
|------|----------|---|--|
| | Notes | Show user defined cpe-class, based on dhcp option 60 parameters | |
| 1 | | C3000#show cpe-class | |
| | Examples | cpe-class "stb-test" | |
| | | dhcp option 60 "stb-str" | |

4.4.13 Check DHCP Parameter

| Step | Command | show dhcp [relay option-82 giaddr-primary] | |
|------|---------|--|--|
| | | Show DHCPrelay agent and optiona parameters | |
| 1 N | Notos | relay | DHCP relay agent function status |
| | Notes | option-82 | DHCP relay agent insert option -82option status |

| | giaddr-primary | DHCP relay agent giaddr insert primary IP optionfunction status |
|----------|-------------------------------|--|
| Examples | C3000#show dhcp dhcp relay | |
| | no dhcp giaddr | primary |

4.4.14 Check CMTS GIGE IPAddress Parameters

| Step | Command | show interface gige | | |
|------------------------------|----------|---------------------------|-------------------|--|
| Notes Show GIGE IP Address I | | Parameters | | |
| | Examples | C3000#show interface gige | | |
| | | MacAddress: | 00:02:5e:00:01:dd | |
| 1 | | ip address | netmask | |
| | | 192.168.0.254 | 255.255.255.0 | |
| | | 192.168.2.1 | 255.255.255.0 | |
| | | cable-modem | | |

4.4.15 Check CMTS GIGE Statistics

| Step | Command | show interface gige statistics | | |
|------|----------|---------------------------------------|-----|-----------------|
| | Notes | Show GIGE interface status statistics | | |
| | Examples | C3000>show interface gige statistics | | |
| | | Gige link speed : 1000BaseT FDX | | X |
| 1 | | Tx pkts:5 | | TX bytes: 210 |
| | | Rx pkts:715 | | RX bytes: 85407 |
| | | Rx rate:0 | bps | |
| | | Tx rate:0 | bps | |

4.4.16 Check DS channel (qam) configuration

| Step | Command | show interface qam [<channel>]</channel> | | |
|------|----------|---|----------------------------|--|
| | | Show DS channel status, default display all DS channels | | |
| | Notes | [<channel>]</channel> | Appinted DS channel,<1~16> | |
| | | C3000>show interface qam | | |
| | | interface downstream 1 | | |
| | | Status: | DOCSIS | |
| 1 | | Frequency: | 387000000 | |
| | Examples | Modulation: | 64QAM | |
| | | Annex: | А | |
| | | Interleaver depth: | 1128-4 | |
| | | Power level(dBmV): | 45 | |
| | | Utilization(%): | 1 | |

| interface downstream 2 Status: DOCSIS Eragueneuu 20500000 | |
|---|--|
| Status: DOCSIS | |
| Fraguency 30500000 | |
| Frequency: 39500000 | |
| Modulation: 64QAM | |
| Annex: A | |
| Interleaver depth: I128-4 | |
| Power level(dBmV): 45 | |
| Utilization(%): 1 | |
| Index: 102 | |
| interface downstream 3 | |
| Status: DOCSIS | |
| Frequency: 40300000 | |
| Modulation: 64QAM | |
| Annex: A | |
| Interleaver depth: I128-4 | |
| Power level(dBmV): 45 | |
| Utilization(%): 1 | |
| Index: 103 | |
| interface downstream 4 | |
| Status: DOCSIS | |
| Frequency: 41100000 | |
| Modulation: 64QAM | |
| Annex: A | |
| Interleaver depth: I128-4 | |
| Power level(dBmV): 45 | |
| Utilization(%): 1 | |
| Index: 104 | |
| | |

4.4.17 Check US channel Configuration

| Step | Command | show interface upstream [<channel>]</channel> | | |
|------|----------|--|-----------------------------|--|
| | | Show US channel status, default disaplay all US channels | | |
| | Notes | [<channel>]</channel> | Appointed US channel, <1~4> | |
| | | C3000>show interface upstream | | |
| | | interface upstream 1 | | |
| 1 | | Status: | Enable | |
| | Examples | Frequency: | 3000000 | |
| | | Bandwidth: | 3200000 | |
| | | Power level(dB): | 0 | |
| | | Profile: | | |

| ATDMA-MediumNoiseQPSK | |
|-----------------------------------|--------------|
| Channel type: | ATDMA |
| Docsis 3.0 Enhanced me | ode: Disable |
| Minislot: | 4 |
| Timing offset: | 0 |
| Data-backoff: | 3 6 |
| Ranging-backoff: | 2 5 |
| Pre-equalization: | Enable |
| Utilization(%): | 0 |
| Index: | 201 |
| interface upstream 2 | |
| Status: | Enable |
| Frequency: | 33200000 |
| Bandwidth: | 3200000 |
| Power level(dB): | 0 |
| Profile: ATDMA-MediumNoiseQPSK | |
| Channel type: | ATDMA |
| Docsis 3.0 Enhanced m | ode: Disable |
| Minislot: | 4 |
| Timing offset: | 0 |
| Data-backoff: | 3 6 |
| Ranging-backoff: | 2 5 |
| Pre-equalization: | Enable |
| Utilization(%): | 0 |
| | |

4.4.18 Check VLAN

| Step | Command | show interface vlan [<vlan id="">]</vlan> | | |
|------|----------|--|-------------------------|--|
| | | Show VLAN status, default display all VLAN | | |
| | Notes | [<vlan id="">]</vlan> | Apponited VLAN <2-3700> | |
| | | C3000#show interface vlan | | |
| | | interface valn : 100 | | |
| 1 | Examples | vlan port : cable-modem | | |
| | | tag mode : gige | | |
| | | interface valn : 200 | | |
| | | vlan port : host | | |
| | | tag mode : both | | |

4.4.19 Check CMTS load balancing configuration

| Step | Command | show load-balance config | | |
|------|----------|---|--|--|
| | Notes | Show CMTS load balancing parameters | | |
| | | C3000#show load-balance config | | |
| | | Load-balance basic configuration: | | |
| | | Load Balancing Mode :DYNAMIC (Run Time Traffic | | |
| | | Stats) | | |
| | Examples | Collection/Analysis Period :60 | | |
| | | DCC init-tech for ATDMA :broadcast-ranging(init-tech 1) | | |
| 1 | | DCC init-tech for SCDMA :broadcast-ranging(init-tech 1) | | |
| | | DBC init-tech for ATDMA :broadcast-ranging(init-tech 1) | | |
| | | DBC init-tech for SCDMA :broadcast-ranging(init-tech 1) | | |
| | | Dynamic Mode Parameters | | |
| | | Channel Overload Trigger Threshold : >=60% of | | |
| | | channel capacity | | |
| | | Channel Load Difference Threshold : >=20% of | | |
| | | channel capacity | | |

4.4.20 Check CMTS load balancing status

| Step | Command | show load-balance docsis-group [<group_id>]</group_id> | |
|------|----------|--|--------------------------|
| | Notes | Show CMTS load balancing group status, default displaying all load balancing group | |
| | | [<group_id>]</group_id> | Balance group ID <1~255> |
| | Examples | C3000#show load-balance docsis-group | |
| 1 | | Load-Balance group not exist | |
| | | Load-Balance exclude mac-address: | |
| | | exclude mac-address: not exist | |
| | | exclude mac-address OUI: not exist | |
| | | exclude mac-address R | Range: not exist |

4.4.21 Check CMTS system log

| Step | Command | show logging | |
|------|----------|---|--|
| | Notes | Show CMTS running log | |
| | | C3000>show logging | |
| | | 2013-9-6 12:40:39 : system start | |
| | Examples | 2013-9-6 12:42:57 : system update firmware ok | |
| 1 | | 2013-9-6 12:44:12 : system start | |
| L | | 2013-9-9 9:43:55 : system start | |
| | | 2013-9-9 10:3:58 : 192.168.0.253 :webs login | |
| | | 2013-9-9 10:4:16 : 192.168.0.253 :webs login | |
| | | 2013-9-9 10:12:50 : 192.168.0.253 :webs login | |
| | | 2013-9-10 8:16:18 : system start | |

| | 2013-9-10 8:18:40 : system update firmware ok |
|--|---|
| | 2013-9-10 8:20:16 : system start |
| | 2013-9-10 10:31:48 : system start |
| | 2013-9-11 5:13:40 : system start |
| | 2013-12-31 18:6:36 : system start |
| | 2013-12-31 18:57:59 : system start |
| | 2013-12-31 19:3:18 : system start |
| | 2013-12-31 19:4:15 : 192.168.0.253 :webs login |
| | 2013-12-31 19:6:22 : 192.168.0.253 :webs login |
| | 2013-12-31 19:29:23 : 192.168.0.253 :webs login |
| | 2013-12-31 19:29:25 : 192.168.0.253 :webs login |
| | 2013-12-31 19:54:0 : system update firmware ok |
| | |

4.4.22 Check CMTS multicasting statistics and activity dialogue

| Step | Command | show multicast statistics | |
|------|----------|---|--|
| | Notes | Show CMTS multicasting dialogue statistics status | |
| | | C3000#show multicast statistics | |
| | | Multicast Info: | |
| | | IgmpGeneralMemQueries : 0 | |
| | | IgmpGrpSpecificQueries : 0 | |
| | | IgmpQueriesUsRxDropped : 0 | |
| | | lgmpV2MemRptsUsRxUsTx : 0 | |
| | | IgmpV2MemRptsUsRxDropped : 0 | |
| | | lgmpV2UPnPRptsUsRxDropped : 0 | |
| | | lgmpV2MemRptsDsRxDropped : 0 | |
| | | IgmpLeaveGrpUsRxUsTx : 0 | |
| | | IgmpLeaveGrpDsRxDropped : 0 | |
| 1 | Examples | lgmpV3MemRptsUsRxUsTx : 0 | |
| | Examples | IgmpV3MemRptsUsRxDropped : 0 | |
| | | lgmpV3MemRptsUsRxBadAsmGroup : 0 | |
| | | IgmpV3MemRptsUsRxBadSsmGroup:0 | |
| | | IgmpV3MemRptsDsRxDropped : 0 | |
| | | IgmpUsRxUnsupportedDropped : 0 | |
| | | IgmpDsRxUnsupportedDropped : 0 | |
| | | MldGeneralMemQueries : 0 | |
| | | MldGrpSpecificQueries : 0 | |
| | | MldQueriesUsRxDropped : 0 | |
| | | MldV1SolicitedNodeRptsUsRx : 0 | |
| | | MldV1MemRptsUsRxUsTx : 0 | |
| | | MldV1MemDoneUsRxUsTx : 0 | |

| | | MldV1MemRptsUsRxDrop | ped : O |
|---|----------|---------------------------------------|------------------------------------|
| | | MldV1MemRptsDsRxDrop | ped : 0 |
| | | MldV2MemRptsUsRxUsTx | : 0 |
| | | MldV2MemRptsUsRxDrop | ped : 0 |
| | | MldV2MemRptsUsRxBadA | smGroup : 0 |
| | | MldV2MemRptsUsRxBadS | smGroup : 0 |
| | | MldV2MemRptsDsRxDrop | ped : 0 |
| | | MldUsRxUnsupportedDro | oped : 0 |
| | | MldDsRxUnsupportedDrop | oped : 0 |
| | | NonMldUsForwarded | :0 |
| | | NonMldDsForwarded | : 0 |
| | | HmePackets | :0 |
| | Command | show multicast session-grou | p [<ip_address>]</ip_address> |
| | | Show CMTS activity multicas dialogues | ting dialogue, default display all |
| 2 | NOTES | [<ip_address>]</ip_address> | Appointed multicasting address |
| | Examples | C3000#show multicast session-group | |
| | | No multicast sessions are active | |

4.4.23 Check CMTS Network Mode

| Step | Command | show netmode | |
|------|----------|-------------------------------|--|
| | Notes | Show CMTS subnet network mode | |
| 1 | | C3000#show netmode | |
| | Examples | cable modem net mode bridge | |
| | | cpe net mode bridge | |

4.4.24 Check Strategy Route

| Step | Command | show policy-route | | |
|------|----------|--------------------------------|---------------|-------------|
| | Notes | Show CMTS strategy route table | | |
| 1 | | C3000#show policy | /-route | |
| | Examples | src ip address | netmask | gateway |
| | | 10.1.2.0 | 255.255.255.0 | 192.168.0.2 |

4.4.25 Check Static Route

| Step | Command | show visits-control | | |
|------|----------|------------------------------|---------|-------------|
| | Notes | Show CMTS static route table | | |
| 1 | | C3000#show static-route | | |
| | Examples | ip address | netmask | gateway |
| | | 0.0.0 | 0.0.0.0 | 192.168.0.1 |

4.4.26 Check CMTS subnet exchanging visiting control status

| Step | Command | show visits-control | |
|------|----------|---|--|
| | Notes | Show CMTS subnets exchange visisting control status | |
| 1 | F | C3000>show visits-control | |
| | Examples | no visits-control | |

4.4.27 Check Current Running Configuration Parameters

| Step | Command | show running-config | |
|------|----------|-----------------------------------|------------|
| | Notes | Show CMTS running configuration p | parameters |
| | | C3000#show running-config | |
| | | interface upstream channel: | |
| | | ups 1 | |
| | | Status: | Enable |
| | | Frequency: | 3000000 |
| | | Bandwidth: | 3200000 |
| | | Power level(dB): | 0 |
| | | Profile: ATDMA-MediumNoiseQPSK | |
| | | Channel type: | ATDMA |
| | | Docsis 3.0 Enhanced mode: | Disable |
| | | Minislot: | 4 |
| | | Timing offset: | 0 |
| | | Data-backoff: | 3 6 |
| 1 | | Ranging-backoff: | 2 5 |
| 1 | Examples | Pre-equalization: | Enable |
| | | ups 2 | |
| | | Status: | Enable |
| | | Frequency: | 33200000 |
| | | Bandwidth: | 3200000 |
| | | Power level(dB): | 0 |
| | | Profile: | |
| | | ATDMA-MediumNoiseQPSK | |
| | | Channel type: | ATDMA |
| | | Docsis 3.0 Enhanced mode: | Disable |
| | | Minislot: | 4 |
| | | Timing offset: | 0 |
| | | Data-backoff: | 36 |
| | | Ranging-backoff: | 25 |
| | | Pre-equalization: | Enable |
| | 1 | | |

| interface downs | troom channel: |
|-------------------|--------------------------------|
| interface downs | |
| qam 1 | DOCCIC |
| Status: | DOCSIS |
| Frequency: | 387000000 |
| Modulation: | 64QAM |
| Annex: | A |
| Interleaver d | lepth: I128-4 |
| Power level(| dBmV): 45 |
| qam 2 | |
| Status: | DOCSIS |
| Frequency: | 395000000 |
| Modulation: | 64QAM |
| Annex: | А |
| Interleaver d | lepth: I128-4 |
| Power level(| dBmV): 45 |
| | |
| qam 16 | |
| Status: | DOCSIS |
| Frequency: | 50700000 |
| Modulation: | 64QAM |
| Annex: | A |
| Interleaver d | lepth: I128-4 |
| Power level(| dBmV): 45 |
| cpe class: | |
| cpe class not ex | xist |
| interface vlan: | |
| interface vlan r | not exist |
| interface gige 0: | |
| MacAddress: | 00:02:5e:00:01:dd |
| ip address | netmask |
| 192.168.0.254 | 255.255.255.0 |
| static route: | |
| in address | netmask gateway |
| 0.0.0.0 | 0.0.0.0 192.168.0.1 |
| nolicy route | |
| nolicy route no | t exist |
| huilt-in-dhon-sa | rver: |
| IP Scone · | cable-modem |
| starting addres | 192 168 0 2 |
| and address : | 102 169 0 100 |
| enu auuress. | 132.100.0.100 DEE DEE DEE O |
| netmask : | 255.255.255.0 |
| gateway addres | 55. 192.168.0.1 |

| primary dns addre | ess : 0.0.0.0 |
|------------------------------------|---|
| secondary dns ad | dress : 0.0.0.0 |
| bootserver addres | ss : 192.168.0.254 |
| bootfile name : | cm.bin |
| log server address | . 0.0.0.0 |
| tod server addres | s: 0.0.0.0 |
| lease time : | 7200 |
| | |
| cable helper-addre | ss: |
| helper-address | |
| 192.168.0.254 | cable-modem |
| 192.168.0.254 | host |
| ip access list: | |
| no ip access contr | ol |
| load balance: | |
| Load-balance basi | c configuration: |
| Load Balancing | Mode :DYNAMIC (Run Time Traffic |
| Stats) | |
| Collection/Anal | ysis Period :60 |
| DCC init-tech fo | r ATDMA :broadcast-ranging(init-tech 1) |
| DCC init-tech fo | r SCDMA :broadcast-ranging(init-tech 1) |
| DBC init-tech fo | r ATDMA :broadcast-ranging(init-tech 1) |
| DBC init-tech fo | r SCDMA :broadcast-ranging(init-tech 1) |
| Dynamic Mode | Parameters |
| Channel Overlo channel capacity | ad Trigger Threshold : >=60% of |
| Channel Load D channel capacity | ifference Threshold : >=20% of |
| Load-Balance grou | ıp not exist |
| Load-Balance excl | ude mac-address: |
| exclude mac-ad | dress: not exist |
| exclude mac-ad | dress OUI: not exist |
| exclude mac-ad | dress Range: not exist |
| static ip address: | |
| static ip address n | ot exist |
| visits control: | |
| no visits-control | |
| ip snooping: | |
| ip snooping | |
| network mode: | |
| cable modem net | mode bridge |
| cpe net mode brid | lge |
| dhcp relay: | |

| | dhcp relay | |
|--|----------------------------|------------------|
| | dhcp giaddr primary: | |
| | no dhcp giaddr primary | |
| | dhcp insert option 82: | |
| | dhcp insert option 82 | |
| | l2-vpn-service: | |
| | cable I2-vpn-service dot1q | |
| | cable remote: | |
| | remote-query interval(s): | 300 |
| | SNMP community string: | "public" |
| | cable flap aging interval: | |
| | flap-list aging interval: | 60 |
| | NTP server: | |
| | NTP Server: 0.0.0.0 TimeNo | ze(Minutes): 480 |
| | log server: | |
| | syslog Server: 0.0.0.0 | |

4.4.28 Check the prohibition for accessing network CM MAC table

| Step | command | show cable modem disable-forwarding the prohibition for accessing network CM MAC table |
|------|---------|--|
| | notes | Display the current CMTS |
| 1 | example | C3000#show cable modem disable-forwarding 00.01.02.03.04.05 |

4.4.29 Check the SSH or WEB login timeout

| Step | command | show timeout |
|------|---------|---|
| | notes | Show the current CMTS SSH or WEB login timeout |
| 1 | | C3000#show timeout |
| 1 | example | Telnet and SSH timeout periods <minutes> :5</minutes> |
| | _ | Webs timeout periods <minutes> : 5</minutes> |

4.4.30 Check the current CM static multicast

| Step | command | C3000#show cable igmp-static-group |
|------|---------|--------------------------------------|
| | notes | Show the current CM static multicast |
| 1 | | C3000#show cable igmp-static-group |
| 1 | example | static-group address: |
| | | 239.1.1.1 |

4.4.31 Check the current CM ip-provision-mode

| Step | command | show cable ip-provision-mode |
|-----------|---------|---|
| | notes | Show the current CMTS CM access IPv4, IPv6 mode |
| 1 avampla | | C3000#show cable ip-provision-mode |
| | example | cable provisioning mode : IPv4 |

Chapter 5 Management CMTS by Embed Web

5.1 Summary

5.1.1 About Ember Web

The built-in Web server of Ascent C3000 CMTS series is the management for CMTS which is based on HTTP protocols. Users can manage & configure CMTS via Web log in. Main functions are as following:

- Checking running status
- Setting network interface parameters
- Setting RF interface parameters
- CM & CPE management
- CMTS management

5.1.2 Setting Common Operations

Application: Once finished configuration, click "Application", all your configurations will be effective and saved in CMTS memories.

Add: If need any add or revise for listed configuration, click "Add", then you can add a new listed configuration item.

Delete: Choose the appointed item from the listed configuration, click "DELETE" to delete that item.

Query: You may check suitable listed item by clicking QUERY via keywords setting.

Web user timeout handling: If there is no operation in Web setting page for a long time, the system will be timeout status, it will log off.

5.2 System Management

5.2.1 Running Status:

| stem Manage | RUNNING STATU | S | |
|---------------------------|------------------|---|--|
| etwork Interface | Basie Info | | |
| RF Interface CM Manage | Firmware Version | R v4.2.14.0904+C.v4.3.0.r2.3218.14.0904 | |
| Device Manage | Hardware Version | BCM93218.AP.v3.10 | |
| | Running Time | 2 Hours 25 Minutes | |
| | System Time | 2014-9-5 11:34:11 | |
| - 1 | WAN Status | | |
| | IP Address | 192.168.0.254 | |
| | Netmask | 255.255.255.0 | |
| C Quit | Gateway | 192.168.0.1 | |
| | MAC Address | 00.02.5e.00.01.a1 | |

Current Running Status

Software Version: Show CMTS current software version

Hardware Version: Show CMTS current hardware version

Running Time: Show total running time of the CMTS from the power on point last time

System Time: Show current CMTS system time

IP Address: Show WAN interface IP address

Subnet Mask: Show WAN interface subnet mask

Gateway Address: Show WAN interface gateway address

MAC Address: Show WAN interface MAC address

5.2.2 Change Password

It can prohibit unauthorized users logging in web setting page by changing passing word. The defaulted user name is admin, password is admin. User name can not be changed but the password could be.

Notice: The password support Max. 15 English letters, case-sensitive, please pay special attention on this point.

| Set Password | - | Unginal Password | Fower & Environment |
|---|---|------------------|---------------------|
| New Password RF Interface Confirm Password CM Manage Apply | | | Set Password |
| RF Interface Confirm Password CM Manage Apply Device Manage Apply | | New Password | twork Interface |
| CM Manage Apply Device Manage | | Confirm Password | Interface |
| Device Manage | | App | / Manage |
| | | | vice Manage |
| | | | |
| | | | |

5.3. Network Interface Settings

5.3.1 IP Address Setting

Set WAN Interface and IP subnet address and subnet mask, Max. 32 Interface IP addresses.

| ystem Manage | IP INTERF | ACE | | | |
|----------------------|---------------|---------------------|-----------|---|--|
| letwork Interface | • WAN | | | | |
| IP Address | IP | Address 192.168.0.2 | 254 | | |
| Static Route | 100 | | 5 A | - | |
| . Policy Route | | Netmask [255.255.25 | 5.0 | | |
| Embed DHCP Scope | | Apply | | | |
| 5. Network Parameter | . ID Subwat | | | I | |
| 5. CPE Class | • IF Sublet | | | | |
| Vian Setting | 192.168.0.254 | 255.255.255.0 | WAN | | |
| ACL Setting | IP Address | Netmask | Interface | | |
| Interface | | | | ~ | |
| 1 Manage | L | Add Delete | | | |
| | | | | | |

IP Address: Configure Interface IP address

Subnet Mask: Configure interface subnet mask

Subnet Interface: Including WAN, CM, CPE, MTA, Secondary and CPE-Class

5.3.2 Static Router Setting

After setting static router, the message which has been appointed to destination will transmit it as your appointed path, there could be Max.32 static routers.

| Vetwork Interface | . Static Poute | | | | |
|----------------------------------|----------------|------------|-------------|--|--|
| 1. IP Address 2. Static Route | 0.0.0.0 | 0.0.0.0 | 192.168.0.1 | | |
| 3. Policy Route | Destination IP | Netmask | Gateway | | |
| 4. Embed DHCP Scope | | | | | |
| S. Network Parameter | | Add Delete |] | | |
| 6. CPE Class | | | | | |
| 7. Vlan Setting | | | | | |
| 8. ACL Setting | | | | | |
| RF Interface | | | | | |
| M Manage | | | | | |

Destination Address: The destination network IP Address which the static route will arrive Subnet Mask: The destination network subnet mask which the static route will arrive The next jump address: The next route IP address needed before data arrived its destination address

5.3.3 Strategy Route Setting

Strategy Route is a mechanism of rote choice according to your own strategy. The strategy could limit data flow from special network to specified gateway. Appoint data flow source subnet via configuration for source IP address and subnet mask, it can configure max. 32 strategy routes.

| stem Manage | POLICY R | DUTER | | |
|-------------------|--------------|---------------|---------------|--|
| twork Interface | Policy Route | | | |
| IP Address | 172.16.0.0 | 255.255.255.0 | 192.168.0.252 | |
| Static Route | | | | |
| Policy Route | Source IP | Netmask | Gateway | |
| Embed DHCP Scope | | | | |
| Network Parameter | | Add Delete | | |
| CPE Class | | | | |
| Vlan Setting | | | | |
| ACL Setting | | | | |
| Interface | | | | |
| 1 Manage | | | | |
| vice Manage | | | | |

Source IP Address: The address of data packet source Subnet Mask: The mask of data packet source Gateway Address: The gateway address will be sent to by qualified data flow

5.3.4 Built-in DHCP Scope Setting

If using built-in DHCP server, you must configure the DHCP action scope. Assign IP address and other network parameters for both CM and CPE, max. 32 scopes.

| System Manage | BUILT-IN DHCP SCOPE | | <u>^</u> |
|--------------------------------------|------------------------------|-------------------------|----------|
| Network Interface | Configed DHCP Scope | | |
| 1. IP Address | CM Scope: | CPE Scope: | |
| 2 Static Route | Start IP:192.168.0.2 | Start IP:192.168.0.101 | |
| Policy Route | End IP:192.168.0.100 | End IP:192.168.0.252 | |
| Embed DUCD Come | Netmask:255.255.255.0 | Netmask:255.255.255.0 | |
| Embed DHCP Scope | Gateway:192.168.0.1 | Gateway:192.168.0.1 | |
| 5. Network Parameter | Primary DNS:0.0.0 | Primary DNS:192.168.0.1 | |
| 6. CPE Class | Secondary DNS:0.0.0 | Secondary DNS:0.0.0 | |
| 7 Vlan Setting | TFTP Server IP:192.168.0.254 | TFTP Server IP:0.0.0.0 | |
| Viun Setting | Boot File:cm.bin | Boot File: | |
| 8. ACL Setting | Log Server:0.0.0.0 | Log Server:0.0.0.0 | |
| RF Interface | Tod Server:0.0.0.0 | Tod Server:0.0.0.0 | |
| CM Manage | Lease Time:7200 | Lease Time:7200 | |
| Device Manage | Set Scope | | |
| E ouis | Interface | | ~ |

Starting Address: The starting address for domain address pool

End Address: The end address for action scope address pool, the end address should not be less than its starting address

Subnet Mask: The action scope subnet mask

Subnet Gateway: The subnet gateway address of action scope

Domain DNS: Set the domain DNS server address

Start Server: The action scope start server IP address

Start File Name: the action scope start server file name

Log Server: Action scope log server IP address

Time Server: Action scope TOD server IP address

Lease Time: The time duration for assigning IP address to DHCP user end

5.3.5 Network Parameters Setting

Configuration for other network control parameters

| System Manage | NETWORK PARAM | | |
|--------------------------|---|-------------------|--|
| Network Interface • No | twork Mode | | |
| L IP Address | CM Subnet | Layer 2 (bridge) | |
| 2. Static Route | CDE Subnet | Laver 2 (bridge) | |
| 3. Policy Route | CFE Sublet | [rayer z (nindle) | |
| 4. Embed DHCP Scope | | Apply | |
| 5. Network Parameter • D | HCP Server | | |
| 6. CPE Class | 02 168 0 254 | CM | |
| /. Vlan Setting | 92.168.0.254 | CPE | |
| 8. ACL Setting | | | |
| F Interface | Server IP address | Interface | |
| M Manage | | × | |
| | The second se | | |

Network Mode: Set the CMTS to transmit CM & CPE data packet through layer 2 bridging or layer 3 route

DHCP Server: Set DHCP server IP address for CMTS subnet access, Max. 32 DHCP servers

DHCP Safety Certificate: If started this option, those IP address host assigned by illegal DHCP server or manual binding IP host can not be accessed into network

DHCP Relay-agent: if choose this option, the CMTS will assign relay agent message to specified DHCP server

DHCP Giaddr Main Mode: If enabled, the CMTS will fill the DHCP message's Giaddr filed by WAN interface IP address. If disabled, the CMTS will distinguish the terminal type and then use matching subnet access IP address to fill the DHCP message's Giaddr field.

DHCP Option 82: If enabled, the CMTS will insert DHCP 82 parameters into DHCP message

L2VPN: If enabled, the CMTS will insert VLAN Tag into those data packet outflow from WAN interface according to L2VPN parameters from CM configuration files, it will stripping VLAN Tag for L3VPN data packet that entered into WAN interface.

5.3.6 CPE Class Setting

The CMTS support user defined CPE-Class subnet based on DHCP option 60 parameters; it can assign IP address, DHCP field and VLAN to appointed CPE-Class, Max. 32 CPE-Class.

| System Manage | CPE CLASS | 1 | | | |
|----------------------------------|------------|------------------|--------------|---|--|
| Network Interface | CPE Class | | | | |
| 1. IP Address 2. Static Route | STB | DHCP Option 60 g | tuboot |] | |
| 3. Policy Route | Class Name | Option | Option Value | | |
| 4. Embed DHCP Scope | | DHCP Option 60 🗸 | |] | |
| 5 Network Parameter | | Add Delete | | | |
| 6. CPE Class | | | | | |
| 7. Vlan Setting | | | | | |
| 8. ACL Setting | | | | | |
| RF Interface | | | | | |
| CM Manage | | | | | |
| evice Manage | | | | | |
| 2 Quit | | | | | |

Class Name: User defined CPE-Class name, it supports Max. 50 numbers or letters.

Option: DHCP Option 60

Option Value: DHCP option 60 parameters, it supports Max. 50 numbers or letters

5.3.7 VLAN Setting

VLAN (Virtual LAN), the CMTS can configure VLAN based on IP subnet and access, it supports Max. 255 VLAN, set the VLAN ID range as 1~65535. If L2VPN enabled, you need add corresponding VLAN.

| System Manage | VLAN | | | | |
|--|--------------------|-------------------|----------------------------------|------------|--|
| Network Interface | Interface VLAN | | | t. | |
| IP Address Static Route Policy Route | GIGE GIGE CM | 100 200 200 | outbound outbound outbound | | |
| Embed DHCP Scope Network Parameter | Interface | Vlan ID | Tag | | |
| 6. CPE Class 7. Vlan Setting | - | Add Delete | | | |
| ACL Setting | IP VLAN | | | | |
| Interface | 172.16.0.0 | 255.255.255.0 | 200 | outbound | |
| 4 Manage evice Manage | IP Address | Netmask | Vlan ID | Tag | |
| | | | | outbound V | |

Access: The access includes CM (Cable Modem subnet), CPE (Cable Modem downlink to host subnet), MTA (VOIP subnet) and CPE-Class

VLAN ID: Range (1~65535)

Tag: Outbound stands for inserting Tag into those data packet from CMTS WAN interface, inbound stands for inserting Tag into data packet transmitted to DS (HFC).Both means insert Tag to both IN and OUT data packet of CMTS.

IP Address: Corresponding network IP address based on IP subnet VLAN's

Subnet Mask: Network mask based on IP subnet VLAN
5.3.8 ACL Setting

ACL (Access Control List), CMTS supports ACL control, Max. 100 ACL rules, it can assign the same rule to different access.

| System Manage | | ACCESS | CONTROL L | .IST | | | | | | |
|----------------------|-------|-------------|-------------|----------|----------------------------------|-------------|---------------------|-----------------------|-----------------|-----------|
| Network Interface | · ACL | Control | | | | | | | | |
| 1_IP Address | | | Status | Disable | ~ | | | | | |
| 2. Static Route | | | | | | 8 | | | | |
| 3. Policy Route | | | P | pply | | | | | | |
| 4. Embed DHCP Scope | • ACL | Config | | | | | | | | |
| 5. Network Parameter | NO | . ID Priori | ty Apply Ty | e Protoc | ol Source IP/Mas | k Source Po | ort Destination IP/ | Mask Dest Port | Apply Inte | rface Edi |
| 6. CPE Class | 1 | 1 100 | PERMIT | ICMP | 192.168.0.1/32 | 1-65535 | 0.0.0/0 | 1-65535 | GIGE | 2 |
| 7. Vlan Setting | | | | | | | The 1 page/total | 1 pages, total 1 reco | ords every page | 10 rows |
| 8. ACL Setting | Se | lect All | | A | dd Delete | | | | | |
| RF Interface | - | | | Kinaa | Contract Contraction Contraction | | | | | |
| CM Manage | | | | | | | | | | |
| | | | | | | | | | | |

ACL Control: If enabled, the CMTS will filter passing data packet by ACL rules.

Select All: Set all ACL rules as SELECTED or NOT SELECTED status.

ADD: Add a new ACL rule

Delete: Delete selected ACL rule

User can edit ACL rule parameter by double click any rule or edit icon. If click ADD, fill in ACL rule parameters and then click to finish.

Rule ID: RULE ID (1~255)

Priority Level: The priority level is 0~255. 255 is the highest priority.

Application Type: ALLOW & Forbidden means after rules matched, whether allow the data packet pass. VLAN rules means adding Tag to data packet after rules matched. Strategy rules means the strategy routing for data packet after rules matched.

Protocol: the network protocols type of data packet

Source IP/Mask: Control PC in local area network by source subnet, if only control 1 PC host, set the subnet mask as 255.255.255.255

Source Port Range: The range for source port range. It will be only activated after setting protocols as TCP/UDP. If user wants to match all source port, set it as: 1~65535. The starting port number should not be bigger than ending port number. If need configuration for only 1 port, set both the starting port and the ending port as the same.

Destination IP/Mask: Input destination subnet which would be controlled

Destination Port Range: Input destination port range which would be controlled

Application Interface: The source access for data packet, control data packet from some access by this configuration item

5.4 RF Interface Setting

5.4.1 US Channel Setting

Set US Channel RF Parameters:

| Disable 0 Disable 0 Disable 0 |
|-------------------------------------|
| Disable 0 Disable 0 |
| Disable 0 |
| Disable 0 |
| Disable U |
| |
| |
| |
| |

Status: ON/OFF US channel

Center Frequency: US channel center frequency ($5000 \sim 65000$ KHz), it will increase as the channel bandwidth increased

Channel Type: The US channel types are ATDMA or SCDMA

Channel Bandwidth: The US channel bandwidth is 6.4 MHz/3.2MHz/1.6MHz

Modulation Mode: US channel modulation mode

Power: US channel receiving power $(-13 \sim 23 dBmV)$.

C3000.0 Enhanced Mode: If enabled, only DOCSIS 3.0 CM can be connected to CMTS

5.4.2 DS Channel Setting

Set DS Channel (QAM) RF Interface Parameter:

| n Manage | | DS CHANN | IEL STATUS | | | | | |
|-----------------|----|----------|----------------|----------|------------|------------|-------------|----------------|
| ork Interface | ID | Status | Frequency(Khz) | Annex | Modulation | Interleave | Power(dBmV) | Utilization(%) |
| erface | 1 | DOCSIS V | 387000 | AnnexA 🗸 | 64QAM 🗸 | 1128-4 🗸 | 45 | 1 |
| ostream | 2 | DOCSIS | 395000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| ownstream | 3 | DOCSIS | 403000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| ectrum Analysis | 4 | DOCSIS | 411000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| anage | 5 | DOCSIS | 419000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| Manage | 6 | DOCSIS | 427000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| | 7 | DOCSIS | 435000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| | 8 | DOCSIS | 443000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| | 9 | DOCSIS | 451000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| | 10 | DOCSIS | 459000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| | 11 | DOCSIS | 467000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| | 12 | DOCSIS | 475000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| | 13 | DOCSIS | 483000 | AnnexA | 64QAM | I128-4 | 45 | 1 |
| | 14 | DOCSIS | 491000 | AnnexA | 64QAM | I128-4 | 45 | 1 |

Status: Set the DS channel as DOCSIS channel/IPQAM channel or fobidden

Center Frequency: The DS channel output center frequency ($88000 \sim 100000$ KHz), it will add as 8MHz or 6 MHz according to DOCSIS, the DS channel frequency range should not be higher than 192 MHz

DOCSIS Standard: The DS channel DOCSIS standard is DOCSIS or EURO DOCSIS

Modulation Mode: The DS channel modulation mode is 64QAM/256/QAM/1024QAM

Interleave Depth: PLS ignore this option if EURO DOCSIS

Power: DS channel output power $(20 \sim 60 \text{dBmV})$

5.4.3 Spectral Analysis

Get real-time US Channel Spectral:



5.5 CM Management

5.5.1 CM Flap List

Show all Cable Flap-List statistics, users can check Cable Flap-List according to MAC address of CM.

| etwork Interface E Interface | Filter: Mac Address | ~ | KeyWor | d: | | | | Query |
|--|---------------------|-----|--------|------|-----|-------|------|-------------------|
| Manage | MAC | Ins | Hit | Miss | CRC | P-Adj | Flap | Time |
| CM Flap List | 00:1f:a4:93:85:28 | 0 | 2602 | 1 | 0 | 0 | 1 | 2014-9-5 10:28:19 |
| 3. CM Permit Setting | | | | | | | | |
| 3 CM Permit Setting 4 CM Rate Setting evice Manage | | | | | | | | |

5.5.2 CM & CPE Status

Show all CM and Host status connected to CMTS, you may check CM from US/DS channel even Cable modem.

| Network Interface PE Interface | Current Status: | | | Total CM:1 | Total CM:1 Online CM:1 Total CPE:1 | | | | | | | | | | |
|--|-----------------|----------------|------------|--|------------------------------------|--------|---------------|---------|------------------|---------|---------------|---------|---------|---------|------|
| CM Manage | | | | US Any 🗸 | DS Any 🗸 | | CM Status Any | | | | Que | ry | _ | | |
| L CM Flap List | | | | | | | | | Channel | Powe | r(dBmV) | SNR | (dB) | Rate(| Kbps |
| 2. CM & CPE Status | No. | CPE | SID | MAC | | | Version | US | DS | US | DS | US | DS | US | DS |
| 3. CM Permit Setting 4. CM Rate Setting | 1 | -(1) bc:ee: | 1 7b:4d | 00:1f:a4:93:85:28 l:c0:9d - 192.168.0.1 | 192.168.0.2 01 | Online | v3.0 | 1,2,3,4 | 1,2,3,4,5,6,7,8 | 32.2 | 12.8 | 42.7 | 49.9 | 0 | 0 |
| Device Manage | | | | | 1 | | | | The 1 page/total | 1 pages | , total 1 red | ords ev | very pa | ge 20 r | JWS |
| | | | | | Del | ete CM | Restart | CM | Restart All CM | | | | | | |

Delete CM: Delete chosen Cable Modem Reboot CM: Reboot chosen Cable Modem Reboot all CM: Reboot all CM connected to CMTS

5.6 CMTS Management

5.6.1 Configuration Management

Back-up: Save the CMTS current configuration to PC so that you may restore settings by those files (named as.cfg). Do not edit any back-up configuration files or else, it can not be restored from this equipment again.

Restore system configuration from files: Choose a back-up file (*.cfg) then you may set restore.

| System Manage | CONFIG MANAGE | ^ |
|---|---|---|
| Network Interface RF Interface | Backup System Setting Click Backup button, system config file may saved to your computer. | |
| CM Manage Device Manage | Васкир | |
| 1. Config Manage | Restore System Setting | |
| 2. Firmware Upgrade | Click restore button, system setting may be restore from config file. 浏览 | |
| | Restore | |
| | Copy Startconfig | |
| | Copy current running config to system start configuration. Copy | |
| E Quit | Reboot CMTS | |
| http://192.168.0.254/set_upg | Click reboot button may restart CMTS. prade_en.asp Reboot | ~ |

Save Configuration: Save CMTS current running configuration to system booting configuration

Reboot: The configuration will not be lost after rebooting, the network transmission will be break off while rebooting

5.6.2 Software Upgrading

Choose an upgrading file; you may upgrade the current running software on that CMTS in order to get more functions and more stable performance. PLS back-up current configuration files before upgrading. PLS do not power off while upgrading.

| Network Interface | Pinner Hand | |
|---------------------|---|--|
| RF Interface | - Finnware Opgrade | |
| CM Manage | opgrade CM 15 Puttiware. | |
| Device Manage | 489,00 | |
| L Config Manage | Caution: Do not power off within upgrading. | |
| 2. Firmware Upgrade | Upgrade | |
| | - Upload File | |
| | Uplead file to CMTS. | |
| | 浏览 | |
| Quit | Caution: Disk space limited, please upload CMTS required files. Do not power off within uploading | |
| | Lipland | |

Upload File: Choose any file and it could be uploaded to CMTS, PLS pay attention that the disk space is limited, if it is not necessary for CMTS, do not upload. Do not power off while uploading or else, there will be data loss.

Chapter 6 NMS System

6.1 Overview

C3000 CMTS NMS network management software is used for the configuration, monitoring, maintenance and safety management of CMTS, CM and CPE and other equipment in the network. It manages CMTS based on OAM protocol and manages CM and CPE based on the SNMP protocol, and runs on the Windows operating system. It can be installed in the server room, and also can realize remote management. The operating status and transmission quality of the CMTS equipment can be viewed through the network management software in a real-time manner. The NMS offers separate management interface for each CMTS.

The main functions of network management software include: CMTS management, CM management, network configuration, RF management, traffic statistical chart, spectrum analysis, operation log, etc., each of which will be described in details.

6.2 Features

- English/Chinese Interface
- Concentration and regional management
- It supports the CMTS offline configuration.
- Real-time display operation and running state
- Adequate CM management
- Efficient network configuration
- Controllable RF management
- Network traffic and online CM statistics
- Complete operating log and screening
- Normative equipment management
- Monitoring of CPU and memory utilization rate
- Optional interface appearance style

6.3 Functions

6.3.1 CMTS Management

Functions of CMTS management are:

- Distributed Management for CMTS
- ADD CMTS
- DELETE CMTS
- CHECK CMTS
- CMTS software upgrading
- CMTS running status display.

| | | | | | 1>192.1 | 68.18.200- | QTC - NMS | | | | | | - | |
|---------------|-------------------|------------------|-----------------------------|------------------|------------|-------------|------------------|-----------|------------------|--------------|--------|-----------|-----|---|
| Nms View He | alo | | | | | | | | | | | | | |
| MTS Manage | # X | 1>192.168.1 | 8.200-Q | IC | | | | | | | | | | |
| | Find | CM Manane | Network | k Manane RE I | Manage Ca | rtogram S | nertrum Analys | is Onera | mon Loo | | | | | - |
| 🗿 🚺 👔 👔 | on | Status | | MAC Add | ress | IP Ad | tress | Pers | US Ch | DS Ch | US P | User Name | ådd | |
| 🛓 🏤 沙坪坝🛙 | ×. | CITS:1>192. | 168, 18, 2 | 200 | | | | | | | | | | |
| | 2.168.18.200-OTC | Status | | MaC Adda | ress | IP Add | ress | Pers | US Ch | DS Ch | US P | User Bane | àdd | |
| — ♦ 2>19 | 2.168.0.254-QTC | SEESE Onlin | 1e | 00:13:71 | 1:e0:f5:2a | 192.16 | .0.2 | Allow | 1 | 1 | 42.4 | | | |
| ॑ 🔩 九龙城团 | ž. | BEERS Onlin | ne | 00:14:c8 | B:9f:a0:84 | 192.16 | . 0. 3 | Allow | 2 | 2 | 42.4 | | | |
| § 3>10 | .0.0.200-QTC | SEE Onlin | ne | 00:24:dl | 1:40:17:00 | 192.16 | .0.4 | Allow | 4 | 3 | 37.7 | | | |
| | . 0. 0. 201-QTC | Colir Onlir | ne | 68:b6:f | c:57:f5:b0 | 192,16 | i0.5 | Allow | 1, 2, 3, 4 | 4, 5, 6, 7 | 41,8 | | | |
| 🖥 🔧 北碚区 | | | | | | | | | | | | | | |
| ↓ \$>10 | . 0. 1. 200-QTC | | | | | | | | | | | | | |
| 6>12 | 7.0.0.1-OTC | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | Refresh | | | | | | | | | | | | | |
| | Region Settin | g | | | | | | | | | | | | |
| | Add CHTS | | | | | | | | | | | | | |
| | Rdia CHTC | | | | | | | | | | | | | |
| | Eurit Onito | | | | | | | | | | | | | |
| | Del Chis | | | | | | | | | | | | | |
| | Save Config | | | | | | | | | | | | | |
| | Firstore Ungr | ade | | | | | | | | | | | | |
| | Class RealTin | o Indoto | | | | | | | | | | | | |
| | CIOSE REALLIN | eupuare | | | | | | | | | | | | |
| | ✓ Connect | I | | | | | 0 | × Outp | ut | | | | | |
| | Disconnect | | 0.65.251 | | | | | Conn | ected to CMT | S 192.168.18 | 3.200. | | | |
| | Restart CMTS | | 0.15.20] | 15 Parameters | | M Shahur | | Get C | M Count 4. | | | | | |
| | · | Channel: | 1 | Channel: | 1 M | ODEL : | | Get C | :M list successf | tul. | | | | |
| evice Status | | Frequency (MHz): | 387.0 | Frequency (MHz): | 30.0 | nline Time: | 54 Hours 50 Minu | kes Get C | M Count 4. | | | | | |
| PU Usage: | 7% | Bandwidth (MH2): | 8.0 | Bandwidth (MHz): | 3.2 | PE[0] | _ | Get C | .M permit succ | esstul. | | | | |
| lemory Usage: | 93% | SNR (dB): | 43.3 | SNR (dB): | 33.6 | | | - | | | | | | |
| un Time | 0 Hours 0 Minutes | Power (dBmV): | 4.3 | Power (dBmV): | 42.4 | | | | | | | | | |
| with thirty. | o moure o minutes | Modulation: | 64QAM | Modulation: | QP5K | | | 14 4 | N Real 1 | line Nessa | te . | | | |
| | | | | | | | | | | | | | | |

CMTS management window completes the CMTS management, and CMTS is displayed in the window with tree area. The user can fill in the relevant information to find the CMTS, each item indicates single CMTS. Click the right mouse button at the view window, then the CMTS menu will pop up, and choose the corresponding management functions by the menu. Operations are as following:

1) Renew

All the "renew" operations in the software display the contents of the database synchronously.

2) Regional settings

The administrator can add, edit and delete areas according to the distribution of CMTS, and include the CMTS into related areas for facilitate management.

Note: when the CMTS list is NULL, a region can be created first before adding the CMTS. When adding a CMTS, the CMTS must correspond to a certain area.

3) Add CMTS

In the dialog box of adding the CMTS, select the CMTS area and fill out the CMTS name, IP address and MAC address. SNMP Read/Write indicates the CM read / write group name accessed by CMTS(we don't use any, users can fill it at random), "real-time update" indicates real-time update status of the CMTS, and the selection of "automatic start" indicates the starting of CMTS real-time update when starting the network management software, vice versa.

Note: the items with "*" are mandatory.

3) Save Configurations

Save the current CMTS configurations as booting configurations.

4) Software Upgrading

Update CMTS software by remote login via NMS

| Add CETS: | | | | | | | | |
|-----------------------------------|----------------------|--|--|--|--|--|--|--|
| *Region | ShaPinBa 🗸 | | | | | | | |
| *CMTS Name | | | | | | | | |
| *CMTS IP: | 192 . 168 . 18 . 201 | | | | | | | |
| CMTS MAC: | | | | | | | | |
| *SNMP Read | : ***** | | | | | | | |
| *SNMP Write: | ****** | | | | | | | |
| Auto Turn On CMTS RealTime Update | | | | | | | | |
| CMTS RealTime Update Status: OFF | | | | | | | | |
| OK Cancel | | | | | | | | |

5) Close real-time update

According to CMTS "real-time update" status display, if the current CMTS's real-time update status is open, it will show "closed real-time update", or else it will be displayed as "start display real-time update". If it has been started, CMTS status changing info will be sent to NMS automatically.

6) Connections

Connect to the selected CMTS. If " $\sqrt{}$ " is displayed on the left of the menu, it indicates that CMTS is "connected", otherwise is in the "disconnect" state.

7) Running status

Display the current CPU and memory utilization rate of the CMTS, as well as the running time of CMTS.

6.3.2 CM Management

Functions can be realized by CM management are:

- Real-time acquisition of CM status
- CM permission control
- CM operation and maintenance
- Browsing, query and ranking of CM information

User can manage from the pop menu by right click, operations are as following:

Acquisition of CM list: update the CM list of CMTS.

Acquisition of CM status: update all CM status information in the CM list, and get the single CM status information by double clicking a certain CM.

Acquisition of CM permission: update the access permission of CM

| | | | | 1>192.1 | 68.18.200- | QTC - NMS | | | | | | | | _ = X |
|-----------------------------|--------------------|-----------|---------------------|------------|------------|----------------|----------|----------------|--------|-------------|---------|--------------|------------|------------|
| Nms View Help | | | | | | | | | | | | | | |
| CMTS Manage # × | 1>192.168.1 | 8.200-QT | C | | | | | | | | | | | |
| Find | CM Manage | Network | Manage RE | Manage Ca | rtogram | nectrum Anak | vsis On | eration Log | | | | | | |
| B 📲 All Region | Status | , noch on | bha DAM | ress | TP Ad | tress | Perm. | IIS C | | DS Ch | IIS P | Hser Name | Add | |
| ■ 🍕 沙坪坝区 | CHTS:1>192. | 168.18.2 | 00 | 1000 | | | 1 02 40 | | | 20 01011 | | obor nako | indu | |
| 🚽 🔮 1>192. 168. 18. 200-QTC | Status | | MAC Add | ress | IP Add | iress | Pern. | US Ch | | DS Ch | US P | User Name | Add | |
| - 🔶 2>192.168.0.254-QTC | RNG-C |)K | 00:13:7 | l:e0:f5:2a | 0.0.0. | 0 | Allow | 2 | | 2 | 0.0 | | | |
| □ 🍄 九龙坡区 | CHICKEN Offli | ne | 00:14:e | 3:9f:a0:84 | 192.16 | 5.0.3 | Allow | 2 | | 1 | -3155.0 | | | |
| - \$ 3>10.0.0.200-QTC | Conlin | ne | 00:24:d | l:4c:f7:c0 | 192.16 | 5. 0. 4 | Allow | 4 | | 3 | 62.2 | | | |
| 4>10. 0. 0. 201-QTC | Onlir | ne | 68:b6:f | ::57:f5:b0 | 192.16 | .0.5 | Allow | 1, 2, 3 | ,4 | 4, 5, 6, 7 | 40.0 | | | |
| □ 🍄 北碚区 | | | | | | | | | | | | | | |
| - • 5>10. 0. 1. 200-QTC | | | | | 10.00 | 10 HI | - | | | | | | | |
| • 6>127.0.0.1-QIC | | | | | Re | fresh | | | | | | | | |
| | | | | | Ge | t CM list | | | | | | | | |
| | | | | | Ge | t CM status | 5 | | | | | | | |
| | | | | | Ge | t CM permit | t I | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | Ma | intenance (| JM Y | Add CM | | | | | | |
| | | | | | Ac | cess Permit | • | Edit CM | | | | | | |
| | | | | | Re | start CM | | DEL CM | | | | | | |
| | | | | | | | | Find CM | | | | | | |
| | | | | | | | | | _ | | | | | |
| | | | | | | | | | | | | | | |
| | < | | | | | | | | | | | | | > |
| | Cm Parameter | | | | | | a x O | utput | | | | | | д) |
| | | (m. 10) | | | | | | onnected to | OMES | 192 168 19 | 200 | | | |
| | DS Parameters | c:r/:cUj | US Paramaters | - | M Shahar | | G | et CM Count | 4. | 172.100.10 | .200. | | | |
| < | Channel: | 3 | Channel: | 4 M | ODFL : | 1 | Ğ | et CM list suc | cessfi | d. | | | | |
| Device Status | Erection of (Mila) | 403.0 | Execution of (Mila) | 39.6 | oleo Tino | 89 Hours 16 Mi | inutes G | et CM Count | 4. | | | | | |
| CPULIsage: 4% | Frequency (MHz). | 0.0 | rrequency (Mnz). | | nine nine; | | G | et CM permit | SUCCE | essful. | | | | |
| or o coogo. | Bandwidth (MHz): | 8.0 | Bandwidth (MHz): | 3.2 | PE[0] | | a | M: 00:13:71 | :e0:f5 | :2a 0.0.0.0 | RNG-OK | | | |
| Memory Usage: 89% | SNR (dB): | 40.4 | SNR (dB): | 37.8 | | | | | | | | | | |
| Bun Time: 0 Hours 0 Minutes | Power (dBmV): | 11.4 | Power (dBmV): | 62.2 | | | | | | | | | | |
| | Modulation: | 64QAM | Modulation: | QPSK | | | K | I FH Re | al Ti | ine Lessag | re | | | |
| | | | | | | | | To | tal CM | 1:4 Online | CM: 2 E | xpired CM: 2 | Real Updat | te: ON |

Notice: Once the CMTS disconnected, user cannot get CM list, CM status and CM authority, all those functions are forbidden.

| Add C∎ | | | |
|----------|-------------|-----------------------|--------|
| | | | |
| *CMTS I | Name: | CMTS:1>192.168.18.200 | ~ |
| *Mac Ac | ldress: | 90:E6:BA:02:CD:B3 | |
| User Na | me: | | |
| User Ad | dr: | | |
| User Ph | one: | | |
| *Access | Permission: | Allow | ~ |
| Reg Tim | e: | 2013年 1月 1日 | ~ |
| Lost Tim | e: | 2013年12月31日 | * |
| | | ОК | Cancel |

Maintenance of CM: Add/Editing / Removal of CM.

Note: the items with "*" are mandatory.

Search of CM: Search CM through the MAC address, IP address, user name, address and telephone number, and the found CM will be highlighted.

CM access permission: "Allow" and "forbid" CM access.

Reboot of CM: Reboot the CM

CM sequencing: Click the title of CM list to sequence the CM list by "CM status", "MAC address", "IP address", "access permission", "upstream channel", "downstream channel" and "return path power".

CM parameters: When using the mouse to double-click the single CM, acquire the CM status, display the upper and lower parameters of CM in the CM parameter dialogue box, CM model, online time and CPE of the corresponding CM.

Indicate the total number of CMs, number of online CMs, number of expired CMs and CMTS real-time update status.

6.3.3 Network parameter

Main Features:

- Real-time access to network configuration
- Real-time setting of network configuration (application of network configuration)
- Off-line configuration: in advance is not connected state editing network configuration,

and then connect the CMTS through the "application of network configuration" to load the configuration



Right click the popped menu of the window to manage, and the specific operation includes:

- Acquisition of network configuration
- Acquire the all the network parameters of the CMTS in a real-time manner.
- Application network configuration
- Set all the network parameters of the CMTS as the content shown in the window.

Note: when the CMTS is not connected, "acquisition of network configuration" and "application of network configuration" will be disabled.

1) IP parameters

Add, edit and delete the IP address of the corresponding "interface" of the CMTS.

| Add IP Address S | ietup 🛛 |
|------------------|-----------------------|
| *CMTS Name: | CMT5:1>192.168.18.200 |
| *Interface: | WAN |
| *IP Address: | 192 . 168 . 18 . 200 |
| *NetMask: | 255 . 255 . 255 . 0 |
| | OK Cancel |

2) Static routing parameters

Add and delete the CMTS static routing list.

| Add Static Route | | | | | | | X |
|------------------|--------|-----|--------|------|-----|----|------|
| *CMTS Name: | CMTS:1 | >19 | 92.168 | .18. | 200 | | ~ |
| *IP Address: | 0 | | 0 | • | 0 | | 0 |
| *NetMask: | 0 | | 0 | | 0 | | 0 |
| *Gateway: | 192 | | 168 | | 18 | | 1 |
| | | | OK | | | Ca | ncel |

3) Built-in DHCP server parameters

Add, edit and delete the scope of built-in DHCP server of CMTS

Note: the items with "*" are mandatory.

| Add IP Scope | | | | | | | | × |
|--------------------|--------|-----|--------|-----|------|----|-------|---|
| *CMTC None | | | | | | | | 1 |
| *Interface: | CMTS:1 | >19 | 92.168 | .18 | .200 | | ~ | |
| *Cheve TD Adducery | СМ | | | | | | * | |
| Duart IP Address; | 172 | • | 16 | • | 0 | • | 2 | |
| *End IP Address: | 172 | • | 16 | • | 0 | • | 200 | |
| *NetMask: | 255 | • | 255 | • | 255 | • | 0 | |
| *Gateway: | 172 | • | 16 | • | 0 | • | 1 | |
| DNS1: | 211 | • | 162 | • | 208 | • | 2 | |
| DNS2: | 0 | • | 0 | • | 0 | • | 0 | |
| TFTP Server: | 172 | • | 16 | • | 0 | • | 1 | |
| *Lost Time: | 86400 | | | | | | | |
| BootFile: | cm.cfg | | | | | | | |
| | | | OK | | | Ca | ancel |] |

4) DHCP server parameters

Add, edit and delete the DHCP server of the CMTS, including configurations for CM server, HOST server, MTA server.

| Add DHCP Server | | | | | |
|-----------------|-------------------------|--|--|--|--|
| *CMTS Name: | CMTS:1>192.168.18.200 💌 | | | | |
| Interface: | Cm 💌 | | | | |
| lp address: | 172 . 168 . 0 . 1 | | | | |
| | OK Cancel | | | | |

5) Network mode

Add and edit CM, CPE network model (2-level switching or 3-level routing), DHCP security cortication of CMTS which is opened or not

| Set network mode | |
|---------------------|------------------|
| *CMTS Name: CMTS:1: | 192.168.18.200 💌 |
| Cm 3 layer mode | |
| Cpe 3 layer mode | |
| DHCP Safe | |
| OK | Cancel |

6.3.4 RF Parameters

Main Features:

- Edit the upstream/downstream channel configuration;
- Acquire the upstream/downstream channel configuration;
- Set the upstream/downstream channel configuration;
- Off-line configuration

When the CMTS is not connected, the upstream/downstream channel configuration can be edited in advance, before connecting the CMTS device and load the configuration through the "application upstream/downstream channel configuration".

Operations are as follows:

Right click the popped menu of the window to manage, and the specific operation includes:

1) Acquire the downstream channel configuration

Acquire the real time downstream channel configuration of the CMTS

2) Application of downstream channel configuration

Set the real time downstream channel configuration of the CMTS

| | | | 1>192.16 | 8.18.200-QTC - NMS | | | | _ = X |
|------------------------------|--------------------------|-----------------|----------------|-----------------------------|--------------------------|-----------------|----------------|-------------------|
| Nms View Help | | | | | | | | |
| CMTS Manage 0 × | 1>192.168.18.200-QTC | : | | | | | | |
| Find | CM Manage Network M | anage REM | tanage Cart | noram Spectrum Analysis | Operation Log | | | |
| B All Region | Contrialiage (Network In | a lago ini in | idi idge (care | ogram (speca am Anaryas (| operation Log | | | ~ |
| - • 0>A11 CNTS | CHTS:1>192.168.18.20 | 0 | | | | | | |
| 😑 🔧 ShaPinBa | Ds Channel Paramet | | | | | | | - |
| -\$ 1>192.168.18.200-QTC | Channel Number | Status | Frequency | (HHz) Modulation | Annex | Interleaver | Power(dBm | (V) |
| - • 2>192.168.18.230-QTC | 2 | ON | 440.0 | 640AN | A | 112 17 | 45.0 | Refresh |
| B 13 JiuLongPo | 3 | ON | 456.0 | 640.4 | A | 112 17 | 45.0 | |
| - 9 3>10. 0. 0. 200-QTC | 4 | ON | 464.0 | 64QAM | Ä | I12_17 | 45.0 | Edit DS Channel |
| 4>10. 0. 0. 201-QIC | 5 | ON | 472.0 | 64QAM | A | I12_17 | 45.0 | Get downstreams |
| B 15 BaiBei | 6 | ON | 480.0 | 64QAM | A | 112_17 | 45.0 | Set downstreams |
| - \$5710.0.1.200-QIC | 7 | ON | 488.0 | 64QAM | A | 112_17 | 45.0 | |
| - • 6>10. 0. 1. 201-QIC | 8 | ON | 496.0 | 6404W | A . | 112_17 | 45.0 | Edit US Channel |
| | 10 | ON | 512.0 | 64041 | A | 112 17 | 45.0 | Get upstreams |
| | 11 | ON | 520.0 | 64QAM | A | I12_17 | 45.0 | Set upstreams |
| | 12 | ON | 528.0 | 64QAM | A | 112_17 | 45.0 | ALLA THE Day ALLA |
| | 13 | ON | 536.0 | 64QAM | A | I12_17 | 45.0 | sait US Profile |
| | 14 | ON | 544.0 | 64QAM | A | 112_17 | 45.0 | |
| | 10 | ON | 552.0 | B4QAR CLOAN | A | 112_17 | 45.0 | |
| | Ils Channel Paramet. | UN | 560.0 | OTVAR | A | 112_17 | 45.0 | |
| | Channel Number | Status | Frequency | (HHz) Bandwidth(HHz) | Profile | 3.0 mode | Type | |
| | 1 | ON | 28.0 | 3.2 | AtdmaMediumNoise16QAM | OFF | ATDMA | |
| | 2 | ON | 32.0 | 3.2 | AtdnaMediunNoise16QAM | OFF | ATDMA | |
| | 3 | ON | 36.0 | 3.2 | AtdmaMediumNoise16QAM | OFF | ATDMA | |
| | 14 | ON | 40.0 | 3.2 | AtdmaMediumNoise160AM | OFF | ATDMA | × |
| | Cm Parameter | | | 0 × | Output | | | 0 × |
| | CM: [00:18:c0:2b:11:f6] | | | | CM: 00:05:ca:96:9e:99 0. | 0.0.0 DHCP-Re | quest | <u>~</u> |
| < > > | DS Parameters | IS Parameters | CM | Status | CM: 00:05:ca:96:9e:99 19 | 92.168.0.26 DH | CP-ACK | |
| De la Dese | Channel: ¹⁴ | hannel: | 2 MO | DEL: S85101E | CM: 00:05:ca:96:96:99 0. | 0.0.0 RNG | ha a | |
| Device Status | Frequency (MHz): 464.0 F | requency (MHz): | 32.0 Onli | ine Time: 2 Hours 2 Minutes | CM: 00:05:ca:96:96:99 15 | 92.168.0.26 OII | ir ie coudr | |
| CPU Usage: 1% | Bandwidth (MHz): 8.0 B | andwidth (MHz): | 3.2 CP | E(0) | CM: 00:05:ca:96:9e:99 15 | 92.168.0.26 DH | CP-Offer | |
| Memory Usage: 45% | SNR (dB): 43.3 S | NR (dB): | 35.3 | | CM: 00:05:ca:96:9e:99 0. | 0.0.0 DHCP-Re | quest | |
| Run Time: 0 Hours 21 Minutes | Power (dBmV): 8-8 P | ower (dBmV): | 47.7 | | CM: 00:05:ca:96:9e:99 15 | 92.168.0.26 DH | CP-ACK | |
| | Modulation: 64QAM M | iodulation: | ATDMA | | Real Time He | ssage | | |

3) Edit the downstream channels

Set the status, frequency, standard, modulation, interleaving depth and output power of downstream channels, and the downstream channel parameters include:

| Downstreams Confi | ig | | × |
|----------------------|--------------------|----------------------|-----------|
| Channels 1-4 Channel | ls 5-8 Channels 9- | 12 Channels 13-16 | |
| Channel 1 Enabled | | Channel 2 Enabled | |
| Frequency (Hz): | 44000000 | Frequency (Hz) : | 448000000 |
| Annex: | AnnexA 💌 | Annex: | AnnexA 💌 |
| Modulation: | QAM64 💉 | Modulation: | QAM64 💌 |
| Interleaver: | I12_17 💌 | Interleaver: | I12_17 💌 |
| Power(dBmV): | 45.0 | Power(dBmV): | 45.0 |
| Channel 3 | | Channel 4 | |
| 🗹 Enabled | | 🗹 Enabled | |
| Frequency (Hz): | 456000000 | Frequency (Hz) : | 464000000 |
| Annex: | AnnexA 🔽 | Annex: | AnnexA 💌 |
| Modulation: | QAM64 💉 | Modulation: | QAM64 💌 |
| Interleaver: | I12_17 💌 | Interleaver: | I12_17 💌 |
| Power(dBmV): | 45.0 | Power(dBmV): | 45.0 |
| | | | 龍 取消 |

Status: indicates whether the downstream channel is enabled or not;

Center frequency range of the downstream channel: 88MHz ~ 862MHz

DOCSIS standard: "A" indicates the European standard, and "B" indicates American Standard;

Modulation methods: including "QAM64", "QAM256" and "QAM1024";

Interleaving depths: different options of interleaving depths for different corresponding DOCSIS standards;

Output power range: 40~62(dBmV);

4) Acquire the upstream channel configuration

Acquire the upstream channel configuration of the CMTS in a real-time manner.

5) Application of upstream channel configuration

Set the upstream channel configuration of the CMTS in a real-time manner.

6) Edit the upstream channels

Set the status, frequency, channel type, the baud rate (corresponding bandwidth), configuration files, the output power and DOCSIS 3.0 compatibility mode on the upstream channels. The upstream channel parameters including:

| Upstreams | | | X | | | | |
|----------------|-------------------------|-----------------|-------------------------|--|--|--|--|
| Channel 1 | | Channel 2 | | | | | |
| 🗹 Enable | | 🗹 Enable | | | | | |
| Frequency(Hz): | 28000000 | Frequency(Hz): | 32000000 | | | | |
| Туре: | Atdma 🔽 | Туре: | Atdma 🔽 | | | | |
| Symbol Rate: | MSyms2_56 🛛 🗸 | Symbol Rate: | MSyms2_56 🔽 | | | | |
| Bandwidth(Hz): | MHz3_2 | Bandwidth(Hz): | MHz3_2 | | | | |
| Profile: | AtdmaMediumNoise16QAN 🔽 | Profile: | AtdmaMediumNoise16QAN 🔽 | | | | |
| Power(dBmV): | 0 | Power(dBmV): | 0 | | | | |
| DOCSIS 3.0 M | lode | DOCSIS 3.0 Mode | | | | | |
| Channel 3 | | Channel 4 | | | | | |
| 🗹 Enable | | 🗹 Enable | | | | | |
| Frequency(Hz): | 36000000 | Frequency(Hz): | 4000000 | | | | |
| Туре: | Atdma 💌 | Туре: | Atdma 💌 | | | | |
| Symbol Rate: | MSyms2_56 🛛 👻 | Symbol Rate: | MSyms2_56 🔽 | | | | |
| Bandwidth(Hz): | MHz3_2 | Bandwidth(Hz): | MHz3_2 | | | | |
| Profile: | AtdmaMediumNoise16QAN 🔽 | Profile: | AtdmaMediumNoise16QAN 🔽 | | | | |
| Power(dBmV): | 0 | Power(dBmV): | 0 | | | | |
| DOCSIS 3.0 M | lode | DOCSIS 3.0 Mode | | | | | |
| | | ត | 角定 取消 | | | | |

Status: indicates whether the upstream channel is enabled or not;

Center frequency range of the upstream channel: $5MHz \sim 65MHz$

The upstream channel types: include "ATDMA" and "SCDMA";

Bandwidth corresponds to the baud rate: the baud rates of 1.28Msym/s, 2.56Msym/s and 5.12Msym/s correspond to 1.6MHz, 3.2 MHz and 6.4 MHz channel bandwidth accordingly;

Choose the upstream channel configuration file

Upstream channel input power range: -13 ~ 13 (dBmV);

DOCSIS 3.0 compatibility mode: indicates whether the upstream channel is compatible with DOCSIS 3.0 standard;

6.3.5 Statistical Graphs

Main Features:

- Real-time traffic display
- Historic traffic data display

Right click the popped menu of the window to manage, operations are:



1) View the real-time traffic

Display the CMTS channel capacity, dynamic traffic and number of channel CMs based on the upstream channels $US1 \sim 4$ and the downstream channels $DS1 \sim 16$. When the mouse stays on the channel identifier "US1" or "2", it will display the corresponding channel traffic and number of channel CMs;

2) View historical traffic

Choose to view the upstream traffic, the downstream traffic and total number of CMs (the time unit is one hour) over a certain period of time for a single CMTS. When the mouse stays on the time identifier "01/01" or "0:00", it will show the upstream traffic and total number of CMs corresponding to the time;

| History | Flow 🔀 |
|----------------|------------------------|
| <u>C</u> MTS: | 1>192.168.18.200 |
| <u>F</u> rom : | 2013-01-29 💟 0:00:00 💲 |
| <u>T</u> o : | 2013-01-30 💌 0:00:00 💲 |
| | OK Cancel |

The " $\sqrt{}$ " on the left side of the menu indicates the current flow display mode;

6.3.6 Spectrum Analysis

The features realized by the spectrum analysis includes: obtaining the real-time spectrum of the upstream channels. User can obtain all real time US channel spectrum analysis by refreshing.

We have red the US channel frequency range:



6.3.7 Operation Log

The features realized by log management include:

- Recording the administrator's operation
- Operating results
- CMTS alarm information, displaying different levels of logs with different colors.

Right click the popped menu from the window, operations are as follows:

| 1 | | | | 1>192 | .168.18.200-Q | TC - NMS | | _ = × |
|------------------------------|----------------|-------------|----------------------------|---------|----------------------|-------------------|---|-------------------|
| ™ms ⊻iew <u>H</u> elp | | | | | | | | |
| CMTS Manage # × | 1>192.168 | .18.200-Q | тс | | | | | |
| Find | CM Manage | Network | Manage RF M | anage C | artogram Spe | ctrum Analysis Or | peration Log | |
| B 🖓 All Region | CMTS ID | Time | | Oper | ation Conter | it | | 1 |
| • 0>A11 CMTS | 1 | 2013-05- | 24 16:27:28 | Conne | ected to CMT | S 192.168.18.20 | 00. | |
| ShaPinBa | 1 | 2013-05- | 24 16:27:28 24 16:27:28 | Get C | 7M list 7M status | | | |
| ↓ 1)152.168.18.200 GIC | - | 0010 00 | | | | | | |
| 😑 🏤 JiuLongPo | | | | | | | | |
| - 9 3>10. 0. 0. 200-QTC | | | | | | | Glear | |
| ■ 🍕 BaiBei | | | | | | | Eliter | |
| - ♦ 5>10.0.1.200-QTC | | | | | | | | |
| - • 6>10. 0. 1. 201-QIC | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | Cm Paramete | r | | | | †× | Output | ф × |
| | CM : [00:18:c0 |):2b:11:f6] | | | | | Get CM status successful. | ~ |
| < > | Channel: | 4 | US Parameters Channel: | 2 | MODEL : | 585101E | CM: 00:05:ca:96:9e:99 0.0.0.0 RNG | |
| Device Status | Frequency (MH | z): 464.0 | Frequency (MHz): | 32.0 | Online Time: | 2 Hours 2 Minutes | CM: 00:05:ca:96:99:99:192.168.0.26 Offline | |
| CPU Usage: 4% | Bandwidth (MH: | z): 8.0 | Bandwidth (MHz): | 3.2 | CPE[0] | J | CM: 00:05:ca:96:99:99 0.0.00 DHCP-Discover CM: 00:05:ca:96:99:99 192.168.0.26 DHCP-Offer | |
| Memory Usage: 46% | SNR (dB): | 43.3 | SNR (dB): | 35.3 | | | CM: 00:05:ca:96:99:99:0.0.0.0 DHCP-Request | |
| Run Time: 0 Hours 26 Minutes | Power (dBmV): | 8.8 | Power (dBmV): | 47.7 | | | CMI: 00:05:03:96:96:99 192:168.0.26 DHCP-ACK | - |
| | Modulation: | 64QAM | Modulation: | ATDMA | | | K () H Real Time Message | |
| | | | | | | | Total CM: 16 Online CM: 15 Expired CM: 0 Re | al Update: ON 🔄 🔡 |

Clear: clear the displayed log, but it will not delete the log record in the database;

Screening: display the contents of the log by specifying the CMTS, type and time range to be viewed;

CMTS: "all the equipment" indicates all CMTS, and others indicate one single CMTS;

Types include: "all", "operation log" and "alarm log";

Time range: record the starting time and ending time of the log;

| Filter | |
|----------------|-------------------------|
| <u>C</u> MTS: | 1>192.168.18.200 |
| Туре: | All |
| <u>F</u> rom : | 2013-01-28 🖌 16:28:06 🛟 |
| <u>T</u> o : | 2013-01-29 💟 16:28:06 🛟 |
| | OK Cancel |

6.3.8 Information Output

- Display the running status of CMTS;
- Display the operation status for CMTS;
- Display the real-time updated content of CMTS;

Output # × Get IP addresss successful. Get route successful. Get Embed DHCP scope successful. Get DHCP server successful. Get network mode successful. Get DHCP safe successful. Get downstreams successful. Get downstreams successful. Set upstreams successful. • Net the method bulk • Get DHCP safe successful. • Get downstreams successful. • We heat Time Tessage •





Ascent Communication Technology Ltd

AUSTRALIA

961 Mountain Highway, Boronia, Victoria 3155, Australia

Phone:+61-488 293 682 Email: <u>sales@ascentcomtec.com</u>

EUROPE

Pfarrer-Bensheimer-Strasse 7a, 55129 Mainz, Germany Phone:+49 (0) 6136 926 3246 Email: <u>sales@ascentcomtec.com</u>

CHINA

11/F Tower B, Central Towers 567 Langao Road, Shanghai 200333 China Phone: + 86-21 2221 8268 Email: sales@ascentcomtec.com

USA 2710 Thomes Ave, Cheyenne, WY 82001 USA Phone:+1-203 816 5188 Email: <u>sales@ascentcomtec.com</u>

Specifications and product availability are subject to change without notice. Copyright © 2011 Ascent Communication Technology Limited. All rights reserved. Ver.C3000_CMTS_UG_B_May 2014