Headend Operations Best Practices

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Good Habits are not Brand Specific

Findings from 2006-2007 Arris CADANT C4 CMTS audit.

Results and procedures are widely applicable to most Head-End equipment.

Best Practices: Applying real world lessons to the C4 CMTS maintenance and operations activities

- The C4 CMTS has required operating conditions specified in user documentation.
  - These are the min/max operating conditions
  - Some aspects of maintenance and operation procedures are suggested
- ARRIS understands that customers develop their own internal procedures for maintenance
  - We want to augment these procedures based on:
    - Our experiences with working with different customers
    - The best recommendations of our design team
- “Best Practices” are offered as a set of suggestions for C4 CMTS maintenance and operations

Case studies – lessons learned

- ARRIS recently analyzed the operation of C4's in different regional areas.
- The analysis consisted of several elements:
  - headend site visits by an ARRIS Technical Support engineer
  - The CMTS configurations were audited for anomalies
  - Trend analysis was applied to recent reported problems to gain a historical perspective
- Insights gained from this process can be re-used by the C4 CMTS users community

ARRIS is grateful for the opportunity to analyze these in-service CMTSs

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Data Collection

- The data included the following categories:
  - Proper ventilation and environmental operating conditions
  - Grounding, ESD handling and Power
  - Proper Module (front cards) and Physical Interface Card (PIC) installation
  - Proper installation of the Power Conditioning Modules and fan trays
  - Minimizing noise from RF terminations
  - Alarm indicators
  - Regularly scheduled maintenance activities

Proper ventilation and environmental operating conditions

- Proper ventilation
  - Fans upgraded for 2D/12U CAM operation
  - Improper ventilation due to a dirty air-filter or obstruction
- Environmental operating conditions
  - Headend equipment placement
  - Temperature and humidity control
  - Limiting exposure to dust and other foreign particles

Grounding, ESD handling and Power

- Grounding
  - Chassis ground wire locations
- ESD handling
  - Anti-static packaging
  - ESD wrist strap ports on the C4 CMTS
- Power
  - Power Conditioning Modules (PCMs)
  - Power Supply Units
  - Power Cabling

Proper Module (front cards) and Physical Interface Card (PIC) installation

- Module (front cards) seating
  - Proper track alignment
  - Use of ejector levers with locking tabs
- Physical Interface Card (PIC) seating
  - Proper track alignment
  - Use of ejector levers with locking tabs
- Filler cards

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Proper installation of the Power Conditioning Modules and fan trays

- Power Conditioning Modules (PCMs)
  - Improper use of PCM handle
  - Power cabling placement
  - Power supply strain relief brackets
- Fan trays
  - Proper shipping
  - Tray insertion precautions
  - Alarm indicators

Minimizing noise from RF terminations

- Module and PIC RF ports
  - Proper Connection Termination
    - Capping unused RF ports
  - Proper tightening of the RF ports
    - Do not over-tighten cables
- RF cable condition and placement
  - Checking for damage to insulation and shielding

Alarm indicators

- Power alarms
  - General power alarm levels through top panel flap
  - Specific power fuse alarms for “A” and “B” sides under the top panel flap
    - Per power distribution branch fuse
- Fan alarms
  - LEDs on fan trays to indicate faults on either of the two fans (front and rear) in the tray
- Module alarms
  - Module Power LEDs
  - Module Out of Service LEDs
  - Module Alarmed LEDs (SCMs only)

Regularly scheduled maintenance activities

- Air filter replacement interval
  - Every 3 months or less depending on conditions at the headend
- Softswitch testing for the control complex coordinated with the next level of support
  - Verifies duplex operation (if configured)
- CAM sparing testing coordinated with the next level of support
  - Verifies continued service during a single card fault (if configured)

Blatant Plug: Ask Arris Website

- Ask Arris
  - Common facts and procedures can be found 24x7.
  - The “Ask ARRIS” capability exists to access information and if needed automatically open an incident with an ARRIS support engineer for further investigation.
  - Incidents can be viewed, updated and closed.
  - Note: A valid ARRIS service contract is required to get full access to the “Ask ARRIS” tool.

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Q&A / Wrap-up

- Thanks for your time

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