

SCTE Broadband Premises Technician (BPT) Competencies

Scope

The Society of Cable Telecommunications Engineers (SCTE) **Broadband Premises Technician** certification describes the knowledge of an experienced field technician who will install and troubleshoot telecommunications services (video, voice, and data) at the customer’s premises. The successful certification candidate has the knowledge to install and service most “triple-play” installations.

The Broadband Premises Technician certification is one of three stand-alone Broadband Premises Specialist certifications. Content includes “the how” of the telecommunications installation and service.

I. Technology, Systems & Requirements

| Competency | Knowledge, Skills, and Abilities |
|---|---|
| A Explain the basic components of NTSC video. | 1. Explain basic analog (NTSC) television operation |
| | a. Name the components of the video signal |
| | i Describe picture construction |
| | ii Describe signal structure |
| | iii Describe composite video |
| | 2. Explain the following transmission techniques: |
| | a. Define analog modulation |
| | i Amplitude |
| | ii Frequency |
| | iii Phase |
| | b. Describe frequency assignments |
| | i Bandwidth |
| | ii Frequency plans (forward/reverse) |
| iii Visual carrier | |
| iv Aural carrier | |
| v Color sub-carrier | |
| B Explain the basics of digital signals. | 1. Explain digital fundamentals: |
| | a. Binary system |
| | i Fundamentals |
| | ii Numbering |
| | iii Coding of information |
| | 2. Name the components of the digital signal |
| | a. Basics of digital signals |
| | i Define digital |
| b. Explain analog to digital (A/D) conversion | |



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| | i | Fundamentals of conversion |
| | ii | Define decoding |
| | iii | Define pulse-code modulation (PCM) |
| | iv | Define codec |
| | 3. | Explain the following digital modulation techniques |
| | a. | Digital Modulation |
| | i | Quadrature Phase-Shift Keying (QPSK) |
| | ii | Quadrature Amplitude Modulation (QAM) |
| | iii | Frequency-Shift Keying (FSK) |
| | 4. | Digital Multiplexing |
| | a. | Multiple Streams in 6 MHz bandwidth |
| | b. | MPEG |
| | c. | Compression ratios |
| | d. | Multiplexing (with respect to DOCSIS) |
| | i | Time Division Multiplexing (TDM) |
| | ii | Frequency Division Multiplexing (FDM) |
| | | (a) Broadband spectrum digital signal frequency allocation |
| | e. | Describe two-way signal flow |
| | 5. | Explain signal distribution methods |
| | a. | Wireless |
| | b. | Wired |
| | i | Coaxial cable |
| | ii | Twisted pair |
| | iii | Optical |
| | 6. | Explain channel mapping |
| | 7. | Explain structure of messages through the introduction of the following: |
| | a. | Frames |
| | b. | Packets |
| | c. | Open Systems Interconnection Basic Reference Model (OSI Reference Model; OSI Model) |
| | 8. | Identify RF carrier levels for digital QAM/channel |
| | 9. | Define the following transmission metrics: |
| | a. | Data rate |
| | b. | Symbol rate |
| | i | Payload |
| | ii | Overhead |
| | iii | Throughput |
| | | (a) QoS - quality vs. quantity of signal |
| | | (b) Service Level Agreement (SLA) |

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| C Identify the components and characteristics of fiber-optic cable used within the drop system and at the customer's premises. | 1. Optical fiber |
| | a. Define |
| | i Composition |
| | ii Characteristics |
| | (a) Attenuation |
| | (b) Wavelength |
| | b. Benefits |
| | c. Applications |
| | d. Safety |
| | 2. Calculate fiber loss and expected signal levels |
| D Identify and describe the characteristics of cables and wire used within the drop system and at the customer's premises. | 1. Describe coaxial cable attenuation properties |
| | a. Define dB |
| | i Explain the difference between dB and dBmV |
| | b. Define attenuation |
| | c. Explain the effect cable length has on coaxial cable |
| | d. Explain the effect temperature has on coaxial cable |
| | e. Explain the effect frequency has on coaxial cable |
| | f. Define in basic terms velocity of propagation |
| | g. Define in basic terms DC loop resistance |
| | h. Define in basic terms impedance |
| | i. Define in basic terms frequency response |
| | j. Define in basic terms return loss |
| | 2. Given device inputs/outputs, cable attenuation, and insertion losses, be able to calculate coaxial cable loss and expected signal levels |
| | 3. Describe the following twisted pair properties: |
| | a. Cross talk |
| | b. Capacitance |
| | c. Frequency Response |
| d. Classifications | |
| E Identify the differences and similarities between the cable operator-provided and other voice services. | 1. Public Switched Telephone Network (PSTN) |
| | 2. Define the following: |
| | a. Ported number |
| | b. Native number |
| | c. On- net |
| | d. Off-net |
| | 3. Fundamentals of broadband telephony |
| | a. Define circuit switched |
| | b. Define Voice over internet protocol (VoIP) |
| | i Packet switching |
| ii PacketCable™ | |
| (a) eMTA | |



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| | 4. Powering |
| | a. Twisted pair powering (AC) |
| | i. Advantages |
| | ii. Disadvantages |
| | b. Coaxial powering |
| | i. Advantages |
| | ii. Disadvantages |
| | c. Batteries |
| | d. Network power vs. home power |
| F Identify the differences and similarities between cable operator-provided high-speed services (HSD) and other HSD services. | 1. Internet |
| | a. Define the Internet |
| | b. Public vs. private (managed network) |
| | c. Firewall |
| | d. Define fundamentals of high-speed data |
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II. Premises Devices

| Competency | Knowledge, Skills, and Abilities |
|---|---|
| <p>A Identify and describe customer provided devices used to offer video, voice and data services at the customer's premises.</p> | 1. Televisions |
| | a. Explain basic analog (NTSC) television operation |
| | i Block diagram functions |
| | ii Powering |
| | iii Signal sourcing |
| | (a) Channel characteristics |
| | (b) Channel assignments |
| | (c) Channel bandwidth |
| | b. Describe the characteristics of a cable compatible television |
| | i Cable compatible interface |
| | ii Channel capacity |
| | c. Describe common television controls |
| | i User Controls |
| | ii Service Controls |
| | (a) Second Audio Programming (SAP) |
| | (b) Closed captioning |
| | d. Describe typical interfaces for the following TV types and components: |
| | i Standard definition (SD) |
| | (a) RF |
| | (b) Composite (as it relates to the interface) |
| | (i) RCA |
| | (c) S-video |
| | ii High definition (HD) |
| | e. Name the types of TV Receivers: |
| | i Cathode Ray Tube (CRT) - Direct view (|
| | ii Projection devices |
| | iii Liquid Crystal Display (LCD) |
| | iv Plasma |
| | v HDTV |
| | (a) Aspect ratio |
| (i) 4:3 | |
| (ii) 16:9 | |
| (b) Screen resolution | |
| (i) 480i | |
| (ii) 480p | |
| (iii) 720p | |
| (iv) 1080i, p | |
| (c) Connections | |



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| | (i) Component |
| | (ii) High-Definition Multimedia Interface (HDMI) |
| | 1. Includes audio |
| | (iii) Digital Visual Interface (DVI) |
| | (iv) PC interface |
| | (d) Effects of aspect ratio mismatch: |
| | (i) Letter box |
| | (ii) Pillaring |
| | (e) Digital Light Processor (DLP) |
| | f. Digital TV Transition (DTV) – Feb 2009 impact |
| | 2. Digital Video Recorder (DVR) |
| | a. Define a DVR and describe its purpose |
| | b. Explain the interface with service provider device |
| | 3. Digital Video Disc/Digital Versatile Disc (DVD) |
| | a. Define DVD and describe its purpose |
| | b. Define Blu-Ray |
| | c. Explain the interface with service provider device |
| | 4. Network DVR service |
| | 5. Video Cassette Recorder (VCR) |
| | a. Define a VCR and describe its purpose |
| | b. Explain the interface with service provider device |
| | 6. Define the following navigation devices/interfaces: |
| | a. Remote Control |
| | i Identify the keys on a remote control |
| | b. Parental Control |
| | i Define parental control |
| | c. (IR) Blaster |
| | i Define Infrared (IR) Blaster and describe its purpose |
| | 7. Game Consoles |
| | a. Identify a game console |
| | 8. Home Theater Receiver |
| | 9. Dolby AC3 |
| | 10. Video Switches |
| | a. Define in basic terms “video switches” and describe purpose |
| | 11. Slingbox |
| | a. Define in basic terms “Slingbox” and describe purpose |
| | 12. iPod Touch |
| | a. Define in basic terms “iPod Touch” and describe purpose |



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| | 13. Media Center |
| | a. Define in basic terms "Media Center" and describe purpose |
| | 14. Audio |
| | a. Analog stereo TV |
| | i Baseband |
| | ii Sony/Philips Digital Interconnect Format (S/PDIF) (Digital RCA) |
| | iii Coaxial cable |
| | (a) RCA jacks (analog) |
| | b. Optical fiber |
| | i TOSLink |
| | 15. Interactive TV |
| | a. VOD |
| | b. SVOD |
| | 16. Telephones |
| | a. Telephone components |
| | i Base |
| | ii Ringer |
| | iii Handset |
| | iv Hook switch |
| | v Dial pad |
| | b. Powering |
| | i Loop start/ground start |
| | ii Loop current |
| | iii Ringing |
| | (a) REN |
| | c. Cordless phones |
| | i Frequencies of operation |
| | (a) Duplex frequency |
| | ii Powering/UPS |
| | iii Modulation techniques |
| | (a) Digital Spread Spectrum (DSS) |
| | d. Other Devices |
| | i Dial-up modems |
| | (b) V.90/92 |
| | ii Alarm service equipment |
| | (c) Line seizing |
| | iii External Caller ID Devices |
| | iv FAX |
| | 17. Personal computers (PCs) |
| | a. Software |
| | i Operating systems (OS) |
| | (a) Windows |
| | (b) 98 SE |
| | (c) NT |
| | (d) XP |



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| | (e) Vista |
| | ii Macintosh |
| | iii Linux |
| | iv Installation of cable-supplied data services |
| | (a) Service provider applications |
| | (i) Mail |
| | (i) Security |
| | 1. Define encryption |
| | b. Hardware |
| | i CPU/motherboard |
| | ii Expansion bus |
| | (a) ISA expansion bus |
| | (b) Peripheral Component Interconnect (PCI) |
| | (c) PCMCIA |
| | (d) Universal Serial Bus (USB) |
| | (e) IEEE 1394 multimedia connection |
| | (f) Firewire (Apple) |
| | iii Define computer Memory |
| | (a) RAM |
| | (b) ROM |
| | (c) CMOS |
| | iv Storage devices/media |
| | (a) Internal storage |
| | (b) External storage |
| | c. Input/Output |
| | i Serial interface |
| | (a) EIA-232 |
| | (b) USB |
| | (c) Infrared |
| | (d) Network Interface Card (NIC) |
| | ii Parallel interface |
| | iii Peripheral devices |
| | d. Application configuration |
| | i Browsers |
| | (a) Internet Explorer |
| | (b) Mozilla Firefox |
| | (c) Safari (Apple) |
| | e. Email |
| | (a) Client |
| | (b) Web-based |

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| <p>B Identify and describe the function and use of company-provided devices used to offer voice and data at the customer's premises.</p> | 1. Digital set-top boxes (STB) (middleware) |
| | a. Features/functions |
| | b. Set-top applications |
| | i Navigation aids |
| | (d) Onscreen displays |
| | (e) Program guides |
| | 2. Modem |
| | 3. Embedded Multimedia Terminal Adapter (eMTA) |
| | 4. Conditional access techniques |
| | a. Analog |
| | b. Digital |
| | 5. CableCard/STB integration |
| | a. Define |
| | b. Provisioning |
| | 6. T-commerce |
| | 7. Third party applications |
| | a. Program guides |
| b. News | |
| c. Sports | |
| d. Weather | |
| e. Caller ID on television | |

III. Installation

| Competency | Knowledge, Skills, and Abilities |
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| <p>A Describe the cable types, handling techniques, connectorization, and methods and procedures for installing coaxial drop cable used to provide service to the customer's premises.</p> | 1. Describe the following coaxial cable types and explain when each is used: |
| | a. Underground (flooded) |
| | b. Aerial messenger |
| | c. National Electrical Code (NEC) Classification |
| | i CATV |
| | ii CATVX |
| | iii CATVR |
| | iv CATVP |
| | 2. Define coaxial compression connectors |
| | a. Identify connector components |
| | 3. Explain the purpose of security shields and demonstrate installation and removal |
| | 4. Explain how drop cable preparation is accomplished for each of the following cable preparation stages: |
| | a. Jacket removal |
| | b. Dielectric |
| | c. Braid |
| | d. Center conductor |
| | e. Braid |
| | 5. Explain how the following cable handling techniques must be practiced: |
| | a. Minimum bend radius |
| | b. Drip loops |
| | c. Structural considerations |
| | i Fastening |
| | ii Attachments |
| | iii Structural return loss |
| d. Describe the impact of improper handling techniques | |
| e. Describe the impact of improper fastening techniques | |
| 6. Mechanical and electrical integrity | |
| a. Describe the torque specifications for connecting coaxial drop cable to: | |
| i Consumer equipment | |
| ii Exterior wiring | |
| b. Weatherproofing | |
| i Silicone grease | |
| ii Thread protectors | |

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| | (a) Length variations |
| | iii Boots and grease |
| | iv Shrink tube |
| | v Encapsulating devices |
| B Describe the cable types, handling techniques, connectorization and splicing, and methods and procedures for installing optical fiber drop used to provide service to the customer's premises. | 1. Describe how to construct the following drop fiber splices/connectors: |
| | a. Fusion |
| | b. Mechanical |
| | c. Connectors |
| | 2. Describe fiber preparation |
| | a. Identify safety considerations |
| | 3. Describe fiber handling |
| | a. Describe the impact of improper handling techniques |
| | 4. Define fiber to the customer's premises (FTTx) where x = |
| | a. Home |
| | b. Curb |
| | c. NID |
| C Describe the wire types, handling techniques, termination, and methods and procedures for installing twisted pair wire used to provide service to the customer's premises. | 1. Describe the twisted pair wire in the premises |
| | a. Category 5 twisted pair |
| | i Plugs and jacks |
| | ii RJ31x |
| | iii RJ-etc. |
| | (a) RJ-11 |
| | (b) RJ-14 |
| | (c) RJ-45 |
| | b. Unshielded Twisted pair(UTP) color codes |
| | c. Polarity |
| | 2. Describe wire handling |
| | a. Describe the impact of improper handling techniques |
| | 3. Differentiate between the data cable types: |
| | a. Cat 1 |
| | b. Cat 3 |
| | c. Cat 5 /5e /6 |
| | i P568 A B |
| | d. Plenum |
| | 4. Describe the following terminal blocks/punch downs |
| | a. 66 |
| b. 110 | |
| c. Building Industry Cross-connect (BIX) | |
| d. Binding post | |
| D Describe the methods and procedures for inspecting an existing residential bond and for | 1. Explain why bonding is necessary |
| | 2. Explain the purpose and function of the following bonding hardware: |



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| ensuring the bond meets industry standards. | a. Bonding blocks |
| | b. Bonding wire |
| | i Drop attachment |
| | ii Ground electrode attachment |
| | 3. Explain residential drop inspection process |
| | a. Identify the proper bonding locations for bonding residential coaxial drop cable |
| | 4. Describe the proper bonding techniques in the following special circumstances: |
| | a. Mobile homes |
| b. MDUs | |
| E Describe the methods and procedures for installing video service at the customer's premises | 1. Describe generally accepted practices for full-service video installation |
| | 2. Describe the generally accepted practices for performing a reconnect |
| | a. Inspect / proof the drop |
| | 3. Describe the generally accepted practices for performing a disconnect |
| F Describe the methods and procedures for installing telephony service at the customer's premises. | 4. Describe the general accepted practices for performing a change of service (up/downgrade) |
| | 1. Describe the generally accepted practices for how to perform a full-service voice installation |
| G Describe the methods and procedures for installing high-speed data (HSD) service at the customer's premises. | a. Inspect and test the wire for good performance |
| | 1. Describe the generally accepted practices how to perform a full-service high-speed data installation, including connection to |
| | a. Equipment |
| | b. Ethernet/USB |
| | i Cross-over/straight through |
| | c. Directional coupler and/or splitter |
| | i High pass filter |
| | ii Step attenuator |
| | d. Cable modem/eMTA |
| | 2. Computer system requirements |
| | a. Minimum RAM |
| | i Define |
| | b. Minimum hard drive space |
| | i Define |
| | 3. Operating system (OS) compatibility |
| | a. Macintosh |
| | b. Windows |
| c. Linux | |
| 4. Installation overview | |
| 5. Birth / service certificate | |
| H Describe the methods and | 1. Drop splitters/couplers |



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| <p>procedures for installing passive and active devices used to provide video, voice and data service at the customer's premises.</p> | <p>a. Explain isolation as related to splitters and couplers</p> |
| | <p>b. Explain voltage blocking as related to splitters/couplers (with respect to house amplifiers)</p> |
| <p>I Describe the methods and procedures for conflict resolution with customers.</p> | <p>1. Define customer interaction and describe how each of the following is affected by (or could affect) the image the customer has of the company:</p> |
| | <p>a. Explain the field technician's role in customer retention in the following situations:</p> |
| | <p>i Retaining customers</p> |
| | <p>(a) Problem identification</p> |
| | <p>(b) Taking responsibility</p> |
| | <p>(c) Solving the problems</p> |
| | <p>(d) Following up with customer</p> |
| | <p>ii Internal vs. external customers</p> |
| | <p>(a) Interactions with "front office"</p> |
| | <p>(b) Interactions with other technicians</p> |
| | <p>(c) Responsibility and accountability</p> |
| | <p>(d) Interactions with the general public and non-customers</p> |
| | <p>b. Explain the following effective communications skills and explain how these skills contribute to good customer interactions:</p> |
| | <p>i Listening</p> |
| | <p>ii Clarity of speech</p> |
| | <p>iii Empathy</p> |
| | <p>iv Probing</p> |
| | <p>v Telephone etiquette</p> |
| | <p>(a) Listening</p> |
| | <p>(b) Voice inflections</p> |
| | <p>(c) Background noise</p> |
| | <p>(d) Ending a call</p> |
| | <p>vi After-hours calls</p> |
| | <p>c. Explain proper use of company-provided and/or personal communications devices</p> |
| | <p>d. Describe conflict resolution</p> |
| | <p>e. Describe problem resolution</p> |
| | <p>f. Customer compensations</p> |
| | <p>2. Explain the steps to take to effectively communicate with difficult customers</p> |

IV. Troubleshooting and Maintenance

| Competency | Knowledge, Skills, and Abilities |
|---|---|
| <p>A Describe the function, use, care, and maintenance of test equipment.</p> | 1. Signal Level Meter (SLM) |
| | a. Display readouts of an analog channel features |
| | i Full scan |
| | ii Adjacent channel level |
| | b. Identify the following digital display features: |
| | i QAM Analyzer |
| | (a) Noise analysis |
| | (b) Phase analysis |
| | (c) |
| | (d) CW interference/ingress |
| | (e) Reflections/microreflections |
| | ii Modulation Error Rate (MER) |
| | iii Bit Error Ratio (BER) |
| | iv Constellation analysis |
| | v DOCSIS stats |
| | c. Return test |
| | i Signal generator (for example, DSAM, RSVP) |
| | ii Birth/service certificate |
| | d. Video and audio carrier measurements |
| | e. Maintenance |
| | i Charging |
| | ii Known source- accuracy verification |
| | iii Channel plans |
| | f. DOCSIS "2.0" /RF Operating Parameters |
| | i Definition |
| | ii Provide examples for: |
| | (a) Downstream |
| | (b) Upstream |
| | 2. Test TV |
| | a. Tracking picture and/or sound impairments |
| b. Diagnosing bad customer TV | |
| 3. Volt Ohm Meter (VOM)/Digital Multi-Meter(DMM) | |
| a. Using resistance function | |
| i Isolating shorts | |
| ii Identifying opens | |
| iii Cable identification | |
| b. Using voltage function | |
| i Checking for hot (electrified) chassis condition | |



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| | c. Using ammeter function |
| | d. VOM (voice applications) |
| | 4. Signal leakage detector |
| | a. Ingress |
| | i. Definition |
| | ii. Symptoms |
| | iii. Appearance |
| | iv. Sources |
| | v. Detection |
| | vi. Repair |
| | vii. Technician's role; escalation procedures |
| | b. Egress |
| | i. Definition |
| | ii. Symptoms |
| | iii. Sources |
| | iv. Detection |
| | (a) Measuring 20 μ V/m |
| | v. Repair |
| | vi. Technician's role; escalation procedures |
| | c. System monitoring |
| | i. Cumulative Leakage Index (CLI) |
| | (a) Definition/requirement |
| | 5. Cable Locator |
| | a. Locating underground cables |
| | b. Identifying utility colors and flags |
| | 6. Time Domain Reflectometer (TDR) |
| | a. Definition |
| | b. Application and use |
| | i. Velocity of propagation |
| | ii. Locating defects |
| | iii. Shorts |
| | iv. Opens |
| | v. Determining cable lengths |
| | 7. Line toner |
| | a. Definition |
| | b. Application and use |
| | i. Voice applications |
| | 8. Polarity tester |
| | a. Definition |
| | b. Application and use |
| | 9. Return path tester (example, RSVP) |
| | a. Definition |
| | b. Application and use |
| | 10. Butt set (voice applications) |
| | a. Definition |
| | b. Application and use |
| | 11. Wire ID (voice applications) |



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| | a. Definition |
| | b. Application and use |
| | 12. Wire mapper (voice applications) |
| | a. Definition |
| | b. Application and use |
| | 13. Brown meter (loop tester) (voice applications) |
| | a. Definition |
| | b. Application and use |
| | 14. T&N Tester (example: Sidekick) |
| | a. Definition |
| | b. Application and use |
| | 15. Banjo (voice applications) |
| | a. Definition |
| | b. Application and use |
| | 16. Cable modem emulator / Web-based application |
| | a. Definition |
| | b. Application and use |
| | (a) Spoofing / cloning modem |
| B Describe the divide and conquer (isolation) method of troubleshooting. | 1. Explain the steps in the troubleshooting process: |
| | a. Symptom analysis |
| | i Verify problem symptoms with customer |
| | b. Problem isolation |
| | c. Divide and conquer |
| | d. Problem resolution/repair |
| | e. Confirm problem resolution/repair |
| | 2. Diagnose equipment problems: |
| | a. Identify signal issues |
| | b. Interpret premises signal level readings (too high; too low) |
| | 3. Set-top terminals |
| | a. Self diagnostics |
| | i Power on self diagnostics |
| | 4. Describe the process to troubleshoot forward and return path |
| C Describe the procedures to troubleshoot common voice service problems at the customer's premises. | 1. Describe the loopback test |
| | 2. Equipment problems |
| | 3. Symptoms/causes |
| | a. Poor connection |
| | b. Wiring Faults |
| | c. Powering |
| | d. Interference/Ingress |
| | e. Upstream |
| | 4. Remote diagnostics |
| | 5. Troubleshoot common voice issues |
| | 6. Digital Voice Testing |
| | a. MOS – Mean Opinion Score |
| | i Define what constitutes this score |



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| | <ul style="list-style-type: none"> b. Perceptual Evaluation of Speech Quality (PESQ) c. Speech quality assessment d. Real-time Transport Protocol (RTP) tests (for Packet Loss, Jitter, and Latency, etc.) <ul style="list-style-type: none"> i if these are out of limits, understand when to escalate | |
| <p>D Describe the procedures to troubleshoot common high-speed data (HSD) service problems at the customer's premises.</p> | 1. Describe typical HSD troubleshooting issues for the following: | |
| | <ul style="list-style-type: none"> e. Cable modems f. Computer g. Operating systems h. Utilities <ul style="list-style-type: none"> i Internet Control Message Protocol (ICMP) | |
| | 2. Error types and testing | |
| | <ul style="list-style-type: none"> a. Bit errors <ul style="list-style-type: none"> i BER b. Protocol errors c. Routing errors <ul style="list-style-type: none"> i Latency ii Jitter d. Error Detection <ul style="list-style-type: none"> i Parity ii Carrier Sense Multiple Access with Collision Detection (CSMA/CD) i. Error Control | |
| | 3. Helpful PC applications | |
| | <ul style="list-style-type: none"> a. IPconfig b. Ping c. Trace route d. Throughput Testing | |
| | 4. Troubleshoot common high-speed data issues | |
| | <p>E Describe common analog and digital signal impairments that occur when providing video, voice and data service at the customer's premises.</p> | 1. Identify the name, cause, and repair/remedy for each of the following analog signal impairments: |
| | | <ul style="list-style-type: none"> a. Snow (no picture) <ul style="list-style-type: none"> i Loss of signal b. Blue TV screen <ul style="list-style-type: none"> i Loss of signal c. Snowy picture <ul style="list-style-type: none"> i Low signal d. Snowy picture on channels 2 through 6 only; lines in picture e. Ghosting <ul style="list-style-type: none"> i Ingress f. Two pictures (co-channel) |



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| | i Simultaneously receives two TV signals |
| | g. Flash or blip in picture |
| | h. Herringbone pattern |
| | i. Horizontal bars (hum bars) |
| | j. Diagonal lines (Intermodulation beats) |
| | k. CB radio interference |
| | i Interfering signals |
| | l. Randomly flashing lines or flashing picture |
| | i Electrical interference |
| | (a) Interfering signals within the premises |
| | m. "Sparklies" |
| | i Terrestrial interference |
| | (a) Interfering from satellite/sun outages (spring/fall) |
| | n. Scrambled picture |
| | 2. Identify the name, cause, and repair/remedy for each of the following digital signal impairments: |
| | a. Tiling |
| | b. Blocking |
| | c. Freezing |
| | d. Jerkiness |
| | e. Smearing |
| | f. Artifacts |
| | g. Object Retention |
| | h. Robotic voice |
| | i. Echo |
| | j. Dropped call |
| | k. Voice break up |
| | l. Slow web page |
| | m. Server not found |
| | n. Lip synch |
| | o. No picture / black screen |
| | 3. Media Impairments |
| | a. Name a typical cause of the following digital impairments |
| | i BER |
| | ii Latency |
| | iii Jitter |
| | iv Packet Loss |
| | 4. List the procedures for troubleshooting the set-top box and interactive program guide (IPG) |

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| F Describe DOCSIS tools used when troubleshooting video, voice and data service at the customer's premises. | 1. Define Simple Network Management Protocol (SNMP) |
| G Describe work force management tools used when troubleshooting voice and data service at the customer's premises. | 1. Define work force management |
| | 2. Describe the types of tool that may be used to access SNMP tools – examples: a. Auspice |
| H Describe the provisioning process. | 1. Define Provisioning |
| | 2. List the configuration files |
| | 3. List the provisioning steps |

V. Standards

| Competency | Knowledge, Skills, and Abilities |
|---|---|
| <p>A Explain/define the regulatory agencies and/or standards that govern practices for providing video, voice and data services at the customer's premises.</p> | 1. Federal Communications Commission (FCC) Part 76 |
| | a. Define the FCC |
| | b. Explain the FCC's role in the telecommunications industry |
| | c. Define the Telecommunications Act of 1996 and explain its purpose |
| | 2. National Cable Television Association (NCTA) |
| | a. Define NCTA standards |
| | b. Explain NCTA's role in the telecommunications industry |
| | i Define the on-time guarantee |
| | 3. Society of Cable Telecommunications Engineers (SCTE) |
| | a. Define SCTE standards |
| | b. Explain SCTE's role in the telecommunications industry |
| | 4. National Electrical Code (NEC) |
| | a. Define the NEC |
| | b. Explain NEC's role in installing/inspecting residential bonds in the telecommunications industry |
| | 5. National Electrical Safety Code (NESC) |
| | a. Define the NESC |
| | b. Explain NESC's role in the telecommunications industry |
| | 6. Occupational Safety & Health Administration (OSHA) |
| | a. Define the OSHA |
| | b. Explain OSHA's role in the telecommunications industry |
| | 7. Motion Picture Experts Group (MPEG) standards |
| | a. Define MPEG standards |
| | b. Explain MPEG's role in the telecommunications industry |
| | 8. Data Over Cable Service Interface Specifications (DOCSIS) |
| | a. Define DOCSIS |
| | b. Describe frequency hopping |
| | c. Explain DOCSIS' role in the telecommunications industry |
| 9. Dolby digital | |

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| | a. Define the Dolby digital standards |
| | b. Explain Dolby digital standards' role in the telecommunications industry |
| | 10. Emergency Alert System (EAS) |
| | a. Define EAS |
| | b. Explain EAS' role in the telecommunications industry |
| | 11. PacketCable specification |
| | a. Define the PacketCable specification |
| | b. Explain the PacketCable specifications' role in the telecommunications industry |
| | 12. Belcore |
| | a. Define Belcore |
| | b. Explain Belcore's role in the telecommunications industry |
| | 13. Modified Final Judgment (MFJ) |
| | a. Define Modified Final Judgment (MFJ) |
| | b. Define demarcation point |
| | c. Explain MFJ's role in the telecommunications industry |
| | 14. Wiring Standards – telephone cables (EIA / TIA) |
| | a. Define the following wiring codes / standards |
| | i 568 (A or B) |
| | ii 569 |
| | iii 570 |
| | b. Name the color codes for telephone jacks/plugs |
| | 15. Define the following in-home networks standards |
| | a. Wire Based |
| | i Home PNA |
| | ii Powerline (Home Plug) |
| | iii Structured wiring/smart home |
| | iv Multimedia over Coax Alliance (MoCA) |
| | b. Wireless |
| | i Bluetooth |
| | ii 802.11x |
| | iii 802.16x |
| | 16. Network domains: |
| | a. Define Local Area Network (LAN) |
| | b. Define Metropolitan Area Network (MAN) |
| | c. Define Wide Area Network (WAN) |
| | 17. Define the following network standards and protocols: |
| | a. IEEE 802.2 |
| | b. IEEE 802.3 |
| | i Network Interface Card (NIC) |
| | ii Media access control (MAC) Addressing |



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| | iii Cables |
| | c. Define in basic terms the OSI model |
| | d. Define in basic terms the TCP/IP model |
| | i Packets |
| | e. Define the basic processes for each of the following provisioning protocols |
| | i Dynamic Host Configuration Protocol/ Domain Name System (DHCP/DNS) |
| | ii Time of Day (ToD) |
| | iii Trivial File Transfer Protocol (TFTP) |
| | 18. Communications Assistance for Law Enforcement Act (CALEA) |
| | a. Define |
| | 19. Be aware of the term Advanced Televisions Systems Committee (ATSC) |
| | 20. Local Franchise Agreement |