

## **SPECIFICATION STANDARD**

### **Commissioning and Acceptance**

**27 08 00**

## **PART 1: GENERAL**

This section intends to establish complete service requirements for inspection, testing, verification, and documentation of telecommunications infrastructure, cabling, and equipment, upon request, at the University of New Mexico following these specifications and applicable UNM IT requirements and codes.

This specification includes requirements for all types of commissioning including continuous commissioning, milestone monitoring, acceptance commissioning, third-party verification, internal commissioning, acceptance, and network operability, depending upon the project's requirements.

It includes the commissioning of all types of telecommunications infrastructure work including but not limited to structured cabling systems, network analysis, optical fiber cabling systems, coaxial cabling systems, outside plant cable, duct banks, multiduct, trenches, maintenance holes, and aerial pole line distribution.

The Contractor, designated agent, or employee is held responsible to be familiar with the provisions contained herein and with other Sections of this Specification as applicable to the completion of the installation.

### **1.01 SCOPE OF WORK**

All services will be contracted or provided by UNM IT and will be considered to be part of the project scope and budget. The need for commissioning or acceptance will be determined by UNM IT. Work covered by this Section shall consist of furnishing labor, equipment, supplies, materials, and test equipment unless otherwise specified to verify compliance.

### **1.02 QUALIFICATIONS**

A. The Contractor shall send only fully qualified personnel to perform work under this section of work.

1. The contractor shall have a fully qualified (RCDD or equivalently qualified) IT Commissioning Agent overseeing operations for the project.
2. Any licensing requirements shall be fulfilled for all work.
3. The Contractor shall provide, a complete list of personnel proposed to perform the work, listing their qualifications and experience with the type and size of work required by the project.
4. Each Technician, Journeyman, and Equipment Operator will have a minimum of five (5) years of experience with all applicable telecommunications systems.

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5. The commissioning agents shall be certified by the manufacturer of the testing equipment used to perform the commissioning of the project.

## **PART 2: PRODUCTS**

### **2.01 PRODUCTS STANDARD**

- A. All work performed and commissioned shall be done following the most current version and requirements of the following references:

1. Division 26 Electrical Division
2. Division 27 Communications Systems
3. Division 28 Electronic Safety and Security.
4. BICSI Wireless Design Manual
5. BICSI Customer-Owned Outside Plant Design Manual
6. BICSI Telecommunications Distribution Design Manual
7. TIA Standards: 568, 569, 607, 758
8. National Electrical Code.
9. National Electrical Safety Code
10. Related NFPA Codes and Standards.
11. Underwriters Laboratories or approved Testing Lab.
12. The manufacturer's specifications, installation, and warranty requirements.
13. The project plans and specifications.

## **PART 3: EXECUTION**

### **3.01 Commissioning Contractor Requirements**

**The IT Commissioning Contractor must be approved by UNM IT to provide this service for communications projects both on and off campus.**

- A. The University of New Mexico owns, operates, and maintains copper and optical fiber cable distribution systems, structured cabling systems, infrastructure, and networks serving its Campuses. UNM IT campus system consists of voice and data networks, structured cabling systems, copper and optical fiber inter and intra-building cabling and infrastructure systems, wireless, voice, and data systems, and other support facilities. These systems are considered typical of those found on most University campuses.

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- B. Because of the nature of many of the occupancies in UNM Buildings, the efficient operability of voice and data networks is critical to the operations of the University. The efficiency of voice and data networks cannot be verified until the network is operating at its highest potential or has undergone complete testing and verification under the UNM IT Commissioning Specification Standard, third party verification and acceptance of voice and data facilities are necessary to provide guarantee of a system's optimal performance.
- C. Work covered by this Section shall consist of furnishing labor, equipment, supplies, materials, test equipment, deficiency reports, and other requirements specified in the project plans and procurement documents.
- D. When commissioning and/or acceptance is managed internally by UNM IT, the UNM IT cabling Contractor shall provide any field and verification reports, photographs, test reports, inspections, punch list, or other items and documentation identified in this section as requested by UNM IT.
- E. The Contractor shall have the ability to provide complete testing and verification capabilities.
- F. All test equipment shall be certified, and calibrated to meet manufacturers' requirements and meet the performance requirements of Underwriter's Laboratories (UL), ETL – SEMKO, the manufacturer's systems specifications/requirements, and most current TIA/EIA standards as it applies to the specified testing application.
- G. Each Contractor shall be knowledgeable of work to be performed by other trades and take necessary steps to integrate and coordinate their work with other trades.
- H. All work performed in occupied spaces shall be in a manner that allows the owner to operate the existing facilities continuously.
- I. All user outages, including wireless access points, shall be submitted to the UNM IT Department for approval two weeks before starting work that will affect user connectivity.
- J. The contractor is required to obtain all permits from the proper jurisdictions for all work associated with this specification.
- K. The Contractor is to provide to UNM IT all reports, documentation, and test results at substantial completion in a UNM IT-approved format.

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- L. All work performed or verified must be compliant with the UNM IT Guide Specifications, and Design Guidelines and follow the installed product's manufacturer's instructions and procedures.
- M. UNM IT shall provide technical assistance in identifying/specifying commissioning and testing requirements as they pertain to the specific project.
- N. The UNM IT will provide access to the buildings, premises, or facilities. In addition, the Contractor may obtain keys to the buildings and certain areas within them on an "as-needed" basis and with the payment of a refundable per key deposit from the UNM Lock Shop. The contractor is responsible to obtain all training and badges required to perform the work.
- O. The Commissioning Contractor shall arrange directly with the project's contractors for site access not controlled directly by the University. The University will assist the Contractor in obtaining access to these areas when needed.
- P. UNM will assist in obtaining entry/access to equipment rooms, tunnels, and facilities.
- Q. The work under this contract shall consist of furnishing materials; test equipment and qualified labor to test, evaluate and document communications layer one system throughout the UNM IT system.
- R. The Commissioning Agent shall provide certified structured cabling system technicians on-site to perform operations related to the testing and evaluation.
- S. The contractor is to commit to all listed and applicable standards including current Technical Service Bulletins (TSBs) and addendums.
- T. The Commissioning Agent shall deliver the following test and reports as specified in the work order for the project:
  - 1. Provide Field Verification and Deficiency Report(s), photographs, and installation evaluations of the structured cabling system's infrastructure and spaces. Verify to the most current versions of ANSI/TIA 569, UNM IT Specifications, Standards and Guidelines, the National Electrical Code, applicable codes/ordinances, the structured cabling manufacturer's warranty requirements, the infrastructure system's manufacturers specifications, and the project specification and drawings.
  - 2. Provide Field Verification and Deficiency Report(s), photographs, and

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installation evaluations of the structured cabling. Verify the most current versions of ANSI/TIA 568, UNM IT Specifications, Standards, and Guidelines, test using the TIA 568 link performance requirements, the National Electrical Code, applicable codes/ordinances, the structured cabling manufacturer's warranty requirements, the cabling systems system's manufacturer's specifications, and the project specifications and drawings.

3. Provide Field Verification and Deficiency report (s), photographs, and installation evaluation of the grounding and bonding system to TIA 607, UNM IT Specifications and Guidelines the National Electric Code specification and drawings. Include verification of ohms of resistance at all ground bars.
4. Provide Field Verification and Deficiency report (s), photographs, and installation evaluation of labeling for installed systems, infrastructure, facilities, and equipment according to the manufacturer's warranty requirements, UNM IT specification, guidelines, and the project's specification and drawings.
5. Provide Network Verification and Deficiency report (s), including but not limited to: Network Service Availability, Ethernet Utilization and the presence of network error, port identification, verify link connectivity, verify Power Over Ethernet, service activation documentation, troubleshooting link and, and other network performance and documentation testing as per the manufacturer's specifications or as specified.
6. Provide Field Verification and Deficiency report (s), photographs, and installation evaluation of the outside plant copper and optical fiber cable, facilities, and infrastructure to EIA/TIA 758 BICSI Customer Owned Outside Manual Plant Manual, UNM IT specifications and guidelines, the National Electrical Code, National Electrical Safety Code, applicable codes/ordinances, the structured cabling systems manufacturers warranty requirements, the infrastructure system's manufacturers specifications, cable systems manufacturers specifications, and the project specification and drawings. Include the following in-field verification.
  1. Neat and workman-like manner
  2. Installation evaluation
  3. Placement
  4. Conduits and seals
  5. Multiducts

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6. Labeling
  7. Trench
  8. Copper cable
  9. Optical Fiber cable
  10. Splices – bonding, color coding, neatness, fold back, etc.
  11. Splice cases instructions
  12. Manholes and apparatus
  13. Pole setting and hardware
  14. Grounding and bonding
  15. Waterproofing compound
  16. Cleanup & Restoration
6. Provide Field Verification and Deficiency report (s), photographs and installation evaluation of fire-stopping.
1. Verify proper use of listed applications to applicable codes
  2. Verify photographs
  3. Verify labeling
  4. Verify submittals
7. Testing of the Optical Fiber
- A. Test to all TIA/EIA specifications on all wavelengths.
1. TIA-526-7 for single mode fiber
  2. TIA-526-14 for multimode fiber
8. A test sample of structured cabling. Include in reports all test results, not only pass/fail using the current Fluke tester and software
1. Category 6-testing as specified and providing test equipment specified and/or approved by UNM IT.
  2. Category 6 Augmented F/UTP – testing as specified and providing test equipment specified and/or approved by UNM IT. Comparison of sample testing to contractor test results
9. Provide testing of outside plant copper cable pairs and grounds including:
1. Line mapping result: Pass/Fail
  2. Proper wiring configuration for cable pairs and bundles
  3. Open conductors – provide
  4. Footage for failures
  5. Split pairs
  6. Reversed pairs
  7. Shorts – provide ohms & provide loop resistance in ohms
  8. Grounds – provide ohms & distance to fault on failures
  9. Crossed pairs

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10. Sheath and ground rod resistance test in ohms

10. Provide all test results in the following format.

1. Two (2) – paper copies bind in notebook form
2. Two (2) – electronic formats on a Thumb drive
3. Provide test results in EXCEL Format

11. Evaluate project drawings and specifications to determine and report deficiencies in the design.

12. Verify red lines (as-builts to submittals) to installation to determine and report deficiencies.

U. Scheduling: Work performed under this Contract shall usually be performed during normal working hours (8 A.M. to 5 P.M.) and on normal working days, Monday through Friday, unless otherwise specifically requested and authorized by a duly designated agent of the University (See paragraph F. below). The Contractor shall make every attempt to schedule the work so as not to interfere with the operations of the affected project, department, or user(s).

V. UNM designated agent/designee: The name(s) of such duly designated agent(s) shall be supplied to the Contractor within ten (10) days after the date of Contract award.

W. Work request: The Contractor shall be authorized to perform work through the issuance of a Work Order, executed proposal, or other written order issued by the duly designated agent(s) of the University. The order will specify the work location and a general description of the problem or work to be performed. The designee will also provide a briefing on the work to be performed. A copy of the work order authorization, reports, photographs, and drawings must be submitted with any invoice for payment and must be signed/authorized by the UNM designee.

X. Emergency Response: If the work is classified by the University's designee as an "Emergency Request", such work will be scheduled by the Contractor at once and shall automatically authorize the Contractor to perform overtime work if the work must be performed during non-standard working hours. Response to "Emergency Work" shall be immediate and shall be handled following this paragraph and the General Conditions.

Y. Identification; while working on campus, all of the Contractor's employees are to wear UNM/UNMH identification cards in addition to uniforms, badges, etc.

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indicating the Company and preferably the employee's name. The Commissioning agent and their representatives shall be attired professionally with the company's name and logo.

- Z. The Commissioning Agent and their representatives shall provide all personal protection equipment as required by the project.

**End of Section**