SUMMARY OF CHANGES IN THIS VERSION:

1. The Guarantee Period of Service clause has been removed from this spec. section. It has been replace with a requirement to comply with FAR clause, Warranty. See Article 3.4.
SECTION 27 31 00
VOICE COMMUNICATIONS SWITCHING AND ROUTING EQUIPMENT

SPEC WRITER NOTES:
1. Contact Department of Veterans Affairs, Veterans Health Administration (VHA), Telecommunications Support Service (TSSO-005N2), Telephone (301/427-3950) for technical assistance.
2. Edit between //---//. Delete if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the remaining paragraphs. Defer to VHA TSSO-005N2 for technical assistance and approval concerning all issues.

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installing, certification, testing, and guaranty of a complete and operating Telephone Electronic Private Branch Exchange (EPBX) equipment and interconnecting cable (not cable distribution plant) system (here-in-after referred to as “the System”), and associated equipment to be installed in the VA //Medical Center//, //Out Patient Clinic//, //Nursing Home Care Unit//, //Domiciliary//, or ____________________ here-in-after referred to as “the Facility”. The System shall include, but not be limited to, telephone processing switch, equipment cabinets, interface enclosures, and relay racks, stand-by battery(s), necessary combiners, traps, and filters; interconnection nodes and/or amplifiers; telephone instruments; auxiliary systems; and necessary passive devices such as: protectors, isolators, splitters, couplers, cable “patch”, “punch down”, and cross-connector blocks or devices, cable management items, voice and digital cable distribution system, and associated hardware. The System shall additionally include, but not be limited to: telecommunication closets (TC); telecommunication outlets (TCO) copper and fiber-optic interconnecting cables, connectors, “patch” cables, and/or “break out” devices.

B. The System shall be delivered free of engineering, manufacturing, installation, and operating defects. It shall be designed, engineered and installed for ease of operation, maintenance, and testing.
C. The term “provide”, as used herein, shall be defined as: designed, engineered, furnished, installed, certified, and tested, by the Contractor.

D. The Telephone System is defined as an Emergency Critical Care Communication System by the National Fire Protection Association (NFPA). Therefore, its installation and operation shall adhere to all appropriate National, Government, and/or Local Life Safety and/or Support Codes, which ever are the more stringent for this Facility. At a minimum, the System shall be installed according to NFPA, Section 70, National Electrical Code (NEC), Article 517 and Chapter 7; NFPA, Section 99, Health Care Facilities, Chapter 3-4; NFPA, Section 101, Life Safety Code, Chapters 7, 12, and/or 13; Joint Commission on Accreditation of Health Care Organization (JCAHCO), Manual for Health Care Facilities, all necessary Life Safety and/or Support guidelines; this specification; and the original equipment manufacturer's (OEM) suggested installation design, recommendations, and instructions. The OEM and Contractor shall ensure that all management, sales, engineering, and installation personnel have read and understand the requirements of this specification before the System is designed, engineered, delivered, and provided.

E. The VA Project Manager (PM) and/or if delegated, Resident Engineer (RE) are the approving authorities for all contractual and mechanical changes to the System. The Contractor is cautioned to obtain in writing, all approvals for system changes relating to the published contract specifications and drawings, from the PM and/or RE before proceeding with the change.

1.2 RELATED WORK

A. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Section 27 05 11, REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS.
C. Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS.
D. Section 27 10 00, STRUCTURED CABLEING.
E. Section 26 27 26, WIRING DEVICES.
F. Section 27 05 26, GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS.
G. Section 26 41 00, FACILITY LIGHTNING PROTECTION.
H. Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLEING.
//I. Section 27 31 31, VOICE COMMUNICATIONS SWITCHING AND ROUTING EQUIPMENT - EXTENSION.//
//J. Section 27 51 16, PUBLIC ADDRESS AND MASS NOTIFICATION SYSTEMS.//
1.3 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only. Except for a specific date given, the issue in effect (including amendments, addenda, revisions, supplements, and errata) on the date the system’s submittal is technically approved by VA, shall be enforced.

B. Joint Commission on Accreditation of Health Care Organization (JCAHO) Comprehensive Accreditation Manual for Hospitals

C. National and/or Government Life Safety Code(s): The more stringent of each listed code.

D. National Fire Protection Association (NFPA):

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<tbody>
<tr>
<td>70</td>
<td>National Electrical Code (NEC)</td>
</tr>
<tr>
<td>75</td>
<td>Protection of Electronic Computer/Data Processing Systems</td>
</tr>
<tr>
<td>77</td>
<td>Recommended Practice on Static Electricity</td>
</tr>
<tr>
<td>99</td>
<td>Standard for Health Care Facilities</td>
</tr>
<tr>
<td>101</td>
<td>Life Safety Code</td>
</tr>
<tr>
<td>1221</td>
<td>Emergency Services Communication Systems</td>
</tr>
</tbody>
</table>

E. Underwriter’s Laboratories, Inc. (UL):

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</thead>
<tbody>
<tr>
<td>65</td>
<td>Wired Cabinets</td>
</tr>
<tr>
<td>96</td>
<td>Lightning Protection Components</td>
</tr>
<tr>
<td>96A</td>
<td>Installation Requirements for Lightning Protection Systems</td>
</tr>
<tr>
<td>467</td>
<td>Grounding and Bonding Equipment</td>
</tr>
<tr>
<td>497/497A/497B</td>
<td>Protectors for Paired Conductors/Communications Circuits/Data Communication and Fire Alarm Circuits</td>
</tr>
<tr>
<td>884</td>
<td>Underfloor Raceways and Fittings</td>
</tr>
</tbody>
</table>
F. American National Standards Institute/Electronic Industries /Telecommunications Publications (ANSI/EIA/TIA):

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<table>
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<tbody>
<tr>
<td>568B</td>
<td>Commercial Building Telecommunications Wiring Standard</td>
</tr>
<tr>
<td>569B</td>
<td>Commercial Building Standard for Telecommunications Pathways and Spaces</td>
</tr>
<tr>
<td>598C</td>
<td>Optical Fiber Cable Color Coding</td>
</tr>
<tr>
<td>606A</td>
<td>Administration Standard for the Telecommunications Infrastructure of Commercial Buildings</td>
</tr>
<tr>
<td>607A</td>
<td>Grounding and Bonding Requirements for Telecommunications in Commercial Buildings</td>
</tr>
<tr>
<td>758</td>
<td>Customer-Owned Outside Plant Telecommunications Infrastructure Standard</td>
</tr>
</tbody>
</table>


H. International Telecommunication Union – Telecommunication (Standardization Sector (ITU-T)).


1.4 QUALITY ASSURANCE

A. The authorized representative of the System’s OEM shall be responsible for the design, satisfactory total operation of the system, and its certification.

B. The OEM shall meet the minimum requirements identified in Paragraph 2.1.A. Additionally, the Contractor shall have had experience with three or more installations of systems of comparable size and complexity with regard to coordinating, engineering, testing, certifying, supervising, training, and documentation. Each of these installations shall have been in successful operation for a minimum of three years after final acceptance by the user. These installations shall be provided as a part of the submittal identified in Paragraph 1.5.
C. The System Contractor shall submit certified documentation that they have been an authorized distributor and service organization for the OEM for a minimum of three (3) years. The System Contractor shall be authorized by the OEM to certify and warranty the installed equipment. In addition, the OEM and System Contractor shall accept complete responsibility for the design installation, certification, and physical support for the system. This documentation, along with the System Contractor and OEM certifications must be provided in writing as a part of the Contractor’s Technical submittal.

D. The Contractor’s Telecommunications Technicians assigned to the system shall be fully trained, qualified, and certified by the OEM on the engineering, installation, and testing of the System. The Contractor shall provide formal written evidence of current OEM certification(s) for the installer(s) as a part of the submittal or to the RE before being allowed to commence work on the System.

1.5 SUBMITTALS

A. Provide submittals in accordance with Specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. The RE shall retain one copy for review and approval.

1. If the submittal is approved the RE shall retain one copy for Official Records and return three (3) copies to the Contractor.

2. If the submittal is disapproved, three copies will be returned to the Contractor with a written explanation attached indicating the areas where the submittal deviated from the System Specifications. The RE shall retain one copy for Official Records.

B. Documents: The submittal shall be separated into sections for each subsystem and shall contain the following:

1. Title page to include:
   a. VA Medical Center
   b. Contractor’s name, address, and telephone (including FAX) numbers
   c. Date of Submittal
   d. VA Project No.

2. List containing a minimum of three locations of installations of similar size and complexity as identified herein. These locations shall contain the following:
   a. Installation Location and Name: Owner’s or User’s name, address, and telephone (including FAX) numbers.
   b. Date of Project Start and Date of Final Acceptance by Owner.
c. System Project Number.
d. Brief (three paragraphs minimum) description of each system’s function, operation, and installation.

3. Narrative Description of the system as it is expected to be installed.

4. A list of the equipment to be furnished. The quantity, make and model number of each item is required.

   SPEC WRITER NOTE: Select the required equipment items quantities that will satisfy the needs of the system and edit between the // - //. Delete equipment items that are not required and renumber section as per system design.

The following is the minimum equipment required by the System:

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ea.</td>
<td>EPBX</td>
</tr>
<tr>
<td>1 ea.</td>
<td>Back-up Battery Power Supply</td>
</tr>
<tr>
<td>//As required//</td>
<td>AC Power Supply</td>
</tr>
<tr>
<td>//As required//</td>
<td>TMS</td>
</tr>
<tr>
<td>//As required//</td>
<td>Attendant Console</td>
</tr>
<tr>
<td>1 ea.</td>
<td>Lightning Protection System</td>
</tr>
<tr>
<td>//As required//</td>
<td>Equipment Cabinets</td>
</tr>
<tr>
<td>//As Required//</td>
<td>Environmental Cabinet</td>
</tr>
<tr>
<td>//As required//</td>
<td>Audio Monitor Panel</td>
</tr>
<tr>
<td>//As required//</td>
<td>Trouble Annunciator Panel</td>
</tr>
<tr>
<td>//As required//</td>
<td>Interface/Distribution Cabinet</td>
</tr>
<tr>
<td>//As required//</td>
<td>Microphone Page Console</td>
</tr>
<tr>
<td>//As required//</td>
<td>Stand Alone Relay Rack</td>
</tr>
<tr>
<td>//As required//</td>
<td>CCS</td>
</tr>
<tr>
<td>//As required//</td>
<td>Wire Management System/Equipment</td>
</tr>
<tr>
<td>Reference Only</td>
<td>Telephone Instruments</td>
</tr>
<tr>
<td>Reference Only</td>
<td>Distribution System</td>
</tr>
<tr>
<td>1 ea.</td>
<td>Installation Kit</td>
</tr>
<tr>
<td>//As required//</td>
<td>Separate List Containing Each</td>
</tr>
<tr>
<td>Equipment Spare(s)</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td>//As required// System Conduits, Cable Duct, and/or Cable Tray</td>
<td></td>
</tr>
<tr>
<td>//As required// Telephone Paging Adapter (one each required for PA, Radio, and Dial Dictation sub-systems) //</td>
<td></td>
</tr>
<tr>
<td>//As required// Time Out Device (one each required for PA, Radio, and Dial Dictation sub-systems) //</td>
<td></td>
</tr>
</tbody>
</table>

5. EPBX cabinet and each interface cabinet layout drawing, as each is to be installed.

6. Equipment technical literature detailing the electrical and technical characteristics of each item of equipment to be furnished.

7. Engineering drawings of the System, showing calculated signal levels at the EPBX output, each input and output distribution point, proposed telephone outlet values, and signal level at each telephone outlet multipin jack.

8. List of test equipment as per paragraph 1.5.D below.

9. Letter certifying that the Contractor understands the requirements of the Samples Paragraph 1.5.E.

10. Letter certifying that the Contractor understands the requirements of Section 3.2 concerning tests.

C. Environmental Requirements. Technical submittals shall confirm the environmental specifications for physical TC areas occupied by the System. These environmental specifications shall identify the requirements for initial and expanded System configurations for:

1. Floor loading for batteries and cabinets.
2. Minimum floor space and ceiling heights.
3. Minimum size of doors for equipment passage.
4. Power requirements: The Contractor shall provide the specific voltage, amperage, phases, and quantities of circuits required.
5. Air conditioning, heating, and humidity requirements. The Contractor shall identify the ambient temperature and relative humidity operating ranges required to prevent equipment damage.
6. Air conditioning requirements (expressed in BTU per hour, based on adequate dissipation of generated heat to maintain required room and equipment standards).
7. Proposed floor plan, based on the expanded system configuration of
   the bidder's proposed EPBX for this Facility.
8. Conduit size requirement (between main TC, computer, and console
   rooms).

D. Test Equipment List

1. The Contractor is responsible for furnishing all test equipment
   required to test the System in accordance with the parameters
   specified. Unless otherwise stated, the test equipment shall not be
   considered part of the System. The Contractor shall furnish test
   equipment of an accuracy better than the parameters to be tested.

2. The test equipment furnished by the Contractor shall have a
   calibration tag of an acceptable calibration service dated not more
   than 12 months prior to the test. As part of the submittal, a test
   equipment list shall be furnished that includes the make and model
   number of the following type of equipment as a minimum:
   a. Spectrum Analyzer
   b. Signal Level Meter
   c. Volt-Ohm Meter
   d. Time Domain Reflectometer (TDR) with strip chart recorder
   e. Bit Error Test Set (BERT)
   f. Camera with a minimum of 60 pictures to that will develop
      immediately to include appropriate test equipment adapters. A
      video camera in VHS format is an acceptable alternate.

E. Samples: A sample of each of the following items shall be furnished to
   the RE for approval prior to installation. The samples may be returned
   to the Contractor at the discretion of the RE:

1. TCO Wall Outlet Box 100 mm x 100 mm x 63 mm (4" x 4"x 2.5") with:
   a. One each telephone (or voice) RJ45 jack installed.
   b. Two each multi pin data RJ45 jacks installed.
   c. Cover Plate installed.
   d. Fiber optic ST jack(s) installed. //
   e. RF (F)/video (BNC)/audio (XL) jack(s) installed. //

2. Data CCS patch panel, punch block or connection device with RJ45
   connectors installed.
3. Telephone CCS system with IDC and/or RJ45 connectors, cable
   terminal, and cable management equipment installed.
4. 610 mm (2 foot) section of each copper cable to be used with
   connectors installed and OEM cable sweep compliance and/or
certification tags as specified in Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLE, paragraph 2.4.B.

//5. 610 mm (2 foot) section of each fiber optic cable to be used with connectors installed and OEM cable sweep compliance and/or certification tags as specified in Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLE, paragraph 2.4.B.

//6. Fiber optic CCS patch panel or breakout box with cable management equipment and “ST” connectors installed. //

7. UPS equipment (if required by system design).

F. Certifications:

1. Submit written certification from the OEM indicating that the proposed supervisor of the installation and the proposed provider of the contract maintenance are authorized representatives of the OEM. Include the individual's exact name and address and OEM credentials in the certification.

2. Submit written certification from the OEM that the wiring and connection diagrams meet National and/or Local (whichever is the more stringent) Life Safety Guidelines, NFPA, NEC, UL, this specification, and JCAHCO requirements and instructions, requirements, recommendations, and guidance set forth by the OEM for the proper performance of the System as described herein. The VA will not approve any submittal without this certification.

3. Preacceptance Certification: This certification shall be made in accordance with the test procedure paragraph 3.2.B.

G. Equipment Manuals: Ten (10) working days prior to the scheduled acceptance test, the Contractor shall deliver four (4) complete sets of commercial operation and maintenance manuals for each item of equipment furnished as part of the System to the RE. The manuals shall detail the theory of operation and shall include narrative descriptions, pictorial illustrations, block and schematic diagrams, and parts list.

H. Record Wiring Diagrams:

1. Fifteen (15) working days prior to the scheduled acceptance test, the Contractor shall deliver four complete sets of the record wiring diagrams of the System to the RE. The diagrams shall show all inputs and outputs of electronic and passive equipment correctly identified according to the markers installed on the interconnecting cables, equipment and room/area locations. The wiring diagrams shall show the signal levels of the aural carriers of each audio channel at the
input and output of all electronic equipment, at the beginning and end of each distribution line, and at the speakers. The record wiring diagrams shall be provided in hard copy and two compact disk copies properly formatted to match the Facility’s current operating version of Computer aided drafting (AUTO CAD) system. The RE shall verify and inform the Contractor of the current version of AutoCAD being used by the Facility.

2. Ten (10) days prior to the start of the intermediate test, provide a typewritten detailed description of the System testing plan that meets this specification’s performance standards as indicated in paragraph 2.1.B including illustrations and utilizes the test equipment specified in paragraph 1.5.D. The test plan will need to be evaluated and approved by the RE before intermediate testing begins.

I. Provide two copies of an OEM developed training videotape presentation (reference paragraph 3.3.B) for evaluation and approval by the RE.

J. Provide a typewritten document that details the complete record program in memory for all associated station assignments.

K. Needs Analysis (required for replacement of existing systems): The Contractor shall conduct a needs analysis of the existing Facility with representative’s from the IRM and various departments to determine the System’s requirements. The analysis shall depict System features and capacities, in addition to specific site requirements. The analysis shall be typewritten and contain the following information as a minimum:

1. The EPBX shall initially provide:

<table>
<thead>
<tr>
<th>ITEM WIRED</th>
<th>EQUIPPED CAPACITY</th>
<th>WIRED CAPACITY</th>
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<tbody>
<tr>
<td>Main Station Lines:</td>
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<tr>
<td>Single Line</td>
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<tr>
<td>Multi Line</td>
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<td></td>
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<tr>
<td>(Equipped for DID)</td>
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<tr>
<td>Central Office Trunks:</td>
<td></td>
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<tr>
<td>Two Way</td>
<td></td>
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<tr>
<td>DID</td>
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<tr>
<td>Two-way DRTL</td>
<td></td>
<td></td>
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<tr>
<td>Foreign Exchange (FX)</td>
<td></td>
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<tr>
<td>Conference</td>
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</tbody>
</table>
2. Projected Maximum Growth: The Contractor shall identify the projected maximum growth for each item identified in Paragraph 1.5.B.4. as a part of the needs analysis. For this purpose, the following definitions are provided to detail the System’s capability:

a) All software and hardware required to completely equip the EPBX with all items listed under equipped capacity, shall be provided and installed by the contractor 30 days prior to system cut-over.
b) Wired Capacity" is to include all wiring and equipment listed under wired capacity, with the exception of line, data, and trunk cards, and shall be provided, installed, and tested 30 days prior to system cutover.
c) The EPBX shall be capable of expansion to the projected maximum growth through the use of printed circuit boards and/or modular cabinets that do not require extensive re-wiring and reprogramming.

3. Cable Distribution System: See Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING, for specific cable distribution system requirements. The Contractor is required to formulate a projected cable and TCO count that coincides with the Projected Maximum Growth described herein.

4. Telephone Instruments (Stations): Telephone instruments are an integral component of the System. The Contractor shall indicate each instrument location, type of instrument and class of service as determined by the needs analysis // or as shown on the drawings //.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. SYSTEM REQUIREMENTS:
SPEC WRITER NOTE: Confer with the respective Chiefs of Medical Media, IRM, and Engineering Services; plus, technical assistance and approval from VHA TSSO-005N2 in order to select and insert the following paragraph(s) required by system design. At least one or more of these paragraphs must be used to ensure patient data access from each patient bed location. Edit between the // ------- // and renumber the remaining paragraphs, as required.

1. The System shall perform the following minimum services that are designed in accordance with and supported by an Original Equipment Manufacturer (OEM), and as specified herein. The System shall provide continuous inter and/or intra-Facility voice service. The System shall be capacity sized so that loss of connectivity to an external telephone system(s) shall not affect the Facility’s operation in specific designated emergency operating locations and instruments. The System shall:

   a. Inter-operate, connect, and function fully with the existing Local (Telephone) Exchange Company (LEC) Network(s), Federal Telephone System (FTS) Inter-city Network(s), Inter-exchange Carriers, and Integrated Services Digital Network (ISDN), at a minimum.

   b. Contain control and switching equipment that shall be a voice and digital EPBX with attendant console(s). Contain voice mail and automatic attendant functions and continuous intra and/or inter Facility voice service. Additionally, a universal night answering function from Facility designated remote locations shall be provided.

   c. Direct access to trunk level equipment including audio paging, Industry Standard “T” and/or “DS” carrier protocols, and external protocol converters. Additionally, connections to “T” and/or “DS” access/equipment or Customer Service Units (CSU) that are used in FTS and other trunk applications shall be included in the System design. The Contractor shall provide all T-1 equipment necessary to terminate and make operational the quantity of circuits designated. The CSUs shall be connected to the System’s emergency battery power supply. The System shall be fully capable of
operating in the Industry Standard “DS” protocol and provide that level of service when required.

d. Contain attendant and operator consoles, video monitors with keyboards, and printers to provide employee directory access from the Traffic Management System (TMS). All console positions, video monitors, and keyboards shall have identical capabilities. The System shall accept a mixture of trunk types at the attendant console and extend calls received via these trunks to station users.

e. Be capable of interfacing and operating with Direct-Incoming-Dial (DID) service to stations as identified herein. Assignment to DID shall not affect intra-Facility operation. A DID trunk group, which will operate as a separate trunk group from other Central Office (CO) trunks shall be provided as described herein.

f. Contain the designated number of telephone instruments, where each instrument (also referred to as "station") shall have the ability to direct dial other Facility telephone stations, the public telephone network, tie-lines, and FTS telephone numbers without attendant assistance. Each station shall be dual tone multi-frequency (DTMF) for intra-Facility and external-Facility calling. The term DTMF, as used herein, shall be defined as “a dialing operation (e.g., push-button, digit dialing, or tone dialing, other than rotary/pulse dialing).

1) Standard digital telephone instruments shall be provided to the designated TCOs and as shown on the drawings.

2) "Special hands free" digital telephone instruments shall be provided at designated TCOs and as shown on the drawings.

g. Receive the specified telephone signals acquired from the LEC and FTS contracted carrier, shall process and distribute them to the designated telephone stations, as determined by Class Of Service and indicated on the drawings.

h. At a minimum, one // or _____ // TCO(s) shall be provided on each telephone switch room //, computer room// //, or TC// wall and on either side of each door opening, and shall be supplied with an associated (within 305 mm (one foot)) active duplex 120 Volts Alternating Current (VAC) outlet (using a quad receptacle box for the TCO and a separate duplex receptacle box for the AC outlet) and as shown on the drawings.
1) The telephone multipin jack shall be interfaced and connected to the system via 110 or equivalent type punch blocks the switch room //, computer room// //, and TC//. All connections shall support Category 6 level of service requirements.

2) The construction of distribution TCOs is found in Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.

3) The appropriate distribution cable termination method is found in Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.

4) The appropriate distribution TC construction is found in Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.

i. Perform adjacent channel operation of a minimum of local, long distance, and FTS telephone signals. The System equipment shall be installed and interfaced according to the OEM's schematic diagram for adjacent telephone channel operation. The System shall be provided with testing capability in each equipment rack and have test ports that provide access for each telephone channel without the need to disconnect distribution cables or equipment. Each telephone channel shall be processed as a single channel. A means of monitoring the complete system along with appropriate printout and computer disk archiving of each processed and distributed channel.

2. The System shall be designed to minimize cross talk, background processor noise, inter-modulation, and other signal interference. The EPBX equipment shall be installed and interfaced according to the OEM head-end schematic diagram for adjacent audio channel operation. Each audio input channel shall be processed as a single separate channel and combined into one output channel. Additionally, an audio and visual monitoring panel shall be provided in the telephone switch room to test each converted audio input and distribution channel //, and analog RF channels// transmitted and received signal functions as described herein. The System shall continuously electronically or electrically supervise the EPBX’s Alternating Current (AC) power input, stand by batteries and charger, and internal Direct Current (DC) power supply primary Voltages and/or Currents; each remote control unit, audio //, and
analog RF// interface unit, from the telephone switch room. A
trouble panel shall be provided in the telephone switch room and at
the telephone operator room, Security Service Control Console //,
MAS Emergency Room, // //, and/or _________// to check the
supervisory signals, signal level, audio sound and visual level, and
alert personnel to problems as described herein.

3. Refer to Section 1.3 for initial voice sizing requirements. Also
refer to Section 1.3 for initial data sizing requirements.

//4. At a minimum, the EPBX shall be equipped with://

//5. The following system channels shall be provided:

SPEC WRITER NOTE: Select and insert
required telephone and data channels.
Telephone channel selection should be
based on a survey matrix that identifies
each location and type of signals
approved for the system.

a. Telephone Channels: // _______, _______, _______, ______.//

// b. Spare inputs at the EPBX output combiner: minimum of ______

//.

6. Point Of Local (Telephone) Exchange Company Interface: The
Contractor is not responsible for the condition of the telephone
signals of the LEC system. If the telephone signals at the LEC
interface point do not meet the minimum signal level and quality as
stated herein, the Contractor shall notify the RE, in writing,
detailing the nature of the deficiencies, and the expected effect on
the telephone signals in the new system. The RE will coordinate with
the Facility Engineering Officer so the necessary repairs for the
identified deficiencies can be accomplished.

a. The System shall acquire telephone signals at //
____________________ // and as shown on the drawings.

b. A minimum of // _________ // emergency telephone connections
shall be acquired at // _________ // and connected to //
____________________ // back up circuits as shown on the drawings.

7. EPBX location selection. The EPBX cabinets and associated equipment
shall be located in the //basement, building _____, // //____
floor, building ____. // other ________ // and as shown on the
drawings.

B. System Performance:
1. The System shall support and fully operate in the following functional modes, at a minimum:
   a. Bit Rate Interchange (BRI) Functions.
   b. ISDN in both Standard and Broad Bandwidths.
   c. Fiber-optic Distributed Data Interface (FDDI).
   d. Industry Standard “T” Carrier in single and multiple channels.
   e. Industry Standard “DS” Carrier in single and multiple channels.

2. System Sensitivity: Satisfactory service shall be provided for at least 3,000 feet (ft) for all voice locations.

// 3. Other __________________________________________________ //

// 4.// At a minimum, the System shall meet the following operating parameters:

   a. EPBX:
      1) System speed: 1.0 giga-Bits (gb) per second, minimum
      2) Impedance: 600 Ohms, BA1
      3) Cross Modulation: -60 deci-Bel (dB)
      4) Hum Modulation: -55 dB
      5) System data error: 10 to the -10 Bits per second (Bps), minimum
      6) Loss: Measured at the frame output with reference Zero (0) deci-Bel measured (dBm) at 1,000 Hertz (Hz) applied to the frame input:
         a) Trunk to station: 1.5 dB, maximum
         b) Station to station: 3.0 dB, maximum
         c) Internal switch crosstalk: -60 dB when a signal of +10 dBm, 500-2,500 Hz range is applied to the primary path.
      7) Idle channel noise: 25 dB relative noise per channel (rnC) or 3.0 dBm @ 0 above (terminated) ground noise, whichever is greater
      8) Traffic Grade of Service for Voice: The minimum grade of service shall be P-01 with an average traffic load of 7.0 One Hundred Call Seconds (CCS) per station per hour.
      9) Average CCS per voice station: The average CCS capacity per voice station shall be maintained at 7.0 CCS when the EPBX is expanded up to the projected maximum growth as stated herein.

   b. Voice and Audio Standards:
1) Input and Output Signal Level: 0.0 dBm at 1 kilo Hertz (kHz) test tone modulation level. Each level shall be variable over a 6.0 dB range.
2) Input and Output Impedance: 600 Ohms Balanced (BAL)
3) Input and Output Signals: Terminated on each EPBX Unit
4) Frequency Range: 50 Hertz (Hz) to 3.0 kHz + 1.0 %, minimum
5) S/N Ratio: 60 deci-Bell per mili-Volt (dBmV) + 1.0 dBmV
6) Cross Modulation: -46 dB
7) Hum Modulation: -55 dB
8) Isolation (control unit to unit): 24 dB, minimum

c. Control Signal Standards:
   1) Input and Output Signal: 0.0 dBmV + 1.0 dBmV Level
   2) Input and Output Signals Terminated on each EPBX Unit
   3) Input and Output Impedance 600 Ohms, BAL
   4) Channel Bandwidth:
      b) Voice: 50 Hz to 3.0 kHz, + 5.0%, minimum
   5) S/N Ratio: 60 dBmV + 1.0 dBmV

d. Telephone Outlet (TCO):
   1) Isolation (outlet-outlet): 24 dB
   2) Impedance: 600 Ohms
   3) Signal Level: 0 dBmV + 0.1 dBmV
   4) System speed: 100 mega-Bits (mb) per second, minimum
   5) System data error: 10 to the -6 Bits per second, minimum

/C. The following auxiliary systems shall be provided as required by system design //

//I. The system shall interface and provide a Public Address System (PA) as described in SPECIFICATION SECTION 27 51 16, PUBLIC ADDRESS AND MASS NOTIFICATION SYSTEMS. Each telephone console shall have direct access to selected zones and all zone(s) paging. The console attendant shall also have "priority access" (or ALL CALL or CODE ONE or BLUE) to all zones. Selected station users shall have access to appropriate zone(s) via sub zone (s), by dialing the proper access. The Telephone Contractor is responsible for providing the required NFPA and UL certified device(s) for the PA to be interfaced to a designated Critical Care Emergency Communications Telephone System. The PA System "Emergency Life/Public Safety Rating" will be upgraded to include "Critical Care" by the connection to the telephone system, therefore the system will be installed to all appropriate
Life Safety Code Standards and Instructions. The system shall provide a feature to prevent the PA from being "locked up" by a user placing the system on hold or leaving the receiver "off-hook". //

D. General:

1. All equipment to be supplied under this specification shall be new and the current model of a standard product of an OEM of record. An OEM of record shall be defined as a company whose main occupation is the manufacture for sale of the items of equipment supplied and which:

   a. Maintains a factory production line for the item submitted.
   b. Maintains a stock of replacement parts for the item submitted.
   c. Maintains engineering drawings, specifications, and operating manuals for the items submitted.
   d. Has published and distributed descriptive literature and equipment specifications on the items of equipment submitted at least 30 days prior to the Invitation for Bid.

2. Specifications of equipment as set forth in this document are minimum requirements, unless otherwise stated, and shall not be construed as limiting the overall quality, quantity, or performance characteristics of items furnished in the System. When the Contractor furnishes an item of equipment for which there is a specification contained herein, the item shall meet or exceed the specification for that item of equipment.

3. Each item of equipment to be provided under this contract must bear the approved UL seal or the seal of the testing laboratory that warrants the equipment has been tested in accordance with, and conforms to the specified standards.

4. All supplies and materials shall be listed, labeled or certified by UL or a nationally recognized testing laboratory where such standards have been established for the supplies, materials or equipment. See paragraph Minimum Requirements Section 27 05 11, REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS and the guidelines listed in paragraph 2.J.2.

5. The Contractor shall provide written verification, to the RE at time of installation, that the type of wire/cable being provided is recommended and approved by the OEM. Cabling shall meet the requirements of U.L., the ANSI/EIA/TIA Wiring Standards and the requirements of NFPA 70 (NEC). The Contractor is responsible for
providing the correct protection, cable duct and/or conduit and wiring even though the actual installation may be by another subcontractor.

6. The Telephone Contractor is responsible for interfacing the telephone //, PA// //and, _________// systems with the System. The Contractor shall utilize interfacing methods that are approved by the OEM and VA. At a minimum, an acceptable interfacing method, requires not only a physical and mechanical connection; but, includes matching of signal, voltage, and processing levels, with regard to signal quality and impedance. Each interface point must adhere to all standards described herein for full separation of the Critical Care, Life Safety, and Emergency systems.

7. The telephone equipment and //PA interface equipment// shall be the interface points for connection of the //PA// interface cabling from the telephone switch via the System telephone interface unit. The telephone interface unit //and PA interface unit// shall be provided by the Telephone Contractor. //The Telephone Contractor is not allowed to make any connections to the PA system. //

8. Active electronic component equipment shall consist of solid state components, be rated for continuous duty service, and comply with the FCC standards for telephone equipment, systems, and service.

9. All passive distribution equipment shall meet or exceed -80 dB radiation shielding specifications.

10. All interconnecting twisted pair, fiber-optic cables shall be terminated on equipment terminal boards, punch blocks, breakout boxes, splice blocks, and unused equipment ports/taps shall be terminated according to the OEM’s instructions for telephone cable systems without adapters. The Contractor shall not leave unused or spare twisted pair wire, fiber-optic cable unterminated, unconnected, loose or unsecured.

11. The System shall utilize microprocessor components for all signaling, programming circuits and functions. Program memory shall be non-volatile or protected from erasure during power outages for a minimum of three days.

12. The System shall provide continuous electrical supervision of all telephone switch cabinet mounted equipment, interconnecting cabling, distribution cable plant, and the UPS back up battery and charger to
determine change in status and to assist in trouble shooting System faults.

13. All voltages, except for the primary power to the power supply circuits, shall not exceed 30V AC Root Mean Squared (RMS) or 42V direct current (DC).

14. Color code all distribution wiring to conform to the Telephone Industry standard, ANSI/EIA/TIA, and this document, which ever is the more stringent. At a minimum, all equipment, cable duct and/or conduit, enclosures, wiring, terminals, and cables shall be clearly and permanently labeled according to and using the provided record wiring diagrams, to facilitate installation and maintenance. Reference Specification (Section 27 10 00, STRUCTURED CABLING) and Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.

15. Connect the System’s primary input AC power to the Facility’s Critical Branch of the Emergency AC Power Distribution System as shown on the Drawings or if not shown on the Drawings consult with the RE regarding a suitable circuit location, prior to bidding.

16. Provide a UPS complete with backup battery for the System to operate and function normally (as if there was no AC power failure) in the event of an AC power failure for a minimum of four hours.

17. All equipment shall function and operate normally from the furnished power source, and also, during input power fluctuations or loss of power for a minimum of four hours.

18. Plug-in connectors shall be provided to connect all equipment, with the exception of interface points. Base band cable systems shall utilize barrier terminal screw type connectors, at a minimum. Crimp type connectors installed with a ratchet type installation tool are an acceptable alternate as long as the cable dress, pairs, shielding, grounding, connections and labeling are provided the same as the barrier terminal strip connectors. Tape of any type, wire nuts, or solder type connections are unacceptable and will not be approved.

19. All equipment faceplates utilized in the System shall be stainless steel, anodized aluminum, or UL approved cycolac plastic that matches the equipment item where it is installed. All faceplates shall be constructed of the same material throughout the Facility.

20. Noise filters and surge protectors shall be provided for each equipment interface cabinet, switch equipment cabinet, control
console, local, and remote active equipment locations to ensure protection from input primary AC power surges and noise glitches are not induced into low voltage circuits.

E. Equipment Functional Characteristics

<table>
<thead>
<tr>
<th>FUNCTIONS</th>
<th>CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>105 to 130 VAC</td>
</tr>
<tr>
<td>POWER LINE FREQUENCY</td>
<td>60 Hz ±2.0 Hz</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0 to 50 degrees (°) Centigrade (C)</td>
</tr>
<tr>
<td>Humidity</td>
<td>80 percent (%) minimum rating</td>
</tr>
</tbody>
</table>

2.2 EQUIPMENT ITEMS

A. Electronic Private Branch Exchange (EPBX) Equipment

1. The EPBX shall be fully self contained, electronic, digital in operation, and provide, as a minimum, the following functions:
   a. Intra-Facility station-to-station four digit direct dialing to include those telephone instruments equipped with the DID features.
   b. Direct-output-dial (DOD) from any unrestricted telephone instrument to any CO trunk or FTS access lines by dialing a pre-designated access code. Also, DOD from any station to tie lines by dialing a pre-designated access code.
   c. Incoming calls from FTS access lines and tie lines shall have the ability to direct dial all EPBX stations without attendant assistance.
   d. Restricted telephone instruments shall have access to outside lines through the operator's console.
   e. Unrestricted telephone instruments shall have access to all features, functions, CO trunks, FTS access lines, tie-lines, toll free 800 numbers, and long distance directory assistance.
   f. A minimum of 40 class-of-service (COS) restrictions shall be provided. These restrictions are to be applied individually or in combination as dictated by individual telephone number service requirements. Technical submittals shall describe the number and type of COS restrictions available.
   g. Provide all station users with the standard feature package listed below. The ability to restrict any of these features on a station by station basis shall be provided:
1) Line Hunt Capability: Sequential and circular line hunting lines shall be assigned to a hunt group and need not be in a numerical sequence. The Contractor shall specify the number of hunt groups available and the capacity of each group.

2) Consultation Hold: Telephone instruments or attendant console shall be able to place an incoming call on hold while making a consulting call, then return to the original call.

3) Call Transfer: Telephone instrument call transfer shall permit a user to transfer an incoming or outgoing CO trunk, FTS, or tie-line call to another EPBX station without attendant assistance.

4) Call Pick-Up: Telephone instruments shall have the capability of answering a ringing, but unanswered call, within a pre-designated group of station lines by dialing a feature code or activating a feature button.

5) Call Forwarding: Call forwarding "follow me" functions, when activated by telephone instruments, shall automatically reroute incoming calls to another selected telephone number. Selected telephone instruments shall have the capability of activating and deactivating this feature at their discretion. "Busy and don't answer" functions, shall automatically reroute calls to a pre-programmed secondary telephone instrument when a given telephone instrument is busy or does not answer within a prescribed time interval.

6) Call Queuing: The EPBX shall allow a telephone instrument encountering a busy trunk, e.g. CO, FTS, FX, and tie-lines, to be automatically connected to the trunk when it becomes available.

7) Call back/Ring back: When a telephone or data instrument initiates a call to another internal busy instrument, call back/ring back is activated at the calling instrument by an access code or feature button. When both instruments become idle, the EPBX shall automatically ring the calling instrument and, when answered, rings the called instrument. Activation of this feature shall not prevent the calling instrument from originating or receiving other calls.

8) Music on Hold: The Contractor shall provide music on hold to all EPBX station lines, CO trunks, FTS access lines, and tie-
lines when placed on hold. The acceptable music sources are compact disc player or audio cassette recorder player. The RE will inform the Contractor of the desired type of unit. Under no circumstances shall an off air AM or FM radio be used for this music.

9) Conferencing: A telephone instrument initiated conference (minimum of three parties) which allows stations to conference any combination of telephone instrument, CO, or FTS calls.

10) Automatic Number Identification: A facility where the directory number or equipment number of a calling instrument is obtained automatically for use in message accounting.

11) Station to Station Call Waiting: Busy telephone instruments shall be allowed to receive a second incoming call from another telephone instrument. The busy instrument, upon receiving a second incoming call shall receive a call waiting tone. The busy instrument shall be able to place the initial call on hold and answer the second call. The instrument shall have the capability of alternating between both calls.

12) Station and System Speed Dialing:
   a) System Speed Dialing (not less than 50 numbers) shall be provided to allow designated telephone instruments to originate speed calls to CO, FTS, FX, or tie lines.
   b) Station Speed Dialing shall be provided to support ten numbers per instrument. The instrument shall have the capability of entering, removing, or changing numbers programmed on their Station Speed dialing list.

13) Call Park: A telephone instrument feature will be provided which allows non-preselected internal instruments to access an attendant initiated feature in response to an internal / external paging situation.

14) Universal Night Answer Service: Provide a means of night service transfer for answering all incoming calls, which would normally be answered at the console, from locations other than the console. Chimes, with cut-off switches, to announce incoming calls shall be strategically placed at two locations.

15) Line Load Control: A pre-programmed attendant controlled feature which, when activated from the console positions, restricts all but selected stations from accessing the FTS and
CO trunks during emergency conditions. The activation of line load control shall not affect intra-facility communications, e.g., station to station, access to the Public Address system, audio-page, etc.

16) Dual Common Controls: The following are the minimum features required:
   a) Systems offering a stored program technology control feature shall provide a redundant common processing unit with automatic transfer capability.
   b) Either common control shall be capable of handling the total EPBX traffic load without degradation of service.
   c) In event of failure of the primary common control, the system shall automatically switch to the redundant unit with no interruption to calls in progress and no loss of program features.

17) Line Lock Out:
   a) In the event a telephone instrument handset is not replaced in the telephone instrument cradle, after a pre-determined time interval with no dial action, that station line shall be locked out, i.e., not tie up EPBX switch equipment.
   b) Locked out station lines shall have audible tone applied.
   c) When a locked out telephone instrument handset is restored, the associated station line shall automatically be restored to full service.

18) Supervisory Telephone (not Electrical or Electronic) Signaling and Ringing:
   a) Provide dual solid state signal generating devices, or equivalent, which produce standard supervisory signaling, i.e., ringing, dial tone, busy tone, etc. The failure of any one signal generating device shall not affect more than one-third of the installed main station line capacity.
   b) Dual solid state signal generating devices shall provide automatic transfer to the alternate signal generating device in the event of failure of the primary device.
   c) All supervisory signaling and ringing shall be equivalent to the telephone industry standard, as follows:
      (1) Tones shall be provided to indicate the progress of a call through the exchange, i.e. dial tone - to indicate
that the switching equipment is ready to receive dial
digits and, when required, provide a secondary dial tone
for FTS 2000 access; busy tone (60 to 120 IPM) – to
indicate that a busy line or trunk has been encountered;
audible ring back tone – to indicate to the calling
subscriber that the number dialed is being called.
(2) All supervisory signaling and ringing devices shall be
capable of operating from the emergency DC power source.

19) Fusing:
   a) The EPBX shall be equipped with fuses to protect the total
      telephone system and individual segments of the EPBX so
      that a problem in one segment may be isolated without
      damaging the total EPBX.
   b) Fuses shall be of the alarm indicating type and their
      rating designated by numerical or color code on fuse panels
      that are easily visible.

20) Equipment Power Supply:
   a) The EPBX shall be equipped with a complete on-line power
      supply. The system shall consist of AC surge protection,
      dual load-sharing rectifiers/chargers, batteries, and
      inverter.
   b) The power supply shall have a capacity sufficient to
      support the EPBX including it’s projected maximum growth
      and as required in this specification for interfaced
      equipment.
   c) The Contractor shall coordinate with the Local Exchange
      Company (LEC) to determine CO trunk, FTS access line, and
      other required interface unit power requirements and
      provide power to the LEC or Contractor furnished and
      installed interface units so they will continue to function
      in event of a commercial AC power failure.

21) UPS w/Battery Back-up or Reserve Battery Power Supply:
   a) The reserve battery power supply shall have sufficient
      capacity to supply the EPBX for four (4) hours including
      the projected maximum growth and interfaced equipment. The
      battery power supply shall consist of not less than // 24
      // // -- // sealed maintenance-free cells. Dry cell
      batteries are not acceptable.
b) The system shall be capable of adjustable voltage for float or equalizing batteries. A fully redundant system (not including batteries and inverter) shall be provided. Each rectifier or charger shall have the capacity to support the combined load requirements of the EPBX at its maximum growth and all interfaced equipment.

22) Alarms and Trouble Indicators: It is acceptable to combine the required electrical and/or electronic supervision functions in these panels provided the supervisory standards are completely met:

   a) The Contractor shall provide and make operational visual and audible alarms, equipped with cut-off switches, indicating AC power failure, rectifier failure, major and minor trouble, temperature/humidity, electrical or electronic supervisory alarms. The Contractor shall be responsible for providing the required sensors for the environmental alarms. These alarms shall be remoted to the attendant console area and one other location to be as specified herein. These alarms shall be separate and in addition to the major and minor alarms on the attendant consoles.

   b) The alarm panel shall contain small red indicator lamps for each alarm with cut-off switches or one switch for all alarms and a distinctive audible alarm(s). If one cutoff switch is provided for all audible alarms, it shall restore the alarms to the ready status condition for the audible registration of additional alarms.

   c) The technical submittal shall describe any other EPBX alarms that are remoted and shall describe EPBX alarms/indicators of malfunction(s) that are located on the equipment.

23) The EPBX shall be capable of providing four-digit intra-station dialing and the desired functions described herein.

24) Due to the varied trunk group requirements and possible future trunk group requirements, e.g. public address system access, alternate access codes may be proposed. Grouping of similar type trunk group/features, e.g. 5-1 public address system (all call), 5-2 public address system zone 1, etc. is acceptable.
25) The EPBX shall provide emergency numbers accessible by all station users. The numbers shall appear on the console or a multi-line instrument and at least one other designated location. There shall be a distinctive audible and visual signal associated with the emergency number to ensure an immediate response to calls. The console or multi-line instrument shall have the capability of priority answering the emergency number and extending the call as the situation dictates. A modified trunk circuit may be used for this purpose.

26) The EPBX equipment shall have such sensitivity as required to provide satisfactory service up to 3,000 feet for all voice.

h. The Contractor shall provide a complete set of EPBX electronic modules and/or cards to be used as on-hand operational emergency spare equipment. One each of T-1, DS-**, interface cards etc. is the minimum required or a compliment as directed by the OEM. Additionally, the Contractor shall confer with the RE to determine other spare items that may be required to fully equip the system with emergency repair capabilities that completely adhere to the System Warranty Requirements described herein.

i. Voice Mail Requirements

1) General

a) The requirement is for an automated call processing capability. The automated attendant shall be connected to the EPBX and configured to answer and route calls received on a predetermined number of central office trunks. The system shall be configured so that, if the called extension is busy or does not answer within a predetermined number of rings, then the caller shall be routed to the person’s voice mail box. A complete voice mail system will allow a predetermined number of users to send complete and confidential messages in the users own voice and receive complete and confidential messages in the sender’s own voice. The system shall provide 24 hours per day, 7 days per week access. The system shall be integrated into the operation of the EPBX and be compatible with the local telephone company central office.
b) The system shall provide capacity for the following number of ports (minimum):

<table>
<thead>
<tr>
<th></th>
<th>Equipped Capacity</th>
<th>Wired Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automated Attendant</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Voice Mail</td>
<td>12</td>
<td>20</td>
</tr>
</tbody>
</table>

2) The voice mail system shall initially provide for 500 mailboxes and 40 hours of storage with growth to 60 hours of storage.

3) Voice Mail Features. The system shall have the following features:
   a) Access to the system and its features from any instrument anywhere that provides DTMF signaling.
   b) The ability of those leaving a message to review the message and/or edit the message that is being placed in the mailbox.
   c) Privacy/Security through the use of a "PASSWORD".
   d) The ability to send messages to users on the voice mail system in the following manner:
      (1) To any user on the same voice mail system.
      (2) To more than one user on the same voice mail system - an ad hoc distribution list determined by the sender at the time of message transmission.
      (3) To a predetermined distribution list.
      (4) Broadcast to all users on the same voice mail system.
   e) Verification, With Receipt - The ability of a user to request and receive verification of when a message is actually played through the use of a touch-tone command. The system shall indicate the time and date of when a message is played and place that information in the sender's mailbox.
   f) Envelope Information - The ability of a user to request and receive time and date information of when specific messages were left in the user's mailbox.
   g) Connection to the voice mail system shall be through an EPBX extension number or a seven/ten digit telephone number from the LEC.
h) Message "PROMPTS" shall be provided for every transaction. Messages shall be provided for "GREETINGS" and "INSTRUCTIONS FOR RECORDING OR EDITING A MESSAGE".

i) A message waiting tone, lamp, and/or display shall notify the user that messages are in the user's mailbox.

j) A message shall notify the user, upon accessing the system, of how many messages are in the user mailbox.

k) The user, upon accessing the system, shall have the following response alternatives:
   (1) Respond or send a reply to another user on the same voice mail system.
   (2) Route the message to another user on the same voice mail system.
   (3) Delete the message.
   (4) Save the message.

l) A "Default Path" shall be provided to allow those callers who do not have touch-tone capability or who need to talk to someone to be routed to an operator or some other predetermined answering position.

m) The system shall have the ability to fast forward or rewind recorded messages while being reviewed by the user.

n) The system shall present messages to the user on a "FIFO" basis.

o) User Administration - As a minimum, the system shall provide management information and statistics in the following categories;

p) Port Usage - Traffic statistics on each of the different access paths into the system.

q) Usage of Storage Capacity - Remaining storage capacity at any one time and during peak periods.

r) Mailbox Usage - Connect time and number of new or saved messages.

s) The user administration terminal shall allow for "Class Of Service Controls" in the following areas and for the following parameters:
Initial Authorization:
Ability to enable a mailbox.
Record the "Owner’s" name.
Set initial Pass Number.

Usage Control:
Length of personal greeting.
Length of messages received.
Number of messages.
Message retention time.

Feature Authorizations - Allowed or Not:
Group List Creation.
Group List Usage.
Broadcast Messages.

B. Voice Traffic Management System (TMS)
1. A complete and self-contained on-site TMS shall be provided that is fully compatible with and compliments the system.
2. The Following Functions Shall Be Provided at a minimum:
   a. A 300 dots per inch (DPI) letter quality printer, shall be provided for reports generated by the EPBX and/or the maintenance administration terminal.
   b. The TMS shall be connected to the EPBX emergency battery power supply.
   c. All screen menus shall be standard and provide access to each category of reports.
   d. Traffic Accounting and Management Call Detail Recording (CDR) Package shall be provided for all Voice circuits. The TMS shall:
      1) Include all necessary hardware, software, and interconnections to the EPBX.
      2) Contain a database that shall be stored on non-volatile media. Tape drives are not acceptable.
      3) Provide line numbers, physical locations of equipment by building and room number, the department to which a line is assigned, the name of the person(s) assigned to a particular
number, the type of equipment, and any comments regarding EPBX features.

4) Support additional input and/or output (I/O) ports for video monitors or other terminals which will allow a passive display of the data base(s) by authorized medical center personnel other than those individuals responsible for data input and conducting studies.

5) Exhibit security that shall be provided by User ID and password to protect the data base(s).

6) Provide separate voice line reports, on demand and predetermined schedule, for automatic printing. As a minimum, the following reports are required:
   a) Originating trunk traffic by trunk group, expressed in CCS.
   b) Terminating trunk traffic by trunk group, expressed in CCS.
   c) All trunks busy, by trunk group, expressed as blocked call count.
   d) All equipment busy, i.e., no dial tone and failure to complete cross-office call because of all equipment busy, expressed in blocked call count.
   e) List of all equipment alarms, error tables, trouble logs, history files, etc.

e. The following console measurements shall be accomplished for each console:
   1) Incoming calls.
   2) Calls answered.

f. Remote video monitors shall be provided in the immediate vicinity of the telephone operators for use as an on-line directory lookup system of VAMC personnel. The Contractor provided monitors shall be compatible with the proposed TMS hardware and software.

g. All reports shall be in English notation and will not require interpretation of abbreviations or codes by the user.

h. Sufficient storage on disk shall be provided to prevent a purge of stored data. Call record and facility usage data shall be maintained in the database for a minimum of 30 days. Storage must be capable of accommodating a minimum of 5,000 calls per day.

i. Samples of all reports generated by the TMS are to be submitted with the technical submittal for evaluation of formats and compliance with information field content.
j. Normal system traffic data shall be furnished to the appropriate Facility staff within seven days of a Facility request. A complete and comprehensive traffic study, to include the required traffic data with the Contractor's comments and recommendations, will be prepared and submitted to the appropriate Facility staff quarterly. These studies shall be provided at no additional cost to the VA.

k. Automatic directory service shall generate a telephone directory that includes, name, title, organization, location, extension, and class-of-service. The contractor shall be responsible for loading and maintaining the directory.

l. A Cable plant management function shall be provided with the following minimum requirements:
   1) A list of off-premise cable by circuit number, numbers of pairs for each circuit, and circuit definition.
   2) Provide a complete cable plant distribution record to identify the location (cable pair) on the MDF, the riser, the size cable, cable pair in-use (main cable feeder and station cable), building and room number of the termination, and the type equipment terminated.
   3) Automatically provide when the service order is entered, the cable number and pair assignments.

m. Equipment inventory list shall be provided containing the following minimum requirements:
   1) EPBX cabinets, cards (active and spares), batteries, current and surge protectors, rectifiers, all peripheral equipment, i.e. public address etc.
   2) Quantity of single and multi-line telephones, speakerphones, dial intercom units, speakers, gongs, loud horns, bells, chimes, recorders, etc.
   3) A list of equipment as being used or spare; ordered or received; installed date, warranty date, cost, location, serial number, etc.

n. Electrical and/or Electronic supervisory alarms and faults reports.

C. Attendant Console:

   1. The attendant console(s) shall be compatible with the local commercial telephone system and shall:
a. Be powered from the EPBX’s emergency battery power supply.
b. Be load sharing to insure that all incoming calls are evenly distributed among all consoles regardless of the traffic load.
c. Provide telephone signal (not electrical or electronic) supervision over all calls connected through the console e.g., indication of:
   1) Called party answer (revert back to attendant if no answer).
   2) Trunk group busy.
   3) Station recall to attendant. In the event of an incoming call being placed (in a hold status) prior to a station being dialed after a specified time this call will revert to the attendant.
d. Call transfer capability by attendant.
e. Automatic ring of called station with ring back tone provided to the calling party.
f. The console shall be designed to allow installation as far as 1,000 feet from the EPBX equipment cabinets, serviced by a 24 gauge cable.
g. The Attendant Console shall have:
   1) The ability to enter any on-going voice call, regardless of whether the call was connected through the console, direct-in-dial, or originated as an intra-station call. A warning tone shall be applied when the attendant enters an on-going voice call.
   2) "Call-splitting" ability that will permit the attendant to exclude either the outside or inside party when handling trunk calls.
   3) "Camp-on busy" feature, which will allow the attendant to place incoming voice calls on hold until called station number, is available. Tone burst to be applied to the busy line to alert that a call is waiting.
   4) When the busy line becomes free, the waiting call shall be automatically connected. If the waiting call is not connected after a pre-determined time, the waiting call shall revert to the attendant.
   5) Universal Night Answering Service that shall provide the ability for all incoming calls to be answered from a location other than the console.
6) Attendant headsets consistent with the latest state-of-the-art shall be provided for 10 attendants. The headsets shall be on the ear models, equipped with coiled cord, plug-In case amplifier, and quick disconnect. Indicate in the technical submittal the type of headsets to be provided.

7) One supervisor plug-in handset with a push-to-talk button and a nine-foot cord.

8) Dual tone multi-frequency dialing for attendant completion of all incoming, outgoing, and intra-station calls.

h. Automated Attendant shall perform the following features:

1) Access from any instrument anywhere that provides DTMF signaling.

2) Voice "PROMPTS" shall be provided for every transaction.

3) An introductory greeting shall be provided.

4) The system shall provide, as the initial option, the ability of the caller to enter the extension of the person being called and connection to that extension or enter zero for connection to the operator.

5) For the persons calling who do not have touch-tone capability or wish to talk to an operator, the system shall provide the option of "WAITING ON THE LINE" and having an operator assist the caller. As a minimum at least one port on the system shall provide support for rotary dial service.

6) The system shall have the capability of providing the caller with a directory and sub-directories of telephone numbers and the ability to enter the desired extension at any time while listening to the directory.

D. Equipment Cabinet with Internal Mounting Rails:

1. The equipment cabinet shall be lockable, heavy gauge steel with baked on paint finish. It shall be floor or wall mounted with knock-out holes for cable entrance and conduit connection, provided with ventilation ports and quiet fan with non disposable air filter for equipment cooling. The RE shall be provided with a minimum of two keys for each lock when the System is accepted.

2. A minimum of one cabinet shall be provided with blank rack space, for additional equipment. Blank panels shall be installed to cover any open or unused rack space. Two 120 VAC power strips connected to surge protectors, cooling fan with non-disposable air filter, and
conduit or cable duct interface to adjacent cabinet(s) shall be a part of this cabinet.

3. Blank panels shall be color matched to the cabinet, 3.175 mm (1/8") aluminum with vertical dimensions in increments of 30 mm (1.75") with mounting holes spaced to correspond to EIA 480 mm (19") dimensions. Single standard size blank panels shall be used to fill unused panel or rack spaces in lieu of numerous 30 mm (1.75") types. One blank 30 mm (1.75") high blank panel shall be installed between each item of equipment.

4. AC power outlet strip(s):
   a. A strip shall be provided with an outlet for each item of equipment and a minimum of four spare AC power outlets. Each strip shall be mounted inside and at the rear of each equipment cabinet. It shall contain "U" ground AC outlets for distributing AC power to the installed electronic equipment. The strip shall be self-contained in a metal enclosure with a maximum of 1.8 meters (6 feet) connecting wire with three prong plug.
   b. Technical Characteristics:
      Power capacity: 20 AMP, 120 VAC continuous duty
      Wire gauge: Three conductor, #12 AWG copper

5. Cabinet AC Power Line Surge Protector and Filter:
   a. Each cabinet containing active electronic equipment shall be equipped with a AC Surge Protector and Filter. The Protector and Filter shall be housed in one single enclosure. The Protector and Filter shall provide instantaneous regulation of the AC input voltage and isolate and filter any noise present on the AC input line. It shall be cabinet mounted and the cabinet AC power strip (maximum of two strips) may be connected to it.
   b. Technical Characteristics:

<table>
<thead>
<tr>
<th>Input Voltage range</th>
<th>120 VAC + 15%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power capacity</td>
<td>20 AMP, 120 VAC</td>
</tr>
<tr>
<td>Voltage output regulation</td>
<td>+3.0%</td>
</tr>
<tr>
<td>Circuit breaker</td>
<td>15 AMP, may be self contain</td>
</tr>
<tr>
<td>Noise filtering</td>
<td>Greater than 45 dB</td>
</tr>
<tr>
<td>AC outlets</td>
<td>Four duplex grounded types, minimum</td>
</tr>
<tr>
<td>Response time</td>
<td>5.0 NS</td>
</tr>
</tbody>
</table>
c. Main AC input line: The main AC circuit supplying power to the system shall be the Facility’s Critical AC Branch of the Emergency Distribution System:

1) The EPBX shall be equipped with AC voltage and current surge protectors to prevent damage to the EPBX and rectifiers from power line induced voltage spikes, surges, lightning, etc.

2) Specific requirements for current and surge protection shall include:

   a) Five nS response time to the transient.
   
   b) Voltage protection threshold, line to neutral, starts at no more than 220 V peak. The transient voltage shall not exceed 300 volts peak. Vendor shall furnish documentation on peak clamping voltage as a function of transient AMP.
   
   c) Peak power dissipation 35 Joules per phase (minimum), as measured for 1 millisecond at sub branch panels, 100 Joules per phase at branch panels and 300 joules per phase at service entrance panels. Vendor shall furnish an explanation of how the ratings were measured or empirically derived.
   
   d) Surge protector must not short circuit the AC power line at any time:

      1) The primary surge protection components must be silicon semiconductors. Secondary stages, if used, may include other types of devices.
      
      2) Surge protectors shall incorporate a visual device which indicates whether the surge suppression component(s) is (are) functioning.
      
      3) Surge protection devices shall be UL listed.
      
      4) Voltage and current surge protectors shall be provided on all ancillary equipment provided by the Contractor, not powered from the EPBX primary power supply and emergency battery, e.g., electronic telephones, service units, custom
telephones, speaker phones, modems, data terminal interface, etc.
e) Power dissipation 12,000 W for 1 mS (or 12 Joules).
f) Voltage protection threshold starts at not more than 110 VAC.
g) Surge protectors must not short-circuit the A/C line at any time.
h) Surge protectors shall be self contained, plug in type for 110/120 VAC, 15 AMP, duplex receptacle.

E. Environmental Cabinet (If Selected)

1. The Contractor shall provide this enclosure in lieu of a standard equipment cabinet identified in Paragraph 2.3.A to meet system design in hostile TC locations as identified on the drawings. The enclosure shall fully sustain the installed, including electronic, equipment in the same manner as the standard cabinet identified in Paragraph 2.3.A. Additionally, the enclosure shall fully support all installed equipment as if they were in a stand alone air handling area regardless of the local area’s air handling capabilities. The enclosure shall be a fully OEM assembled unit. If more than two enclosures are required in any system location, those enclosures shall be OEM assembled for consolidating or combining two or more enclosures in a single unit to meet system space and equipment handling designs.

2. Technical Characteristics:

<table>
<thead>
<tr>
<th>Environmental control</th>
<th>Automatic, heating and/or cooling, as required</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMPERATURE CONDITIONS (RATED AT 1,300 W OF INSTALL EQUIPMENT HEAT GENERATION)</td>
<td></td>
</tr>
<tr>
<td>Internal Range</td>
<td>Maintains 80° to 105° of internal heat conditions, maximum</td>
</tr>
<tr>
<td>External Range</td>
<td>100° + 25°, maximum</td>
</tr>
<tr>
<td>Forced air unit</td>
<td>Required with non disposable air filter unobstructed and uninterruptible</td>
</tr>
<tr>
<td>Air conditioning</td>
<td>As required, fully internal mounted</td>
</tr>
<tr>
<td>Heater</td>
<td>As required, fully internal mounted</td>
</tr>
<tr>
<td>Uninterruptible power supply</td>
<td>As required, fully internal mounted</td>
</tr>
<tr>
<td>Front door</td>
<td>Full length, see through, EMI resistant,</td>
</tr>
</tbody>
</table>
and lockable

<table>
<thead>
<tr>
<th>Rear door</th>
<th>Full length, non-see through, EMI resistant, and lockable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduit wiring entrance</td>
<td>Top and/or bottom, fully sealed</td>
</tr>
<tr>
<td>Input power</td>
<td>2 ea. minimum 120 VAC @ 20A, maximum, independent circuit, conduit for fixed or armored cable for moveable installations</td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>1980 mm (78&quot;), maximum</td>
</tr>
<tr>
<td>Width</td>
<td>635 mm (25&quot;), maximum</td>
</tr>
<tr>
<td>Depth</td>
<td>965 mm (38&quot;), maximum</td>
</tr>
<tr>
<td>Front panel opening</td>
<td>480 mm (19&quot;), w/ EIA mounting hole spacing</td>
</tr>
</tbody>
</table>

F. Distribution or System Interface Cabinet:
1. The cabinet shall be constructed of heavy 16 gauge cold rolled steel, have top and side panels and hinged front and rear (front door only if wall mounted) doors. It shall have baked-on iron phosphate primer and baked enamel paint finish in a color to be selected by the using Facility Service Chief or RE, contain integral and adjustable predrilled rack mounting rails or frame that allows front panel equipment mounting and access. When all equipment, doors and panels are installed, snap-in-place chrome trim strip covers are required to be installed that will cover all front panel screw fasteners. It shall be equipped in the same manner as the equipment cabinet.
2. Technical Characteristics:

| Overall height              | 2180 MM (85 7/8"), MAXIMUM |
|                            |                            |
| Overall depth               | 650 mm (25 1/2"), maximum  |
| Overall width               | 535 mm (21 1/16"), maximum |
| Equipment vertical          | 1960 mm (77 1/8"), maximum |
| Mounting space              |                            |
| Front panel horizontal      | 484 mm (19 1/16"), maximum width |

G. Stand Alone Equipment Rack:
1. The rack shall be constructed of heavy 16 gauge cold rolled steel and have fully adjustable equipment front mounting rails that allows front panel equipment mounting and access. It shall have baked-on iron phosphate primer and baked enamel paint finish in a color to be
selected by the using Facility Service Chief or RE. It shall be floor or wall mounted or mounted on casters as directed by the RE.

2. Technical Characteristics:

<table>
<thead>
<tr>
<th>Overall Height</th>
<th>2180 MM (85 7/8&quot;), MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Depth</td>
<td>650 mm (25 1/2&quot;), maximum</td>
</tr>
<tr>
<td>Overall Width</td>
<td>535 mm (21 1/16&quot;), maximum</td>
</tr>
<tr>
<td>Front Panel Opening</td>
<td>484 mm (19 1/16&quot;), EIA horizontal width</td>
</tr>
<tr>
<td>Hole Spacing</td>
<td>per EIA</td>
</tr>
</tbody>
</table>

H. Cross-Connection System (CCS) Equipment - Breakout, Termination Connector (or Bulkhead), and Patch Panels, and Connection Assemblies

1. The connector panel(s) shall be made of flat smooth 1/8 inch thick solid aluminum, custom designed, fitted and installed in the cabinet. Bulkhead equipment connectors shall be mounted on the panel to enable all cabinet equipment’s signal, control, and coaxial cables to be connected through the panel. Each panel shall be color matched to the cabinet installed.

a. Voice (or Telephone)

1) The CCS for voice or telephone service will be Industry Standard 110 type punch blocks. This represents the minimum requirement for voice or telephone, and control wiring in lieu of patch panels, each being certified for category six service. IDC punch blocks (with internal RJ45 jacks) are acceptable for use in all CCS and shall be specifically designed for category six telecommunications service suitable for the size and type of UTP cable used as described herein. As a minimum punch block strips shall be secured to an OEM designed physical anchoring unit located on a wall in the MTC, IMTC, and TC. However, console, cabinet, rail, panel, etc. mounting is allowed at the OEM recommendation and as approved by the RE. Punch blocks shall not be used for Class II or 120 VAC power wiring.

2) Technical Characteristics:

<table>
<thead>
<tr>
<th>Number of horizontal rows</th>
<th>100, minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of terminals per row</td>
<td>4, minimum</td>
</tr>
</tbody>
</table>
Terminal protector required for each used or unused terminal
Insulation splicing required between each row of terminals

b. Fiber optic //, and Analog Audio/

1) Product reference of a Government Approved (US State Department) type is Telewire, PUP-17 with prepunched chassis mounting holes arranged in two horizontal rows. This panel may be used for fiber optic, audio, control cable, and Class II Low Voltage Wiring installations when provided with the proper connectors. This panel IS NOT allowed to be used for 120 VAC power connections.

2) Technical Characteristics:

<table>
<thead>
<tr>
<th>Size</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>Two RUs, 89 mm (3.5&quot;) minimum</td>
</tr>
<tr>
<td>Width</td>
<td>484 mm (19 1/16&quot;), EIA minimum</td>
</tr>
<tr>
<td>Number of connections</td>
<td>12 pairs, minimum</td>
</tr>
</tbody>
</table>

Connectors

Audio Service
Use RCA 6.35 mm (1/4") Phono, XL or Barrier Strips, surface mounted with spade lugs (punch block or wire wrap type strips are acceptable alternates for barrier strips as long as system design is maintained)

Control Signal Service
Barrier strips surface mounted with spade lugs (punch block or wire wrap type strips are acceptable alternates for barrier strips as long as system design is maintained)

Low voltage power (class II)
Barrier strips with spade lugs and clear full length plastic cover, surfaced mounted

FIBER OPTIC
"ST" STAINLESS STEEL, FEMALE

c. Mounting Strips and Blocks:

1) Barrier Strips:

   a) Barrier strips are approved for AC power, data, voice, and control cable or wires. Barrier strips shall accommodate the size and type of audio spade (or fork type) lugs used with insulating and separating strips between the terminals.
for securing separate wires in a neat and orderly fashion. Each cable or wire end shall be provided with an audio spade lug, which is connected to an individual screw terminal on the barrier strip. The barrier strips shall be surface secured to a console, cabinet, rail, panel, etc. 120 VAC power wires shall not be connected to signal barrier strips.

b) Technical Characteristics:

<table>
<thead>
<tr>
<th>Terminal size</th>
<th>6-32, minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal Count</td>
<td>ANY COMBINATION</td>
</tr>
<tr>
<td>Wire size</td>
<td>20 AWG, minimum</td>
</tr>
<tr>
<td>Voltage handling</td>
<td>100 V, minimum</td>
</tr>
<tr>
<td>Protective connector cover</td>
<td>Required for Class II and 120 VAC power connections</td>
</tr>
</tbody>
</table>

2) Solderless Connectors. The connectors (or fork connectors) shall be crimp-on insulated lug to fit a 6-32 minimum screw terminal. The fork connector shall be installed using a standard lug-cramping tool.

3) Punch Blocks. Industry Standard 110 type punch blocks are approved for voice and control wiring at a minimum. Punch blocks shall be specifically designed for the size and type of wire used. Punch block strips shall be secured to a console, cabinet, rail, panel, etc. Punch blocks shall not be used for Class II or 120 VAC power wiring.

4) Wire Wrap Strips. Wire wrap strips (minimum of 0.065" wire wrap) are approved for voice and control wiring and shall meet Industry Standards. Wire wrap strips shall be secured to a cabinet, rail, panel, etc. Wire wrap strips shall not be used for Class II or 120 VAC power wiring.

I. Wire Management System and Equipment:

1. Wire Management System. The system(s) shall be provided as the management center of the respective cable system, CCS, and TC it is incorporated. It shall perform as a platform to house peripheral equipment in a standard relay rack or equipment cabinet. It shall be arrange in a manner as to provide convenient access to all install management and other equipment. All cables and connections shall be
at the rear of each system interface to IDC and/or patch panels, punch blocks, wire wrap strips, and/or barrier strip.

2. Wire Management Equipment. The wire management equipment shall be the focal point of each wire management system. It shall provide an orderly interface between outside and inside wires and cables (where used), distribution and interface wires and cables, interconnection wires and cables and associated equipment, jumper cables, and provide a uniform connection media for all System fire retardant wires and cables and other subsystems. It shall be fully compatible and interface to each cable tray, duct, wireway, or conduit used in the system. All interconnection or distribution wires and cables shall enter the system at the top (or from a wireway in the floor) via a overhead protection system and be uniformly routed down either side (or both at the same time) of the frame in side protection system then laterally via a anchoring or routing shelf for termination on the rear of each respective terminating assembly. Each system shall be custom configured to meet the System design and user needs.

J. Telephone Instruments:

1. Telephone instruments (or station equipment) that are initially installed shall be configured as indicated herein. Final location of some station equipment shall be coordinated with designated VA official prior to installation.

2. All telephone instruments shall be equipped with the inductive capability to radiate a magnetic field required to activate the hearing aid telecoil and to provide personnel, who use hearing aids, access to all telephones within the Facility.

3. Station equipment shall consist of standard single line instruments, patient bedside instruments, and multi-line digital electronic telephone instruments with digital display, of the latest state-of-the-art design.

4. All telephone instruments except patient bedside phones, shall be equipped with a flash button (or equivalent feature button) with pre-determined timing feature to initiate consultation hold and other features normally initiated by operation of the hook-switch. Flash button shall be distinct from the hook-switch.

5. All telephone instruments, except patient bedside phones, shall be equipped with a laminated faceplate listing the most common user
features and their appropriate access codes. The faceplates may be an integral part of the instrument housing or may be an adhesive backed decal that shall be applied over the tone pad area of the housing at the time of telephone set installation.

6. Station instruments shall be feature compatible and have transmission characteristics which are compatible with the proposed System.

7. Telephone instrument signaling shall be by means of standard adjustable, buzzers, chimes, or electronic tone, unless otherwise specified.

a. Single Line:
   1) Single line instruments may be electronic or 2500-type analog phones.
   2) Single line instruments used must be capable of supporting bridged cabling to allow a single phone number on multiple instruments without using multiple switch ports.
   3) Single line instruments must be capable of supporting auxiliary equipment, such as amplified hand sets; external chimes, light, or bells; and other similar equipment without using multiple switch ports.

b. Multi-Line, Digital and Electronic:
   1) The instruments shall be equipped with a digital read-out display and shall have no less than 14 programmable (lines or features) buttons.
   2) The instruments shall employ only one adjustable ringer, bell, buzzer, chime or electronic tone to announce calls. The signaling device shall detect an incoming call to the multi-button instrument and provide an audible signal only on designated lines.
   3) Each instrument shall be equipped with lights to identify the called line and remain illuminated for the duration of the call.
   4) Telephone intercom systems shall normally be associated with these instruments.
   5) The equipment associated with intercom systems may require special features such as built in microphone and speaker. Telephone Intercom Systems shall be required to provide secretaries with a means of announcing calls to offices with
extensions or pickups on the System. The provision of intercom systems shall be identified during the data base survey required as described herein. Any required intercom systems shall be provided and installed by the contractor.

6) This equipment must be capable of supporting auxiliary equipment, such as amplified handsets; external chimes, light, or bells; and other similar equipment. The use of analog switch ports to provide ringing voltage, if required, is acceptable and these switch ports shall be included in the Equipped Capacity as described herein.

7) Hot Line Telephones shall provided between two identified points and as shown on the drawings. These hot lines shall be equipped with two-way automatic ring and cut-off controlled by the telephone hook-switch, i.e. when near-end hand set is removed from the hook switch, the far-end telephone shall ring until the hand set is removed from the hook-switch.

8) Hands Free telephone stations shall be required. In this configuration, a speaker shall be used as both transmitter and receiver to answer or initiate a call. These facilities will normally be used as a hot line between two points. Requirements for hands-free operated facilities shall be identified on the drawings.

c. Patient Bedside:

1) Patient bedside instruments shall be maintenance free, sanitized packet, and capable of supporting table top, side-rail, top bed-rail, or wall mounting. Each phone should have a self-contained line cord of not less than 15 feet.

2) At the discretion of the facility, patient bedside instruments may be discarded, cleaned for reuse, or given to the patient, as appropriate. The anticipated cost per instrument should not exceed $10.00.

K. Lightning Protection System. Each protection system shall be provided, in its entirety, totally and externally to the building. The use of internal electrical wiring for lightning grounding systems is not acceptable and will not be approved. Provide 5% spare protectors.

1. EPBX. The EPBX, cabinets, racks, wire management systems, cable shields, etc. shall be grounded with cooper wire run external to the building and connected to the earth ground. If these items are
installed in an area not protected by lightning protection system, the Contractor shall immediately notify the RE in writing of the lightning strike hazard and make the appropriate contractual updates to accommodate this system.

2. Telephone, Data, Audio, and/or Coaxial Cable Lightning Protector:
   a. The protector shall be an in-line device equipped with screw type connectors to match the coaxial and/or STP or UTP cable specified. It shall be located at each building entrance where each cable enters a building from the outside and grounded with stranded copper wire run external to the building connected to the earth ground. It shall be able to shunt high current surges to earth ground protecting the System’s signal receiving equipment. The protector shall have a minimal effect on the quality of the signal being received or transmitted. It shall be made of non-corrosive metal and waterproof. Refer to EPBX technical data for additional required specifications.
   b. Technical Characteristics:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Pulse Power</td>
<td>1500 W @ 77°F</td>
</tr>
<tr>
<td>Protection Device</td>
<td>Gas Tube or as required by OEM</td>
</tr>
<tr>
<td>Dissipation</td>
<td>1.0 Mili Seconds (MS)</td>
</tr>
<tr>
<td>Response Time</td>
<td>5.0 nS</td>
</tr>
<tr>
<td>Connectors</td>
<td>As Specified</td>
</tr>
<tr>
<td>Ground Wire</td>
<td>#6 AWG Stranded Copper, minimum, or as</td>
</tr>
<tr>
<td></td>
<td>required by the OEM, and/or VA</td>
</tr>
</tbody>
</table>

L. Audio Monitor Panel:

1. The panel shall be EIA/TIA standard for 480 mm (19”) cabinet mounting. It shall be provided in the upper portion of the EPBX equipment cabinet. This unit may be combined in the EPBX Annunciating System and/or Electrical Supervision Panel in order to achieve the minimum electrical supervision requirements of the System. Refer to EPBX technical data for additional required specifications. Provide one spare panel.
2. Technical Characteristics:

<table>
<thead>
<tr>
<th>Monitor speaker</th>
<th>A permanent magnet, 76 mm (3 inch) minimum diameter, and a monitor volume control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audiometer</td>
<td>Easy to read volume unit (vu) or similar meter with illuminated scale and meter calibrating control.</td>
</tr>
<tr>
<td>Channel selector switch</td>
<td>Six positions (Off, 1, 2, 3, 4, and Spare) which shall connect the monitor speaker and VU meter to the selected audio channel.</td>
</tr>
</tbody>
</table>

M. Electrical Supervision Panel:

1. An electrical supervision panel shall be provided in the EPBX cabinet and Telephone Operator, // and _________// locations and as designated on the contract drawings. The panel shall be compatible the EPBX Trouble Annunciation Panel and Audio Monitor Panel to generate electrical and/or electronic supervising signals to continuously monitor the operating condition for the system EPBX, CSU, telephone instruments //, and _________ //, and interconnecting cable trunks. The panel shall generate an audible and visual signal when the system’s supervising system detects an EPBX, CSU, //, and _________ //, or trunk line is malfunctioning. Refer to EPBX technical data for additional required specifications. Provide one spare panel.

2. Technical Characteristics:

<table>
<thead>
<tr>
<th>Silence button or switch</th>
<th>Shall silence the audible signal. However, the visual signal will continue until the supervisory circuit indicates the fault is corrected.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual enunciators</td>
<td>Visually show the amplifier and/or trunk-line unit or supervisory circuit is in fault condition.</td>
</tr>
</tbody>
</table>

2.3 DISTRIBUTION EQUIPMENT AND SYSTEMS

The System shall be provided with a complete cable backbone and building distribution system consisting of copper, fiber optic, and other specified cable and connectors, signal closets, cross connection or terminating systems, telecommunication outlets and interface points as identified in Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING and with technical instructions and approval from the RE.
2.4 INSTALLATION KIT

The kit provided shall include, at a minimum, all connectors and terminals, labeling systems, audio spade lugs, barrier strips, punch blocks or wire wrap terminals, heat shrink tubing, cable ties, solder, hangers, clamps, bolts, conduit, cable duct, and/or cable tray, etc., required to accomplish a neat and secure installation. All wires shall terminate in a spade lug and barrier strip, wire wrap terminal or punch block. Unfinished or unlabeled wire connections shall not be allowed. The Contractor shall turn over all unused and partially opened installation kit boxes, coaxial, fiber-optic and twisted pair cable reels, conduit, cable tray, and/or cable duct bundles, wire rolls and physical installation hardware to the RE. At a minimum, the following installation sub-kits are required:

A. System Grounding:
1. The grounding kit shall include all cable and installation hardware required. All EPBX equipment shall be connected to earth ground via internal building wiring, according to the NEC.
2. This includes, but is not limited to:
   a. Voice Cable Shields
   b. Control Cable Shields
   c. Cable Trays
   d. Equipment Racks
   e. Equipment Cabinets
   f. Conduits
   g. Cable Duct
   h. Cable Trays
   i. Power Panels
   j. Connector Panels
   k. Grounding Blocks

B. Wire and Cable. The wire and cable kit shall include all connectors and terminals, audio spade lugs, barrier straps, punch blocks, wire wrap strips, heat shrink tubing, tie wraps, solder, hangers, clamps, labels etc., required to accomplish a neat and orderly installation.

C. Conduit, Cable Duct and Cable Tray. The kit shall include all conduit, duct, trays, junction boxes, back boxes, cover plates, feed through nipples, hangers, clamps, other hardware required to accomplish a neat and secure conduit, cable duct, and/or cable tray installation in accordance with the NEC and this document.
D. Equipment Interface. The equipment kit shall include any item or quantity of equipment, cable, mounting hardware and materials needed to interface the System with the identified sub-system(s) according to the OEM requirements and this document.

E. Labels. The labeling kit shall include any item or quantity of labels, tools, stencils, and materials needed to completely and correctly label each subsystem according to the OEM requirements, record wiring diagrams, and this document.

F. Documentation. The documentation kit shall include any item or quantity of items, computer discs, as installed drawings, equipment, maintenance, and operation manuals, and OEM materials needed to completely and correctly provide the System documentation as required by this document and explained herein.

// 2.5 AUXILIARY SYSTEMS //

A. The EPBX shall be interfaced to the Public Address System identified in Section 27 51 16, PUBLIC ADDRESS AND MASS NOTIFICATION SYSTEMS and with technical instructions from the RE. The console attendants shall have direct access to selected zones and all zone(s) paging. The attendant shall also have "priority access" to all zones. Selected station users shall have access to appropriate zone(s), by dialing the proper access. The contractor is responsible for providing and installing the required interface device(s) to the PA. The EPBX shall provide a feature to prevent the PA from being "locked up" by a user placing the system on hold or leaving the receiver "off-hook".

PART 3 - EXECUTION

3.1 INSTALLATION

A. Product Delivery, Storage and Handling:

1. Delivery: Deliver materials to the job site in OEM's original unopened containers, clearly labeled with the OEM's name and equipment model and serial identification numbers. The RE may inventory the EPBX equipment at the time of delivery and reject items that do not conform to this requirement.

2. Storage and Handling: Store and protect equipment in a manner which will preclude damage as directed by the RE.

B. System Installation:

1. After the contract’s been awarded, and within the time period specified in the contract, the Contractor shall deliver the total System in a manner that fully complies with the requirements of this
specification. The Contractor shall make no substitutions or changes in the System without written approval from the RE and PM.

2. The Contractor shall install all equipment and systems in a manner that complies with accepted industry standards of good practice, the requirements of this specification, and in a manner which does not constitute a safety hazard. The Contractor shall insure that all installation personnel understand and complies with all the requirements of this specification.

3. The Contractor shall install suitable filters, traps, directional couplers, splitters, telephone outlets, and pads for minimizing interference and for balancing the amplifiers and distribution system(s). Items used for balancing and minimizing interference shall be able to pass telephone signals in the frequency bands selected, in the directions specified, with low loss, and high isolation and with minimum delay of specified frequencies and signals. The Contractor shall provide all equipment necessary to meet the requirements of paragraph 2.1.C and the System performance standards.

4. All passive equipment shall be connected according to the OEM's specifications to insure correct termination, isolation, impedance match and signal level balance at each telephone outlet.

5. All lines shall be terminated in a suitable manner to facilitate future expansion of the System.

6. All vertical and horizontal copper and fiber optic //, and coaxial // lines shall be terminated so shall require modifications of the system EPBX or signal closet equipment only.

7. Terminating resistors or devices shall be used to terminate all unused branches, outlets, equipment ports of the system, and shall be devices designed for the purpose of terminating fiber optic or twisted pair //, and coaxial // cables carrying telephone //, and analog video// signals in telephone //, and analog // systems.

8. Equipment installed outdoors shall be weatherproof or installed in weatherproof enclosures with hinged doors and locks. Provide a minimum of two keys for each lock.

9. Equipment installed indoors shall be installed in metal cabinets with hinged doors and locks. Provide a minimum of two keys for each lock.
C. Equipment Assembly:

1. Cabinets:
   a. Each enclosure shall be: Floor or wall mounted with standard knockout holes for conduit connection or cable entrance; provide for ventilation of the equipment; have front and rear locking doors (except, wall mounted cabinets that require only a front locking door); power outlet strip(s), bulkhead connector and patch panel(s).
   b. Each enclosure shall be equipped with a quiet fan and nondisposable air filter.
   c. Enclosures and stand alone racks shall be installed plumb and square. Each shall be permanently attached to the building structure and be held firmly in place as approved by the RE.
   d. Rack mounted equipment shall be installed on the enclosure’s equipment adjustable mounting racks with equipment normally requiring adjustment or observation mounted so operational adjustment(s) can be conveniently made. Heavy equipment shall be mounted with rack slides or rails allowing servicing from the front of the enclosure. Heavy equipment shall not depend only upon front panel mounting screws for support. Equipment shall be provided with sufficient cable slack to permit servicing by removal of the installed equipment from the front of the enclosure. A color matched blank panel (spacer) of 44 mm (1.75 inches) high, shall be installed between each piece of equipment (active or passive) to insure adequate air circulation. The enclosure shall be designed for efficient equipment cooling and air ventilation.
   e. Provide 380 mm (15 inches) of front vertical space opening for additional equipment. Install color matched blank panels to cover any unused enclosure openings.
   f. Signal connector, patch, and bulkhead panels (i.e. PA, telephone, control, etc.) shall be connected so that outputs from each source, device or system component shall enter the panel at the top row of jacks, beginning left to right as viewed from the front. These will be called "inputs". Each connection to a load, device or system component shall exit the panel at the bottom row of jacks, beginning left to right as viewed from the front. These will be called "outputs".
1) Equipment located indoors shall be installed in metal racks or enclosures with hinged doors and be accessible for maintenance without interference to other nearby equipment.

2) Cables shall enter the equipment racks or enclosures in a manner that allows all doors or access panels to open and close without disturbing or damaging the cables.

3) All distribution hardware shall be securely mounted in a manner that allows access to the connections for testing and provides sufficient room for the doors or access panels to open and close without disturbing the cables.

2. Installation of the EPBX:
   a. General:
      1) The EPBX installation shall comply with all laws, codes and standard industry practices applying to interconnected telephone installations in effect.
      2) In the absence of specifications regarding installation details, standard industry practices shall prevail and first quality material and workmanship shall be provided.
      3) All material, provided by the Contractor, shall be new and thoroughly tested. The installation shall be carried out in a professional manner.
      4) Installation of all equipment shall be fully coordinated with the RE and the Facility staff. No area shall be left without minimal telephone service as described herein.
      5) The Contractor shall provide a triplex outlet with modular jacks with stainless steel cover plate for each telephone outlet as shown on the drawings. The Contractor shall provide the appropriate modular jack (single or triplex) with appropriate cover plate for each 'OUTLET' location identified and verified on the drawings.
      6) The Contractor shall install all patient and wall telephone instruments on a single modular jack designed for wall telephone instruments and patient wall or PBPU installations.
      7) All permanent telephone cables and wires shall be installed in conduit or an enclosed duct system or be of the type approved for installation, as determined by VA requirements, without conduit or enclosed duct system. Cable and wire not installed in conduit or an enclosed duct system must be installed in
cable tray or mechanically supported and separated from other signal cable systems as described herein.

8) Where cable and wire penetrate through fire/smoke partitions, firewalls, or floors, the Contractor shall provide fire/smoke stopping around the outside of any installed conduit/cable tray. The Contractor shall provide and install fire stopping material, type approved by the RE, inside the provided conduit/cable tray after installation is complete.

b. The Contractor shall:

1) Install the equipment in accordance with the specifications for the EPBX as specified and recommended by the OEM.

2) Provide a full time on-site Project Manager effective with VA issuance of the notice to proceed. The Project Manager shall be responsible to fully coordinate and supervise all contractor/sub-contractor personnel in all phases of the installation, training, inspection, cutover, and final acceptance of the System. The Project Manager shall be provided a complete copy of these specifications to include all amendments prior to start of installation of the telephone system.

3) Coordinate and conduct the EPBX data base survey with the RE and a member of the IRM. The Contractor is responsible for identifying all programming of features, classes of service, and equipment to be installed by type and physical location as specified in this document and all attachments thereto. After the survey is completed, a complete list of equipment shall be provided to the RE for approval prior to start of installation.

4) Be responsible for the removal and replacement of damaged ceiling tiles during installation and maintenance service of the cable and wire distribution system. The Contractor shall be responsible for restoring immediate areas (that are approximately one meter (three feet) in diameter) that were damaged during the system installation and maintenance service.

5) Run all cross connects to established circuits during installation and maintenance service for the contract life.
6) Remove, on a daily basis, all debris and scrap generated in the conduct of work.

7) Provide the RE, for review, coordination, and approval a Proof of Performance Test Plan 90 days prior to cut-over of the EPBX. The plan shall be used for testing and acceptance of the system. It shall include sufficient tests to demonstrate the Systems capabilities of providing the services outlined in this document. Test equipment required for demonstration shall be Contractor provided and approved by the RE. A list of test equipment required shall be included with the acceptance test plan. Test equipment shall have undergone calibration certification within six months of system cut-over.

8) Provide Contractor personnel (switch technicians, installers, trainers, and the project manager, etc.) on premise for seven consecutive days after cutover to clear any malfunctions which may develop, to assign/reassign any software features/COS, and conduct any additional training as required.

9) Insure that the project manager and sufficient skilled personnel remain on premise until all items on the punch list, developed during inspection, cut-over, and acceptance testing of the system are completed, inspected, and accepted by the RE.

10) Be responsible for any and all coordination with the LEC relative to interface with the commercial telephone system. The Contractor shall also be responsible for the removal of all voice and/or data equipment and cabling abandoned by the LEC, VA, or other organizations and not retained for exclusive use by VA as a result of this installation.

11) Connect all telephone equipment located in the equipment room to a common provided ground buss. The common system ground shall be located in all telephone closets and the EPBX switch room.

12) Provide EPBX ground between EPBX and all interfaced systems such as PA system equipment chassis, etc.

13) Ensure that other dedicated telecommunications systems applications within the Facility (i.e., pay stations, electro-writing equipment, facsimile etc.) that require space within switch room/telephone closets, conduits, and cable pair are
accommodated. Coordination between applicable parties will be necessary to ensure accommodation of these systems. It shall be the responsibility of the bidders to determine the requirements and include them in their proposal.

14) All portions of the System installation shall conform to local building and fire codes.

15) The Contractor shall not use gasoline, benzene, alcohol, naphtha, carbon tetrachloride, or turpentine for cleaning any part of the equipment. Flammable materials shall be kept in suitable places outside the building. OSHA safety standards and local Facility safety standards shall prevail.

D. Conduit, Cables And Wiring, Cable Tray, Raceways, Signal Ducts, Etc.

1. General:
   a. The Contractor shall employ the latest installation practices and materials.
   b. All cables shall be installed in conduit and/or signal ducts. Conduits shall be installed in accordance with Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS and Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.
   c. Ensure that Telephone //, and PA // Systems (as identified by NEC Section 517) are completely separated and protected from all other systems.

3.2 PROOF OF PERFORMANCE TESTS

SPEC WRITER NOTE: If this section is being used in conjunction with specification Section 27 31 31, VOICE COMMUNICATIONS SWITCHING AND ROUTING EQUIPMENT - EXTENSION or Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING the following testing guidelines are in addition to the requirements outlined in these documents.

A. Interim Inspection:

1. An interim inspection of the installed equipment will be conducted in the presence of the RE prior to the proof of performance testing. This inspection shall verify that the equipment provided, adheres to the installation requirements of this document.

2. The Contractor shall have 50% of the system equipment installed to include, but not be limited to: EPBX, interface, origination and

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junction enclosures powered with the permanent AC wiring, outlets, conduit and cables, before the interim inspection can take place.

3. The Contractor shall notify the RE, in writing, of the estimated date the Contractor expects to be ready for the interim inspection, at least 7 working days before the requested inspection date.

4. Results of the interim inspection shall be provided to the RE and PM. If major or multiple deficiencies are discovered, a second interim inspection may be required before permitting the Contractor to continue with the System installation.

5. The RE in conjunction with PE shall determine if an additional inspection is required, or if the Contractor will be allowed to proceed with the installation. In either case, re-inspection of deficiencies noted during the interim inspection(s), will be part of the proof of performance test. The interim inspection shall not affect the System's completion date. The RE shall ensure all test documents will become a part of the System's record wiring diagrams.

B. Pretesting. Upon completing the installation of the System, the Contractor shall align and balance the system. The Contractor shall pretest the entire system.

C. Pretesting Procedure. During the System pretest, the Contractor shall verify (utilizing the approved spectrum analyzer and test equipment) that the System is fully operational and meets all the System performance requirements of this document. The Contractor shall measure and record the aural carrier levels of each system telephone, at each of the following points in the system:

1. Local Exchange Company (LEC) Inputs.
2. PBX inputs and outputs;
3. MDU, BIU, amplifiers, channel processor and converter inputs and outputs.
4. PBX output S/NR for each telephone.
5. Signal Level at each interface point to the distribution system, the last outlet on each trunk line plus all outlets installed as part of this contract.
6. Four copies of the recorded system pretest measurements shall be submitted, along with the pretest certification, to the RE. The RE shall forward three copies of the pretest documents and a copy of the certification to the PM.
D. Pretesting Certification. After pretesting the System, the Contractor shall notify the RE, in writing, that the system is ready for proof of performance testing in the presence of a Government Representative, and that it meets all requirements stated in this document. The Contractor as described herein shall accomplish submission of this notification of system readiness no later than twenty (20) working days prior to the beginning of the scheduled Government proof of performance test. Failure of the Contractor to comply with these pretest requirements, shall be grounds for automatically canceling the scheduled acceptance test.

E. Acceptance Test

1. After the System has been pretested and the Contractor has submitted the pretest results and certification to the RE, the Contractor shall schedule an acceptance test date and give the RE 30 days written notice prior to the date the acceptance test is expected to begin. The System shall be tested in the presence of a Government Representative and an OEM certified representative. The System shall be tested utilizing the approved test equipment to certify proof of performance. The test shall verify that the total System meets all the requirements of this document under operating conditions, and complies with all system performance standards listed herein. The notification of acceptance test shall include the expected length (in time) of the test.

2. The acceptance test shall be performed on a "go-no-go" basis. Only those operator adjustments required to show proof of performance shall be allowed. The test shall demonstrate and verify that the installed System does comply with all the operational requirements of this specification under operating conditions. The System shall be rated as either acceptable or unacceptable at the conclusion of the test. Failure of any part of the System that precludes completion of the system testing, and which cannot be repaired within four (4) hours, shall be cause for terminating the acceptance test of the System. Repeated failures that result in a cumulative time of eight (8) hours to effect repairs, shall cause the entire System to be declared unacceptable. Retesting of the entire System shall be rescheduled at the convenience of the Government.
F. Acceptance Test Procedure:

1. Mechanical and Physical Inspection:
   a. The Government Representative will tour all major areas where the System and all sub-systems are located to insure they are completely and properly installed in place and are operationally ready for proof of performance acceptance testing. A system inventory including available spare parts will be taken at this time. Each item of installed equipment shall be checked to ensure appropriate UL certification labels are affixed.
   b. The System diagrams, record drawings, equipment manuals, AutoCAD Disks, intermediate and pretest results shall be formally inventoried and reviewed.
   c. Failure of the System to meet the installation requirements of this specification shall be grounds for terminating all testing.

2. Subsystem Operational Test:
   a. After the Mechanical and Physical Inspection, the Contractor shall perform an operational test of each sub-system to verify that all equipment is properly connected, interfaced and is functionally operational to meet the requirements of this document. If any sub-system is not functionally ready, that sub-system shall be declared unacceptable and all testing shall be terminated. At this point, the Contractor shall be permitted one hour to correct the deficiencies.
   b. It may be mutually agreed upon, at this time, to wait one hour or to commence testing of the next sub-system.
   c. Repeated failures of sub-system testing or total system testing, which results in a cumulative time of four hours to effect repairs, shall be grounds for declaring the entire system unacceptable and all testing to be terminated. Retesting shall be rescheduled at the convenience of the Government.

3. Sub-system Performance Test: After the operational test, each sub-system shall be checked to verify that all performance requirements and standards are met. The performance requirements shall be verified using the necessary test equipment. A spectrum analyzer, signal level meter and BERT shall be used to verify there are no visible signal distortions, such as intermodulation, beats, etc. appearing on any received or generated telephone.
4. Total System Test: The testing shall proceed until the System and sub-systems have been operationally and functionally tested and accepted. The total System tests shall verify that the requirements have been met for all system signals as described herein.

   a. LEC Point of Demarcation: The System output(s) shall be checked to verify that all performance requirements are met.

   b. EPBX: This test shall be conducted within 30 days following successful pretesting of the EPBX. In addition to compliance with the technical characteristics and quantities of equipment specified herein, the Final Acceptance Test shall contain the provision that 30 continuous days of uninterrupted telephone service, must be completed prior to the Contractor being deemed to be in compliance with the contract.

      1) For the purpose of final acceptance, the telephone service shall be considered interrupted when the failure of any Contractor provided telephone equipment including batteries, results in an interruption of service. This includes a failure of more than 20% of any trunk group, 15% of any number group (15 or more stations), operator console, or telephone service to any area determined to be critical by the Facility Director. Response time to restore service shall have no bearing upon the term "interrupted service".

      2) To facilitate the EPBX Acceptance Test and to allow familiarization and training of VA employees, the Contractor shall activate the EPBX, including the operator consoles, stations, and equipment a minimum of 30 days prior to the acceptance test date. All installed equipment and circuits shall be fully tested prior to the acceptance by VA. During this "burn-in" period, the Contractor shall de-bug the EPBX. The Contractor shall make the EPBX available for in-house communications and demonstrate to the Facility staff the required features. The VA and Contractor will make certain trunks // and tie line circuits // are available to the EPBX during this "burn-in" period for testing.

5. Individual Item Test: The Government Representative may select individual items of equipment for detailed proof-of-performance testing. The item(s) selected shall meet or exceed the minimum requirements of the specification.
6. Interface Cable Sub-system: To ensure that the System meets all performance requirements, a minimum of 75% of the System outlets and interface points shall be checked. Additionally, each sub-system interface, junction, and connection point or location will be checked. Each distribution active and passive item of equipment, signal input(s) and output(s) will be tested.

7. Distribution Cable Plant Sub-system: For specific distribution testing instructions refer to Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLELING.

G. Test Conclusion:
1. At the conclusion of the Acceptance Test, using the generated punch list (or discrepancy list) the VA and the Contractor shall jointly agree to the results of the test, and reschedule testing on deficiencies and shortages with the RE. Any retesting to comply with these specifications will be done at the Contractor's expense.
2. If the System is declared unacceptable without conditions, all rescheduled retest expenses will be born by the Contractor as described herein.

3.3 TRAINING

A. Furnish the services of an OEM trained and certified engineer or technician for two eight-hour classes to instruct designated Facility maintenance personnel. Instruction shall include cross connection, corrective, and preventive maintenance of the telephone system and equipment.

B. Also, furnish the services of an OEM trained and certified engineer or technician, familiar with the functions and operation of the System and equipment, for two eight-hour periods to train designated Facility IRM personnel. Instructions shall be provided for staff personnel in each area where the System is installed under this contract. When multiple areas are involved, classes will be grouped. Periods of training shall be coordinated with the RE. The RE shall coordinate with the Facility to ensure all shifts receive the required training. Each session shall include instructions utilizing “hands-on” operation and functions of the system.

C. Before the System can be accepted by VA, this training must be accomplished. Training will be scheduled at the convenience of the Facilities Contracting Officer and Chief of Engineering Service.
3.4 WARRANTY

A. Comply with FAR 52.246-21, except that warranty shall be as follows:

B. Contractor’s Responsibility: The Contractor shall warranty that all installed material and equipment will be free from defects, workmanship, and will remain so for a period of one year from date of final acceptance of the System by the VA. The Contractor shall provide OEM’s equipment warranty documents, to the RE (or the Facility Contracting Officer if the Facility has taken possession of the building), that certifies each item of equipment installed under this document conforms to its OEM published specifications.

C. The Contractor shall provide a written commitment from the System equipment OEM to supply parts and on-site engineering support services for the one year warranty service (materials and labor) in the event of default or unsatisfactory service by the Contractor.

1. The OEM certification shall describe, in the event of default or unsatisfactory service by the Contractor, the OEM or an authorized distributor shall fully support the contract (initial installation, warranty service for the one year warranty period of the contract).

2. The System equipment OEM’s signatory of the certified written commitment must be of an individual who has the full authority to obligate the OEM to this commitment. Names, corporate addresses, and telephone numbers of the individuals who have this authority shall be provided as a part of the commitment.

D. The Contractor's maintenance personnel shall have the ability to contact the Contractor and OEM's central emergency assistance maintenance center and request remote diagnostic testing and assistance in resolving technical problems at any time, 365 days a year. The Contractor via a business telephone line at no additional cost shall provide this contact capability to VA. Each Contractor maintenance and supervisor individual shall be fully qualified by the OEM and provide the RE and Facility Contracting Officer with copies of current and qualified OEM training certificates.

E. Additionally, defining the FAR’s warranty outlines concerning this System, the Contractor shall accomplish the following minimum requirements during the one year warranty period:

1. Response Time During the One Year Warranty Period:
   a. The Contractor shall respond on-site, during the standard workweek, to a routine trouble call within 24 hours of its
A routine trouble is considered a trouble that causes a sub-system to be inoperable.

b. The Contractor shall respond on-site to an emergency trouble call within four hours of its report. An emergency trouble is considered a trouble that causes a System to be inoperable at anytime.

1) An emergency trouble call shall be deemed appropriate when a failure involves more than 20 voice circuits.
2) In addition, the failure of a common control unit, power supply, signal generating device or attendant console shall also be deemed as an emergency maintenance call.

c. The Contractor shall respond on-site to a catastrophic trouble call within two hours of its report. A catastrophic trouble call is considered an EPBX failure.

1) If an EPBX failure cannot be corrected within six hours, the Contractor shall be responsible for providing an alternate CPU equipped for a minimum of 100 main station lines, 10 CO trunks, 10 FTS access lines and two operator's console.
2) This alternate system shall be operational within 12 hours (time to commence at the end of the six-hour trouble shooting period) and shall provide emergency service to critical areas as determined by the VAMC Director.
3) The alternate system shall be a programmable system and a pre-written program tape shall be provided to the VAMC Contracting Officer prior to cut-over of the main telephone system.

d. Failures affecting operation of critical emergency health care facilities (i.e., cardiac arrest teams, intensive care units, etc.) shall also be deemed as a catastrophic trouble call if so determined by the Facility Director. The Facility Contracting Officer shall notify the Contractor of this type of trouble call at the direction of the Facility Director.

e. The Contractor shall respond on-site to installation of station or equipment requests or service within:

1) Eight hours for emergency installations designated by the Facility Contracting Officer, and
2) Three working days for routine installations designated by the Facility Contracting Officer.
f. A standard workweek is considered 8:00 A.M. to 5:00 P.M., Monday through Friday exclusive of Federal Holidays. If any trouble cannot be corrected within one working day, the Contractor shall furnish and install compatible substitute equipment returning the System or sub-system to full operational capability, as described herein, until repairs are completed.

g. The RE and/or Facility Contracting Officer are the Contractor’s reporting and contact officials for System trouble calls, during the warranty period.

2. Required On-Site Visits During The Warranty Period

a. The Contractor shall visit, on-site, for a minimum of eight hours, once every twelve (12) weeks, during the warranty period, to perform system preventive maintenance, equipment cleaning and operational adjustments to maintain the System according the descriptions identified in this document.

1) The Contractor shall arrange all Facility visits with the RE or Facility Contracting Officer prior to performing the required maintenance visits.

2) Preventive maintenance shall be performed by the Contractor in accordance with the OEM’s recommended practice and service intervals during non-busy times agreed to by the RE or Facility Contracting Officer and Contractor.

3) The preventive maintenance schedule shall be provided to and approved by the RE and Facility Contracting Officer.

4) Provide on-site a stock of replacement spare parts and equipment, plus test equipment, as specified herein, ensuring they meet the OEM’s minimum recommended spare parts stock sizing requirements for this specific system.

b. The Contractor shall provide the Facility Contracting Officer a type written report itemizing each deficiency found and the corrective action performed during each required visit or official reported trouble call. The Contractor shall provide the RE with sample copies of these reports for review and approval at the beginning of the Acceptance Test. The following reports are the minimum required:

1) The Contractor shall provide a monthly summary of all equipment and sub-systems serviced during this warranty period to the RE or Facility Contracting Officer by the fifth working
day after the end of each month. The report shall clearly and concisely describe the services rendered, parts replaced and repairs performed. The report shall prescribe anticipated future needs of the equipment and systems for preventive and predictive maintenance.

2) The Contractor shall maintain a separate log entry for each item of equipment and each sub-system of the System. The log shall list dates and times of all scheduled, routine, and emergency calls. Each emergency call shall be described with details of the nature and causes of emergency steps taken to rectify the situation and specific recommendations to avoid such conditions in the future. The RE or Facility Contracting Officer shall convey to the Facility Engineering Officer, two (2) copies of actual reports for evaluation.

3) The RE or Facility Contracting Officer shall ensure a copy of these reports is entered into the System’s official acquisition documents.

4) The Facility Chief Engineer shall ensure a copy of these reports is entered into the System’s official technical record documents.

3. Government Furnished Equipment (GFE). GFE that was accepted by the Contractor and interfaced and installed in this System shall become part of this System and included in the Warranty requirements.

F. Work Not Included: Maintenance and repair service shall not include the performance of any work due to improper use; accidents; other vendor, contractor, or owner tampering or negligence, for which the Contractor is not directly responsible and does not control. The Contractor shall immediately notify the RE or Facility Contracting Officer in writing upon discovery of these incidents. The RE or Facility Contracting officer will investigate all reported incidents and render findings concerning any Contractor’s responsibility.

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