

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- e) Multiple Alert Tones: The console client GUI shall provide the ability to select a minimum of three (3) standard, different alert tones. The duration of the alert tone shall be controlled manually when the console User depresses and holds the alert's GUI button with a maximum duration of six (6) seconds. The console client shall provide the ability to generate user-configurable, pre-programmed paging tones on conventional radio channels according to different tone formats and durations, from additional paging GUI buttons available from the console client software.
- f) Conventional Muting: Cross-band muting shall be on a resource-by-resource basis, console-wide, in order to compensate for RF interference between transmitters and receivers (the extent of muting possible depending on System size.) In addition to conventional mute capability, the console shall be capable of selective cross-muting by frequency. For example, a transmitter position [T4R1] controlling a multiple frequency transmitter on F1, would be able to mute auxiliary F1 receivers during transmit. However, when the transmit frequency is changed to F2, the F1 receivers would no longer be muted but the F2 receivers would. The cross-mutes shall be programmable from the console server in each Zone using password-protected access.
- g) Acoustic Cross Muting: The console shall be able to acoustically cross-mute channels on an operator-by-operator basis in order to eliminate acoustic feedback between selected operators. Acoustic cross muting on a console-position basis shall be automatically disabled on selected resources when a headset at a given console is plugged into the headset jack.
- h) Talkgroup Monitoring: The term "talkgroup" refers to a group of radios that have been assigned temporarily or permanently to a separate radio channel for voice communications. Radios shall be assigned to one or more talkgroups for daily operations. Radios may also select different talkgroups as they travel throughout the State, or work specialized details such as Tactical Response Team (TRT), surveillance, State fair, etc. Console operators shall have the ability to monitor and communicate with all talkgroups operating within their geographic area of responsibility. However, console operators shall not have the ability to monitor, or communicate with, any talkgroup that is communicating in an encrypted mode.
- i) Operating Environment Limits: Each radio control console client shall support up to 120 conventional and trunking resources. The number of conventional resources per position should not exceed 60 and the number of trunking resources (talkgroups) per position should not exceed 120. (These numbers are for each operator position.) That is, if there are four operator positions in a location, the total number of talk groups and/or conventional channels shall be as many as 480. The total combined

ATTACHMENT TS TECHNICAL SPECIFICATIONS

number of conventional and trunked resources shall be calculated by using the following: $(\text{Number of trunked resources}) + (2 \times \text{Number of conventional resources}) < 121$.

j) Additional Operational Requirements: Each radio control console suite delivered and installed by Motorola for the State shall provide the following additional operational characteristics:

- Ability to broadcast messages to multiple Units simultaneously using a "mutli-select" function on the console client. Multiple talkgroups or channels shall be able to be simultaneously selected and then activated
- One statewide general access talkgroup for all ISP Units, in addition to all other talkgroup assignments determined through the fleet-mapping effort to be completed by Motorola and the State during the detailed System design phase of the Contract as specified herein
- Ability to monitor simultaneously at any console client, multiple talkgroups and conventional channels simultaneously, based upon the active operating environment loaded on that client at that time
- Ability of one console at a control center to privately contact another console at the same control center, or one at a different control center operating on the System statewide, through the console client using a specific talkgroup pre-programmed for the console's operating environment, without using RF frequencies within the System.
- Ability to contact a single, specific field radio Unit via a private radio call by both alerting the User through a alert signal generated by the Unit to contact the console User, and through selecting a "private call" selection on the console client GUI. Target radio selection by the client shall be by Unit ID number, or by Unit name (alias), at the console User's discretion.
- Ability to communicate with and monitor traffic generated by all ISP Units (includes transient or itinerant cars) within District of assignment all the time, with the exception of encrypted radio traffic.
- Ability to monitor and communicate with talkgroups. The term "talkgroup" refers to a group of officers who have been temporarily or permanently assigned a separate frequency to communicate on, such as TRT, a surveillance team, vehicles assigned to a specific detail or incident which are operating on a specific frequency such as the State fair, a major incident, Valkyrie detail, etc. A console client in one Zone in the System shall be able to monitor all trunked radio traffic occurring in another Zone without impacting the prevailing, overall service level from the System.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- Ability to communicate with and monitor traffic generated by all ISP Units within district of assignment (includes transient or itinerant cars) only when needed, with the exception of encrypted communications.
- Access a one-touch "emergency alert button" on a console to alert field officers that a call-taker needs urgent assistance, by depressing the alert tone GUI button on the console client, or by initiating an emergency radio call, which requests a channel with highest System priority, through multiple GUI button depressions on the console client to prevent accidental activation.
- Access to a visual indication identifying a mobile/portable Unit transmitting (calling). This shall be able to be accomplished by use of Unit ID, or by pre-programmed alias information (car number, badge number, etc.)

k. Additional Functional Requirements: Each radio control console suite delivered and installed by Motorola for the State shall provide the following additional functional characteristics:

- The console client GUI shall organize talkgroups, patches, multi-select, telephone, and auxiliary I/O, arrangements pre-programmed according to the operating environment established during user logon, into logical, easily accessible GUI objects, or "resources". A radio call from the console to any such arrangement, or during a private or individual call, shall be accomplished by depressing and holding a "PTT" GUI button on the resource. Each resource shall have individual speaker volume control via use of a slider bar on the resource pane. The resource pane shall visibly change in contrast to other resources on the client screen, to indicate that it has been selected. The resource pane shall display a red transmit indicator in the resource window when that resource or talkgroup is keyed by the console user. Resource panes shall indicate when incoming radio calls on those resources are occurring on the STARCOM21 Network. The console user shall be able to easily navigate all drop-down menus, GUI buttons, resources panes, and dialog boxes using the touch-screen, pointing device, and keyboard. The GUI interface shall employ user behavior common to other Windows™ conventions (drag-and-drop, single click to select, double-click to activate, etc.)
- The console client shall provide a GUI to permit remote control of auxiliary switches and relays, such as door locks, lights, etc. Four types of auxiliary control shall be: outbound/latching, outbound/momentary, inbound/latching, and inbound/momentary.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

Other equipment controllable through this facility shall include an instant voice recorder and voting comparator.

- The console client shall maintain on-screen an activity log of all radio traffic arriving at that console position. The log shall show inbound call information, including, the name of the channel/talkgroup, Unit ID/alias, and the time of the call, in a tabular format sorted by most recent time at the top of the list. The activity log shall remain active throughout the user logon session, and clear only upon user log-off.
- The console client shall provide at the top of the screen a user-configurable row of GUI buttons the User may select to initiate general client or System actions rapidly. System time shall be shown on the toolbar.
- Consoles shall be affiliated with each trunking talkgroup the console is monitoring, such that it is recognized by the System as a valid participant in the talkgroup.

3.3.1.2 Control Stations

- a) Motorola shall configure, and deliver at each ISP District Control Center , the radio control stations ordered by the State. Fifty-six (56) of these control stations shall be rendered operational by Motorola at the ISP District locations and in the respective quantities identified in **Exhibit 3** to this **Attachment TS**. Each radio control station shall be identically constructed and feature-equipped for use by public safety agencies on the STARCOM21 System.
- b) If the State elects for ISP District 18, Motorola shall deliver, install, configure, and render operational one (1) radio control console client, as specified under **Paragraph 3.3.1.1** of this **Attachment TS**, and remotely interconnect this client and audio panel to server plant and electronics bank, respectively, installed by Motorola at ISP District 9.

3.3.1.2.1 Physical Characteristics

The control station shall be constructed similar to the mobile radio unit specified herein, but designed, configured, and packaged for indoor use—placed on a desk or into the console furniture the State is purchasing per **Paragraph 2.1.7** of this **Attachment TS**. The control station radio and its power supply shall be packaged in a single, desktop-friendly enclosure. The remote desk set shall provide front-facing controls, function buttons, knobs, and display.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

An internal, self-contained, loudspeaker, and a telephone-style handset (although Motorola will make a good faith effort to provide an interface to the System headset at the price listed in **Attachment PR**) shall be provided with each control station. The control station radio shall be supplied with a pre-measured and pre-terminated electrical power, microphone, and interconnect wiring.

3.3.1.2 Functional Characteristics

Motorola shall deliver and install the control station to be functionally the same as the mobile radio specified herein, thereby not relying on connectivity to the console server plant in which to operate. The control station shall not have console priority capability. The control station shall be programmed to have a System priority higher than the mobile radios. Priority level assignments shall be finalized during the detailed System design.

3.3.1.3 CAD Interface

Motorola shall deliver to the State an application program interface (API) from the radio console software.

3.3.1.4 Control Center Facility Provisions

The State will provide to Motorola at each ISP control center location where a radio control console is to be located per **Exhibit 3**, floor space, prime utility, a grounding point, and back-up generator electrical power capacity, HVAC capacity, cable ingress/egress to route any antenna feeds or interconnect cabling, needed to install and commission all equipment supplied by Motorola under **Paragraph 3.3.1.1** of this **Attachment TS**. The State will be responsible for any ongoing recurring costs associated with these provisions throughout the Contract Term, including any extensions thereto.

The State will install, and render suitable for use or operation, the new control center console furniture and voice logging recorder equipment specified under **Paragraphs 2.1.5** and **2.1.6**, respectively, of this **Attachment TS**. Motorola shall install into the console furniture and render operational all radio control consoles and stations specified herein.

Motorola shall install the electronics rack into an equipment room near or collocated with each ISP control center room, according to each control center's layout determined during the Contract's detailed design phase specified herein. Motorola shall install all cable trays, raceways, ladders, clamps, dressings, conduit, etc. needed for all interconnect wiring and cables between all control center equipment supplied by Motorola. Motorola shall be responsible for determining the suitability and readiness of each control center facility to receive Motorola's equipment. Motorola shall install all equipment

ATTACHMENT TS TECHNICAL SPECIFICATIONS

provided herein according to prevailing local ordinances and construction standards, and commercial best practices.

The State will be responsible to make application for any building permits required for construction of, or modifications to, control center buildings on State property.

3.3.2 Mobile Radio Requirements

Motorola shall deliver to the State mobile radios in the quantities and at the times specified in the Contract. Each mobile radio shall be identically constructed and feature-equipped for use by public safety agencies on the STARCOM21 System. Each radio delivered shall be FCC type-accepted, and possess the physical and functional characteristics specified below.

3.3.2.1 Physical Characteristics – Mobile Radios

- a) All mobile equipment proposed for use in the System must meet or exceed U.S. Military Specifications (810E) for operating and storage temperature, humidity, rain, dust, salt, shock, vibration, air pressure, and other environmental factors that affect durability, weather resistance, and constant use by Public Safety personnel year-round in automobiles, and fixed and rotary wing aircraft. Use in aircraft shall be accommodated through the use a third-party radio controller. The the controller and its installation, and the installation of the Unit, is not included as part of the Contract.
- b) Smaller mobile radios shall utilize miniaturized packaged design.
- c) Each mobile radio shall be supplied with a 3dB gain antenna including the mount and cable.
- d) If the State elects and pays the price listed in **Attachment PR**, Motorola shall deliver antennas designed for surveillance packages for investigations/covert units to reduce the number and external appearance of antennae when mounted on ISP automobiles in the quantities determined by the State at time of order placement.
- e) Consideration, awareness and design making sure all safety and design features are utilized to insure safety of the driver and any passengers in the vehicle relating to air bags, sharp edges, space needs, ease of access to equipment and use, etc.
- f) The mobile radio shall be delivered with a remote-mount kit (*i.e.*, offering the ability to remotely mount the radio control head, with integral power button, and power and transmitter lights, in the driver/pilot compartment, while placing the radio transceiver Unit in a trunk or suitable equipment bay. The kit will include a transceiver mounting bracket and control head mounting bracket.)

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- g) Utilize other Motorola equipment in a public safety squad car without inducing RF interference to the radio transmission affecting audio quality or signal and not induce additional RFI/EMI that would affect the performance, functionality, or reliability of that equipment. The mobile radio shall have shielding to minimize the potential for any interference to the radio. Should RF interference be encountered between the mobile radio supplied by Motorola and installed by the State, and other equipment in any squad car, Motorola shall support the State in isolating such interference.
- h) If the State elects and pays the price listed in **Attachment PR**, Motorola shall deliver radios with the ability or additional equipment as needed to control an ISP squad car's light bar, siren, and external public address speaker. The State will supply the necessary relays specifically needed for the equipment for specific vehicle equipment to be controlled.
- i) The mobile radio control head shall contain a one-line, 8-character (minimum) alphanumeric display, adjustable brightness control capability, electronic mode and volume control buttons, and a 3x4-button keypad for direct dialing, talkgroup/channel/mode selection, emergency notification, and other assorted radio functions.
- j) Function keys should be easily recognizable. All function keys shall be programmable with the exception of keys vital to radio operation such as volume control, control head dimming, etc.
- k) Each mobile radio shall be supplied with a standard push-to-talk ("PTT") palmset microphone with hang-up bracket, and a 10-watt interior loudspeaker with mounting bracket.
- l) All mobile radios will be delivered with fixed length and pre-terminated interconnect power, antenna, cabling and wiring harnesses, ready for installation. All wiring and cabling will be properly shielded and jacketed according to the environmental conditions commonly encountered in public-safety installations.

3.3.2.2 Functional Requirements – Mobile Radios

Each radio delivered shall meet the functional characteristics specified below:

- a) Ability to communicate, car to car, with ISP Units in adjacent patrols, using either a reachable fixed repeater/base station-site, and via "talkaround" (unit-to-unit) modes, selectable by any mobile radio user. The radio unit must be within the coverage area of the System or the "talkaround" area of the desired mobile.
- b) Ability to access ISPERN and other legacy radio networks operating in the State for communications with users operating in shared or other partitions when patched by a telecommunicator to a particular talkgroup.
- c) Ability of mobile radios to scan all working voice channels at a site (from 3 to 28), depending on the detailed System design configuration, with two

ATTACHMENT TS TECHNICAL SPECIFICATIONS

levels of priority for the different talkgroups. Multiple talkgroups, therefore, shall be scanned on any operating voice channels, with two of the talkgroups prioritized.

- d) Ability to scan in three modes (talkgroups up to 10 per list, conventional, and priority up to 15 per list) in up to 32 possible combinations, for all channels, frequencies, and talkgroups, programmed into the mobile radio.
- e) Access to a one-touch "emergency button" on a mobile radio to alert a communications station of an urgent need for assistance by an officer. The mobile radio User shall have the ability to locally "clear" the mobile radio's emergency mode from the radio control head. While in emergency mode, the radio shall continue to support complete communications capabilities. (ISP may decide to have emergencies moved to a specific talkgroup that could be different from the talkgroup that is selected in the radio at the time of the emergency.)
- f) Ability to communicate with any other User on the System operating in the same talkgroup programmed into the User's mobile radio. Motorola shall pre-program all mobile radios prior to delivery to the State according to the fleet-map finalized during the Contract's detailed System design phase.
- g) Ability to use covert radio equipment for car-to-car and car-to-station communications.
- h) Motorola shall deliver mobile radios with dual-band package (i.e., the extended band capability for communicating on VHF "high-band" conventional radio Systems). The bandsplit(s) for specific quantities of dual-band radios delivered shall be identified no later than 180 days after Contract Execution. The dual-band radio shall provide the ability to distinguish source of radio traffic, such as high-band or 800 MHz traffic, using different speakers to aid in differentiation of signal sources received by the radio simultaneously. For the dual-band package, Motorola shall deliver a second, VHF whip-style antenna and 10-watt loudspeaker with mounting bracket, both with their attendant interconnect wiring/cabling.
- i) Ability to communicate with and monitor traffic generated by all ISP Units within District of assignment (includes transient or itinerant cars) when the desired talkgroups are part of the radios scan list and are active in the coverage area.
- j) Ability to communicate with other Users operating in shared or other partitions, regardless of the location of all Users distributed geographically within the STARCOM21 Network. Regardless of the location of the other User, any User on the System shall have the ability to communicate with any other User on the System as long as they have the same talkgroup programmed into their radio.
- k) Ability to monitor critical messages as disseminated from any statewide or adjacent ISP Districts. The talkgroups that are to be monitored can be

ATTACHMENT TS TECHNICAL SPECIFICATIONS

programmed into a scan list. The talkgroups must be active in the coverage area to be monitored.

- l) Ability to monitor District station broadcasts regarding severe weather when patched by a telecommunicator to a particular talkgroup.
- m) Upgradeable to support encrypt/scramble communications to other ISP and MEG/Task Force units. If the State elects and pays the price listed in **Attachment PR**, Motorola shall supply mobile radios delivered in the quantities specified in the Contract, equipped with DES-OFB encryption capability. Each such mobile radio so equipped shall be able to encrypt/decrypt voice communications on a talkgroup or channel basis, using all radio modes (trunked, conventional, and talkaround.) This version of mobile radio shall accept up to 16 encryption keys.
- n) The mobile radio shall display which communications console is transmitting to the User's mobile radio. This indication shall be the console operator position's unique ID. Each talkgroup shall have its own unique ID on the dispatchers screen.
- o) If the State elects and pays the price listed in **Attachment PR**, Motorola shall provide, within a reasonable time, a field-deployable mobile communications control set in the form of a Transportable Communication System (TCS). The TCS shall consist of a 5-channel portable repeater suite capable of STARCOM21 System trunked operation. The TCS shall be able to be transported via an ISP-supplied van or mobile command post. The TCS shall be able to operate both as a standalone site provided repeated voice communications, and as a temporary replacement with all attendant functionality, performance, and capability for a fixed repeater site within the STARCOM21 System that would otherwise be unavailable for a prolonged period.
- p) Ability to receive and accept "over-the-air" programming/reprogramming from a remote, central location using only the STARCOM21 System itself as the carrier. Programming accepted by mobile radios via over-the-air shall include, but not be limited to, adding new working voice channels and talkgroups, disabling or locking the channel selector on the radio when the radio is dynamically regrouped, and disabling/re-enabling the usability of specific mobile radios.
- q) All mobile radios delivered under the Contract shall be delivered capable of APCO Project 25 "9600 CAI" digital-trunked and digital-conventional, analog-trunked (SMARTNET™/SMARTZONE™), and analog-conventional, operating modes. All modes shall be included, programmable, and available, in each mobile radio delivered.
- r) Transmitter output power: 35 Watts (30 Watts maximum in "talkaround" mode).
- s) Frequency Bands: 746 MHz (if available at time of shipment to the State according to the delivery schedule established in the Contract), 806-870

ATTACHMENT TS TECHNICAL SPECIFICATIONS

MHz (quantity of radios required for each 800 MHz band-split shall be specified by the State no less than 240 days after Contract Execution or 30 days after Motorola has notified the State that it expects Final System Acceptance in 180 days. All mobile radios shall be delivered pre-programmed with all possible channels/frequencies identified in the STARCOM21 System's frequency allocation plan valid on the delivery date.

- t) Channel Bandwidths: 12.5/25 kHz programmable both locally and, for working voice channels, on a mode-by-mode basis.
- u) Each mobile radio shall be programmed with a unique ID number.
- v) Channel capacity: 255 channels (in any variety and combination of frequency bands indicated above.)

3.3.3 Portable Radio Requirements

Motorola shall deliver to the State portable radios in the quantities and at the times specified in the Contract. Each mobile radio shall be identically constructed and feature-equipped for use by public safety agencies on the STARCOM21 System. Each radio delivered shall be FCC type-accepted and possess the physical and functional characteristics specified below.

3.3.3.1 Physical Characteristics – Portable Radio

- a) All portable equipment proposed for use in the System must meet or exceed U.S. Military Specifications (810E) for operating and storage temperature, humidity, rain, dust, salt, shock, vibration, air pressure immersion, and other environmental factors that affect durability, weather resistance, sunlight exposure, and constant use by Public Safety personnel year-round outside, and inside automobiles.
- b) Portable radios must include batteries to power the radio for a minimum of 8 hours of continuous operation based upon a 5% transmit/5% receive/90% standby duty-cycle. The portable radio shall include an automatic battery-charge preservation technology that reduces transmitter power consumption when operating near a STARCOM21 System repeater site.
- c) The size of the portable radio shall be no larger than 160 mm x 60 mm x 25 mm (less battery).
- d) The portable radio shall include both visual and audible alerts indicating that the battery is nearly discharged. Any audible alarm shall be capable of being turned off so as not to impede covert operations.
- e) A flexible, User-replaceable, antenna shall be provided with each portable radio delivered under the Contract.
- f) Motorola shall deliver each portable radio with a speaker/PTT-microphone/antenna (SMA) accessory designed for being clipped to and

ATTACHMENT TS TECHNICAL SPECIFICATIONS

used by a User at shoulder/lapel level. Each portable radio shall be delivered with, and be capable of using, an earpiece accessory.

- g) The portable radio shall contain a 4-line, 12-character (minimum) alphanumeric display, with adjustable LCD brightness/contrast control capability. The LCD display and keypad shall be backlit on demand.
- h) The portable radios shall have the capability of accepting a covert/surveillance SM harness (push-to-talk microphone and earpiece).
- i) Motorola shall provide keys and knobs whose functions will be easily recognizable. Specific features shall include to volume control rotary knob, a 2x3-button keypad, 3-position toggle switch and a rotary knob for talkgroup/channel/mode selection, an emergency notification button, and other assorted radio functions. All function keys shall be programmable with the exception of keys necessary for radio functionality (volume, mode selection, etc.).
- j) The portable radio shall have shielding to minimize the potential for any interference to the radio.
- k) Motorola shall supply with each portable radio delivered a leather case complete with D-Ring swivel and belt-clip.

3.3.3.2 Functional Requirements – Portable Radio

Each portable radio delivered by Motorola to the State will meet the functional characteristics specified below:

- a) Ability to communicate with headquarters, other ISP cars, or other portables in various environments: uneven terrain, wooded areas, areas with many buildings of various heights, etc. using either a reachable fixed repeater/base station-site, a reachable vehicular repeater System (VRS), and via "talkaround" (unit-to-unit) modes, selectable by any mobile radio User. (The portable Unit must be in the coverage area of the scenarios listed above.)
- b) Ability of the user to use the portable radio from all positions (i.e., standing, sitting, squatting, prone). (The location of the portable antenna can have an effect on System coverage.)
- c) Ability to communicate with headquarters, other ISP cars, or other portables from inside a building with a building loss of 8 dB or less while operating within the regions listed in **Paragraph 3.2.3.5(c) of this Attachment TS**.
- d) Ability to communicate with any other user on the System operating in the same talkgroup programmed into the user's portable radio. Motorola shall pre-program all portable radios prior to delivery to the State with the right to access all sites in the STARCOM21 System according to the fleet-map finalized during the Contract's final System design and reprogram any radios as needed purchased prior to Final System Acceptance at no additional cost to the State.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- e) Ability to work great distances from patrol vehicle and still be able to communicate with back-up officers (e.g., out of squad car on a manhunt, K-9 tracking a suspect, etc. at a minimum line-of-sight distance of one-quarter mile) using any one of the three fundamental radio modes available: direct-to-Network, through a VRS, or via talkaround mode. (The portable Unit must be in the coverage area of the scenarios listed above.)
- f) Access to a one-touch "emergency button" on a portable radio to alert a communications station of an urgent need for assistance. Emergency button must function while the User is any position (standing, sitting, squatting, prone). The portable radio User shall have the ability to locally "clear" the portable radio's emergency mode. While in emergency mode, the radio shall continue to support complete communications capabilities. The emergency mode shall be functional in normal, trunked service mode in communication directly with the STARCOM21 repeater Network, or through the vehicular repeater System when in the coverage area of the Network or the VRS
- g) The portable radio shall be designed with ergonomic controls.
- h) Ability of portable radios to scan all working voice channels at a site (from 3 to 28), depending on the detailed System design configuration, with two levels of priority for the different talkgroups. Multiple talkgroups, therefore, shall be scanned on any operating voice channels, with two of the talkgroups prioritized.
- i) Ability to scan in three modes (talkgroups up to 10 per list, conventional, and priority up to 15 per list) in up to 32 possible combinations, for all channels, frequencies, and talkgroups, programmed into the mobile radio. (Only one scan list can be active at a time.)
- j) Ability to scan the STARCOM21 Network and other, analog conventional Systems
- k) Ability to communicate with an ISP District from a portable radio outside of vehicle via a mobile vehicular repeater. (The mobile and portable radios must be in the coverage area of their respective devices: Mobile-to-Network and portable-to-VRS.)
- l) Ability to communicate with other Users in shared or other partitions regardless of the location of all users distributed geographically within the STARCOM21 Network. Any User on the System shall have the ability to communicate with any other User on the System as long as they have the same talkgroup programmed into their radio.
- m) Upgradeable to support encrypt/scramble voice communications using DES-OFB format. If the State elects and pays the price listed in **Attachment PR**, Motorola shall supply portable radios equipped with DES-OFB encryption installed in the quantities listed in the Contract. The portable radio shall be able to encrypt/decrypt voice communications on a

ATTACHMENT TS TECHNICAL SPECIFICATIONS

talkgroup or channel basis, using all available radio modes (direct trunked and conventional access to the STARCOM21 Network, and in talk-around). This version of portable radio shall accept up to 16 different key combinations.

- n) Ability to have multiple vehicular repeater systems (VRS) activated in a close proximity without causing interference.
- o) Ability to receive and accept "over-the-air" programming/reprogramming from a remote, central location using only the STARCOM21 System itself as the carrier. Programming accepted by portable radios via over-the-air shall include, but not be limited to, adding new working voice channels and talkgroups and disabling/re-enabling the usability of specific portable radios.
- p) All portable radios delivered under the Contract shall be delivered capable of APCO Project 25 "9600 CAI" digital-trunked and digital-conventional, analog-trunked (SMARTNET™/SMARTZONE™), and analog-conventional, operating modes. All modes shall be included, programmable, and available, in each portable radio delivered.
- q) All portable radios will have transmitter output power of 3 Watts.
- r) Frequency Bands: 806-870 MHz. The quantity of radios required for each 800 MHz band-split shall be specified by the State no later than 240 days after Contract Execution or 30 days after Motorola has notified the State that it expects Final System Acceptance in 180 days. All portable radios shall be delivered pre-programmed with all possible channels/frequencies identified in the STARCOM21 System's frequency allocation plan valid on the delivery date.
- s) Frequency Bands: If the State elects and pays the price listed in **Attachment PR**, a quantity of portable radios shall include the capability to communicate on the 746 MHz frequency band. The quantity of radios required in each 746 MHz bandsplit, if any bandsplit is necessary, shall be specified by the State no later than 240 days after Contract Execution or 30 days after Motorola has notified the State that it expects Final System Acceptance in 180 days. All portable radios shall be delivered pre-programmed with all possible channels/frequencies identified in the STARCOM21 System's frequency allocation plan valid on the delivery date.
- t) Channel Bandwidths: 12.5/25 kHz programmable both locally and, for working voice channels, on a mode-by-mode basis.
- u) Each portable radio shall be programmed with a unique Unit ID number.
- v) Channel capacity: The capacity of portable radios shall be 160 channels (in any variety and combination of frequency bands indicated above.) The portable radio shall provide the ability to access up to ten (10) conventional analog and digital channels for communication on STARCOM21 Mutual Aid, and other off-System networks.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- w) The portable radios shall access ISPERN and other legacy radio networks operating in the State for communications with users operating in shared or other partitions when patched by a telecommunicator to a trunked talkgroup.

3.3.4 Vehicular Repeater Set (VRS)

If the State elects and pays the price listed in **Attachment PR**, Motorola shall deliver to the State vehicular repeater sets ("VRS") as specified in the Contract. Each VRS shall be identically constructed and feature-equipped for use by public safety agencies on the STARCOM21 System. Each VRS delivered shall possess the physical and functional characteristics specified below.

3.3.4.1 Physical Characteristics – VRS

- a) The VRS shall meet or exceed U.S. Military Specifications 810C or later for operating and storage temperature, humidity, rain, dust, salt, shock, vibration, air pressure, and other environmental factors that affect durability, weather resistance, and constant use by Public Safety personnel year-round in automobiles, and fixed and rotary wing aircraft.
- b) Each VRS shall be supplied with a 3dB gain, ground plane antenna including the mount and cable, and a mounting tray/bracket.
- c) All VRS's shall be delivered with fixed length and pre-terminated interconnect cabling including the power and antenna cabling and wiring harnesses, ready for installation. All wiring and cabling shall be properly shielded and jacketed according to the environmental conditions commonly encountered in public-safety installations.

3.3.4.2 Functional Requirements – VRS

Each VRS delivered shall meet the functional characteristics specified below:

- a) The VRS shall include "smart" electronics that allow multiple VRS to operate in close proximity without interference. A sophisticated software algorithm shall be activated in each unit that lets it know when multiple VRS are in the area and only the 'designated' VRS is operational. If that VRS leaves the area, the next VRS in the prioritization ranking shall then take its place.
- b) The VRS shall operate on conventional, analog frequencies only. Therefore, the User must select a conventional, analog talkgroup to communicate through the VRS. Motorola shall include in its frequency allocation plan the radio channel assignments allocated to and required between a user portable radio and a VRS.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- c) If available and the State elects and pays the price listed in **Attachment PR**, Motorola shall deliver (in accordance with a delivery schedule developed by Motorola) a VRS that operates on conventional, digital frequencies, but otherwise complies with all other functional and physical requirements set forth under **Paragraph 3.3.4** (except **Paragraph 3.3.4.2.b**) in this **Attachment TS**. Therefore, the User must select a conventional, digital talkgroup to communicate through the VRS. The digital VRS shall support and allow encrypted voice radio communications through it without performance degradation or encryption corruption.
- d) The VRS shall utilize the vehicle's mobile radio supplied by Motorola under the Contract, and installed by the State, to relay portable radio communications from the portable radio to the STARCOM21 Network. As such, the VRS shall interface directly to the mobile radio supplied herein. The VRS shall be designed to be powered from the vehicle's "accessory" (ACC) power bus, such that the VRS is powered when the vehicle's key is turned to that position.
- e) The VRS shall provide access for multiple portable radios to the STARCOM21 Network at the same time. The VRS shall transmit and receive radio communications on the programmed analog frequency pair allocated for the System. If there are multiple portables in the area, all on the same VRS talkgroup (conventional analog channel), the VRS shall receive transmissions from any of those Units.
- f) Because the VRS relies on the vehicle's mobile radio to reach the STARCOM21 Network, the mobile radio's Unit ID and alias shall be seen by the System. Consequently, the Unit ID or alias of a portable radio communicating through a VRS shall not be seen by the System.
- g) The effective transmission range of the VRS shall be approximately that of a portable radio. Motorola shall balance the transmission parameters such that the talk-out and talk-in coverage of the VRS is essentially equal. The effective radiated power (ERP) of the VRS shall include the gain of the ground plane antenna mounted on the roof of the vehicle. The transmitter power output of the portable radio (to the VRS) is a minimum of 3 watts. When a signal is received from the users portable, it is fed through the VRS to the trunked mobile and transmitted from that mobile to the trunking System, thereby giving the portable radio User the equivalent range of a mobile radio Unit.
- h) Should any one of the portable radios—capable of entering an emergency mode on a conventional channel and operating through a given VRS in a vehicle—be placed into an emergency alert mode, the System shall recognize and prioritize the emergency according to that vehicle's mobile Unit ID and alias.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

3.3.5 Vehicular Portable Adapter (VPA)

Motorola shall deliver to the State vehicular portable radio adapters ("VPA") as specified in the Contract. Each VPA shall be identically constructed and feature-equipped for use by public safety agencies on the STARCOM21 System. Each VPA delivered shall possess the physical and functional characteristics specified below.

3.3.5.1 Physical Characteristics – VPA

- a) The VPA shall meet or exceed U.S. Military Specifications 810C or later for operating and storage temperature, humidity, rain, dust, salt, shock, vibration, air pressure, and other environmental factors that affect durability, weather resistance, and constant use by Public Safety personnel year-round in automobiles.
- b) Each VPA shall be designed for installation in an ISP vehicle's driver compartment in order to accept the portable radio Unit, with battery, supplied under the Contract.
- c) Each VPA shall be supplied with a 3dB gain antenna including the mount and cable, +12VDC battery charger, a standard push-to-talk (PTT) palmset microphone with hang-up bracket, and a 6-watt interior loudspeaker with mounting bracket.
- d) The VPA shall offer the necessary safety and design features when relating to air bags, sharp edges, space needs, ease of access to equipment and use, etc.
- e) The VPA shall be designed such that the portable radio can be placed into it easily and frequently, without the user having to make any other connections to use the portable radio through the VPA. The VPA shall be configured to allow the User to use all portable radio controls and read its display while the radio is placed in the VPA. The VPA shall be constructed to retain/hold in its radio cradle the portable radio during normal driving conditions. If the mounting location of the VPA does not provide viewing access of the portable's display, the State may chose to purchase a handheld display-type microphone as an option.
- f) An indicator light shall be on the VPA that will illuminate when the portable radio is properly engaged into the VPA.
- g) Each VPA shall be delivered with fixed length and pre-terminated interconnect cabling including power and antenna cabling and wiring harnesses, ready for installation. All wiring and cabling shall be properly shielded and jacketed according to the environmental conditions commonly encountered in public-safety installations.

3.3.5.2 Functional Requirements – VPA

Each VPA delivered shall meet the functional characteristics specified below:

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- a) The VPA shall contain an integral RF power amplifier rated at 15 watts output.
- b) The VPA shall contain an integral portable radio battery charger that will charge the portable radio when placed into it. The VPA shall recharge the portable radio battery while the radio is on, being used, and turned off.
- c) The VPA shall be designed to permit the user to communicate on the System through the portable radio using the VPA. The purpose of the VPA shall be to improve radio coverage between the vehicle and the System by increasing the outbound transmit power from the portable radio, and improving the line-of-sight between the System and the portable through the use of the VPA's externally-mounted antenna.
- d) Use of the VPA shall not otherwise affect or impact the functional characteristics of the portable radio specified herein.

3.3.6 Vehicular Portable Radio Battery Charger

Motorola shall deliver to the State vehicular portable radio battery chargers as specified in the Contract. Each vehicular charger shall be identically constructed and feature-equipped for use by public safety agencies on the STARCOM21 System. Each charger delivered shall possess the physical and functional characteristics specified below.

3.3.6.1 Physical Characteristics – Vehicular Charger

- a) The vehicular charger shall be designed for constant use by Public Safety personnel in all four seasons year-round in automobiles.
- b) Each vehicular charger shall be designed for installation in an ISP vehicle's driver compartment in order to accept the portable radio unit, with battery, supplied under the Contract.
- c) The vehicular charger shall offer the necessary safety and design features when relating to air bags, sharp edges, space needs, ease of access to equipment and use, etc.
- d) The vehicular charger shall be designed such that the portable radio can be placed into it easily and frequently, without the User having to make any other connections. The charger shall be constructed to retain/hold in its radio cradle the portable radio during normal driving conditions. Accessories may have to be removed from the portable radio in order to fully insert the portable radio into the vehicular charger.
- e) An indicator light shall be on the charger that will illuminate when the portable radio is properly engaged into the charger.
- f) Each charger shall be delivered with fixed length and pre-terminated wiring ready for installation. All wiring shall be properly shielded and

ATTACHMENT TS TECHNICAL SPECIFICATIONS

jacketed according to the environmental conditions commonly encountered in public-safety installations.

3.3.6.2 Functional Requirements – Vehicular Battery Charger

Each vehicular charger delivered shall meet the functional characteristics specified below:

- a) The vehicular charger shall contain an integral portable radio battery charger that will charge the portable radio when placed into it. The charger shall recharge the portable radio battery while the radio is on, being used, and turned off.
- b) Use of the vehicular charger shall not otherwise affect or impact the functional characteristics of the portable radio specified herein.

3.3.7 Other Portable Radio Accessories

Motorola shall deliver to the State the following additional portable radio accessories, suitable for use with the portable radios delivered under the Contract:

- a) Portable radio battery: Motorola shall deliver one (1) each additional portable radio battery equal to that provided with each type of portable radio delivered under the Contract.
- b) Desktop battery charger: Motorola shall deliver a desktop portable radio battery charger unit in the quantities and at the times specified in the Contract. The charger unit shall accept one (1) battery such that the battery can be placed into the charger when connected to, and disconnected from, the portable radio. The charger unit shall have an indicator light that illuminates when a battery is properly engaged.
- c) Multi-unit battery charger: Motorola shall deliver a wall-mountable portable radio battery charger unit in the quantities and at the times specified in the Contract. The charger unit shall accept up to six (6) batteries such that the battery can be placed into the charger when connected to, and disconnected from, the portable radio. Each charger slot unit shall have an indicator light that illuminates when a battery in that slot is properly engaged.

3.3.8 Radio Programming Kits

- a) Mobile Radios: Motorola shall deliver to the State mobile radio programming kits specified as in **Attachment PR**. The mobile radio programming kits shall be designed and suitable for use with the mobile radios delivered under the Contract. Each mobile radio programming kit shall consist of interface cables, if required, interface box, and programming software designed to run on an Intel/AMD-based

ATTACHMENT TS TECHNICAL SPECIFICATIONS

personal/laptop computer and WindowsNT™/Windows 2000™/Windows XP™ operating System. The kit shall be designed such that the mobile radio can be configured with different channels, talkgroups, modes, permissions, etc. by State personnel via the software.

- b) Portable Radios: Motorola shall deliver to the State portable radio programming kits as specified in **Attachment PR**. The portable radio programming kits shall be designed and suitable for use with the portable radios delivered under the Contract. Each portable radio programming kit shall consist of interface cables, if required, interface box, and programming software designed to run on an Intel/AMD-based personal/laptop computer and WindowsNT™/Windows 2000™/Windows XP™ operating System. The kit shall be designed such that the portable radio can be configured with different channels, talkgroups, modes, permissions, etc. by State personnel via the software.
- c) Control Stations: Motorola shall deliver to the State control station radio programming kits as specified in **Attachment PR**. The control station radio programming kit shall be designed and suitable for use with the control station radio delivered under the Contract. Each control station radio programming kit shall consist of interface cables, if required, interface box, and programming software designed to run on an Intel or AMD-based personal or laptop computer and WindowsNT™/Windows 2000™/Windows XP™ operating System. The kit shall be designed such that the control station radio can be configured with different channels, talkgroups, modes, permissions, etc. by State personnel via the software.

3.4 Design, Implementation, and Documentation

The following paragraphs present the State's requirements for the detailed design and implementation phases of the STARCOM21 System to be performed by Motorola, and the project management oversight and technical literature Motorola shall provide the State.

3.4.1 Detailed Design

Motorola shall complete a detailed System design to comply with the physical, functional, operational, and performance, requirements set forth herein for the System and User Equipment delivered under the Contract. This notwithstanding,, Motorola shall deliver and deploy a fully functional and equipped STARCOM21 Network, the required quantities of User items, and performing the various implementation and support services described herein.

Motorola shall perform the following design efforts, and provide to the State the consequential work products in the form of data, drawings, and documents, pursuant to implementing and commissioning the STARCOM21 System and related User Equipment. The detailed System design phase specified hereunder shall be completed within one hundred and twenty (120)

ATTACHMENT TS TECHNICAL SPECIFICATIONS

days after Contract execution, unless otherwise extended by mutual agreement between the parties and such agreement shall be reduced to writing.

3.4.1.1 Frequency Allocation Plan

Motorola shall prepare and provide to the State for review and approval a detailed frequency allocation plan that will meet the signal limitations set forth by the FCC, NPSPAC Regions 13 and 54, and make the most efficient use of the frequencies. The frequency allocation plan shall include all channels allocated within the 806 and 821 MHz bands, as well as the future 746 MHz band (once identified in either the NPSPAC Region 13 or 54 frequency plans), as discussed under **Paragraph 2.3.3** of this **Attachment TS**. The allocation plan shall distinguish (1) which frequencies are currently licensed by the State and by others; (2) those which must be reallocated; (3) those that must be licensed for the initial System implementation versus those allocated for contingent use once licensed and equipped for use once Additional Users join the System or when the Grade of Service from a given location within the System must be improved. Once the frequencies within the 746 MHz band have been identified during the Contract Term, Motorola shall update the frequency allocation as appropriate to maximize the efficiency of the Network.

3.4.1.2 Coverage Prediction Maps

Motorola shall prepare and provide to the State new coverage maps once the System site locations have been finalized. These coverage maps shall show predicted mobile and portable outdoor direct-to-Network coverage, and portable in-building direct-to-Network coverage, reflecting the coverage requirements and parameters set forth in **Paragraph 3.2.3.4** of this **Attachment TS**. The State will accept from Motorola the portable outdoor coverage maps for informational purposes only. The maps shall show predicted "pass/fail" grid coverage according to the coverage acceptance testing specified hereunder. Mobile talk-out, and portable in-building talk-in maps for the selected cities and counties detailed in **Paragraph 3.2.3.3** of this **Attachment TS**, shall be provided to the State. Motorola shall use a 6-arcsecond GIS database for generating both map sets. The maps shall be color-coded, be annotated with primary and secondary roads, show city, county and State jurisdictional borders, indicate System site locations, be printed on A-size paper, and shall present the data to a scale of 1 inch = 3 miles.

Within thirty (30) days after Contract signature, the State will provide Motorola up to 88,000 specific ISP radio communication-operating locations statewide to assist Motorola with its mobile and portable radio coverage design effort. All 88,000 locations will represent the delivered audio quality (DAQ) test points to be used by Motorola during the mobile radio coverage test described under **Paragraph 3.5.9** of this **Attachment TS** herein. All

ATTACHMENT TS TECHNICAL SPECIFICATIONS

88,000 locations will also serve as the voice test points to be used during the coverage acceptance test specified under **Paragraph 3.5.8** of this **Attachment TS**.

Motorola shall provide the State four (4) complete copy sets of coverage prediction maps prior to final System design. The State and Motorola shall meet to jointly review each set of coverage maps to determine whether marginal coverage areas can be improved or emphasized in a particular area where the ISP regularly conducts operations as indicated by the 88,000 test audio quality test points supplied above. These adjustments may be at the expense of coverage in sparsely populated, open land where no primary or secondary roads exist at that time, but still performing to the Contract coverage requirements set forth herein, provided that this sentence shall not be deemed to require Motorola to develop additional sites. Motorola shall review the State's request, and present up to three different (3) optional System site configurations and related coverage maps for review. The State and Motorola shall meet to review and compare against the first map set these review coverage predictions, and determine which of the two different coverage configurations are better suited to serve the ISP's operational needs.

Although the State understands that these maps are mathematical representations of predicted coverage as demonstrated through Motorola's coverage acceptance testing plan specified herein, these maps shall not relieve Motorola from demonstrating Motorola's guarantee to the State that the STARCOM21 System provides greater than 95% area mobile coverage statewide, and portable in-building coverage in the locations specified under **Paragraph 3.2.3.4** of this **Attachment TS**, to a minimum delivered audio quality (DAQ) of 3.0 as defined by Telecommunications Industries Association ("TIA") document TSB-88A.

3.4.1.3 Initial Fleet-Map/Talkgroup Configuration

The State will provide all information to Motorola needed for Motorola to prepare an initial fleet map for the System. The fleet map shall be a table of radio and console Initial Users, and legacy radio and other conventional system interfaces and patches, organized into one or more talkgroups, by operating location. The State will determine the format and conventions for talkgroups and user alias names that Motorola shall use to program and configure the System and all User equipment. The State will also determine which Initial Users, legacy systems, and conventional channels, are to participate initially in which talkgroups. Motorola shall work with the State and may be required to adjust the fleet map and/or talk group configurations based on new information over the Contract Term. Motorola shall reprogram the State radios to reflect fleet map or talkgroup changes one time after Final System Acceptance at no additional cost to the State. The State may agree to pay for additional fleet map and or talk group changes required during the

ATTACHMENT TS TECHNICAL SPECIFICATIONS

Contract Term. But, the State shall under no circumstances pay for any fleet map or talk group changes required to comply with Grade of Service, Coverage, or System availability guarantees, nor to meet 746 MHz frequency spectrum requirements, that may be mandated by the third-parties or needed by Motorola for efficient operations of the Network.

Based on this information, Motorola shall complete and incorporate into the System and all User Equipment the initial fleet map approved by the State such that the System is properly designed by Motorola to provide the guaranteed Grade of Service, coverage and availability, for the Initial Users specified under **Paragraph 3.2.3.1** of this **Attachment TS**.

3.4.1.4 Site Survey Reports (State Resources Only)

Motorola shall conduct a thorough physical site survey of all State-owned tower/antenna sites, listed in **Exhibit 1**, and State-owned Greenfield Sites, that are both sought for use by Motorola, and provide for the State a copy of such suitability reports at no additional cost to the State. The report shall outline the suitability of each site for use in the STARCOM 21 System. The site survey shall address the following items as minimum:

- General site condition
- Building condition
- Security
- Site access
- Site coordinates
- Site elevation (AMSL)
- Floor space availability
- HVAC equipment
- Generator condition and capacity
- Transmission Line entry ports
- Frequencies in use at the site
- Site grounding
- Tower height
- Tower face width
- Tower construction type (All-weld, Knockdown, etc.)
- Antenna types and locations
- Available space for STARCOM21 antennas
- Tower age
- Tower registration number

ATTACHMENT TS TECHNICAL SPECIFICATIONS

Each survey report shall provide photographs and illustrations of the site, and especially of those areas that Motorola concludes could render the site unsuitable for use. One report shall be provided to the State for each existing, State-owned tower/antenna site, and each State-owned Greenfield Site, surveyed. However, the State is under no obligation to make any changes to the any part of the any items reported by Motorola as deficient. .

3.4.1.5 Tower/Structural Load Analysis Reports (State Resources Only)

Motorola shall perform an updated structural load analysis for each existing, State-owned tower/antenna site in **Exhibit 1**, sought for use by Motorola in the STARCOM21 System, for review and approval by the State. Motorola's analyses shall incorporate the installation and mounting of all new RF and microwave antenna and transmission systems supplied by Motorola. At Motorola's request, the State will provide Motorola any previous structural analysis reports on file for these sites. Motorola shall base its analysis of each tower/antenna site on the same factors (e.g. wind, ice, soil compression, etc.) used in the existing report supplied by the State.

Motorola shall perform such analysis at no additional cost to the State, and submit to the State, an updated structural load analysis for any new tower superstructures that Motorola decides to place on any mutually-agreed Greenfield Sites. For each analysis, Motorola shall consider the load from the new RF and microwave antenna and transmission Systems installed for the STARCOM21 System, under a constant 100 mph wind load, and one (1) inch-thick ice coating load.

3.4.1.6 District Control Center Interconnect

Motorola shall be responsible for providing the physical interconnect transport path between each ISP District Control Center and one of the System's three Zone control points established by Motorola. The State agrees to pay a fee up but not exceeding the amount of money necessary for the use of leased T1 land-line transport it would be required to pay a third-party common carrier. The primary purpose of this option shall be to allow Motorola to guarantee the availability for the Network and to save the State money. Any transport provided by Motorola and used between the District Control Centers and one of the Systems three Zones shall become the property of the State at the end of the Contract Term.

Motorola shall determine the required bandwidth (the number of T1's) between each ISP Control Center and the one the System's three Zone control points to complete the interconnect for Motorola's radio control consoles, and the System management and supervisory platforms installed for the State necessary to meet the availability guarantees in the Contract. In determining the number of T1s required, Motorola shall consider and incorporate the several factors including but not limited to the following:

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- A redundant configuration between a Zone control point and each District's console electronics bank
- The quantity of de-trunked audio channels for the voice logging recorder
- Patch requirements to legacy and any new conventional radio channels
- The quantity of unselected talkgroup speakers at each control console position
- Future expansion
- Any other parameters that, in Motorola's opinion, may add demand on this bandwidth

Motorola will terminate the required T1s at each Control Center and each Zone control point to using appropriate equipment connection, supplied by Motorola. Motorola shall be responsible for completing the cross-connection of the appropriate T1s between the punch-blocks and the transport equipment supplied and installed at each end by Motorola. The State shall be responsible for the purchase of the multiplexer equipment at the Control Center end of the link as specified in **Attachment PR**.

Motorola shall prepare, document, and provide to the State for its files, a detailed DS0 channelization plan, in the form of wiring diagrams, for each control center interconnect.

Motorola shall provide pricing for the above System option in the form of a monthly fee, and as one-time payment, both as provided in **Attachment PR**. The monthly fee shall be for the equipment necessary to meet the above requirements. The fee shall be fixed in **Attachment PR** for the Contract Term, and shall be for servicing and maintaining the equipment only.

For Control Centers other than ISP Centers designated in this contract, Motorola shall, supply at the State's request, a pricing quotation for connectivity for additional interconnections between other control centers and the Network master site(s).

3.4.1.7 System/Network Interconnect

Motorola shall design, supply, install, and maintain, all transport facilities within the System, except for those links employed by Motorola on transports provided by the State. Motorola shall determine the required bandwidth (the number of T1's) from these State-owned transports, based upon the following consideration:

- A redundant transport equipment configuration between all sites, between each site and a central Zone control point, and between each Zone control point, to support the initial radio traffic and associated System overhead for the initial System deployment.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- Future expansion
- Any other parameters that, in the Motorola's opinion, may add demand on this bandwidth

Motorola shall terminate the required T1 multiplexers at the end each transport link at Type-66 punch-blocks, or quick-disconnect panels, supplied by Motorola at the prices listed in **Attachment PR.** The Motorola shall be responsible for completing the cross-connection of the appropriate T1s between the punch-blocks and the transport equipment (multiplexers) supplied and installed at the end of each link by the Motorola.

Motorola shall prepare, document, and provide to the State for its files, a DSO channelization plan, in the form of wiring diagrams, for the interconnect bandwidth from the State-owned transport employed by Motorola for the STARCOM21 System.

3.4.1.8 Radio Control Console Operating Environments

Motorola shall configure and present to the State for review, change, or approval, draft console user configurations customized for each ISP District's unique operating and radio (new and legacy) communications environment as established by the State-approved System fleet-map. Each configuration shall include the specific GUI objects and context configurable for each client, and System-wide user functionality required by the State as specified herein. Motorola may make future changes at no additional cost to the State where the changes would be in the best interest of both the State, and Motorola in meeting the guarantees provided in the Contract for Grade of Service, Coverage, and System Reliability. These actions shall include, but not limited to, talk group changes, fleet map changes and any frequency changes or resorts, as may be requested or desired by Motorola or the State, provided that both parties agree in writing to such actions.

3.4.1.9 System Administration Plan

The State and Motorola shall develop a joint System management, supervision, and reporting administration plan for the STARCOM21 System. The plan shall address and define the site and System alarms, and their corresponding plain-English descriptors to be configured by Motorola into the System management and supervisor platforms used by Motorola, and installed by Motorola for the State, and specified herein. The plan shall also address and define the types, periodicities, formats, and distribution, of the various System activity (i.e. MIS) and System maintenance action reports Motorola shall provide the State during System use through the Contract Term. The plan shall also describe and define the policies, processes, and procedures

ATTACHMENT TS TECHNICAL SPECIFICATIONS

through which Additional Users, beyond the 6,000 Initial Users, join and use the System.

Motorola shall prepare and submit to the State in writing no later than 365 days after Contract Execution, the draft STARCOM21 System Administration Plan. The State shall review, make additional contributions where necessary, and return to Motorola, the plan for finalization and resubmission. Motorola and the State will cooperate to keep current the plan throughout the Contract Term as System support and responsibilities change.

3.4.2 Project Management

Motorola shall organize and implement a formalized project management model to supervise, coordinate, communicate, and control, all stages (design, implementation, test, and operation) of this Contract throughout the Contract Term. Motorola shall staff its project management team with employees sufficiently skilled and experienced in the various functions needed to execute the duties for this contract.

3.4.2.1 Project Director (System Implementation Phase)

Motorola shall identify, assign, and maintain throughout the implementation of the STARCOM21 System and installation of all User equipment, a dedicated Project Director (PD). Motorola's PD shall function as the single point-of-contact for the State on all matters pertaining to Motorola's execution of this Contract. The State reserves the right to approve Motorola's assignment of the PD to this Contract, and shall be allowed to withdraw this approval at any time during the project implementation phase. Motorola shall not change this assignment unless expressly approved beforehand in writing by the State.

Motorola's PD shall have complete responsibility and authority over the implementation phase (*i.e.*, design, procurement, delivery, installation, acceptance test, and user training) of the STARCOM21 System. The PD shall lead a multidisciplinary staff comprised of Motorola personnel and subcontractor organizations selected by Motorola to implement the STARCOM21 System, deliver and—where required—install all User equipment, and perform all responsibilities assigned to it under this Contract.

The PD shall have direct, supervisory responsibility and control over all subcontractors used by Motorola to design and build the STARCOM21 System. Use of any subcontractors shall not relieve Motorola from complete and final responsibility for performing all work assigned to it under this Contract.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

3.4.2.2 System Manager (System Operation Phase)

Motorola shall identify, assign, and maintain throughout the State's use of the STARCOM21 System, a dedicated System Manager (SM). Motorola's SM shall function as the single point-of-contact for the State's System oversight (governance) committee described elsewhere in this specification, on all matters pertaining to the ongoing, performance, availability, service level, administration, and maintenance, of the STARCOM21 after implementation and until the end of the Contract Term. The State reserves the right to approve Motorola's assignment of the SM to this Contract, and shall be allowed to withdraw this approval at any time during the System operation phase. Motorola shall not change this assignment unless expressly approved beforehand in writing by the State.

Motorola's SM shall have complete responsibility and authority over the operation, warranty, maintenance, and expansion, of the STARCOM21 System. The SM shall lead Motorola's engineering, Network management, factory depot, and field service organizations selected by Motorola to support the STARCOM21 System throughout the Contract Term.

The SM shall have direct responsibility for and control over all subcontractors used by Motorola to operate and maintain the STARCOM21 System. Use of any subcontractors shall not relieve Motorola from responsibility for performing all work assigned to it under the Contract.

3.4.2.3 System Implementation and Delivery Schedule

Motorola shall develop and submit no later than thirty (30) days after Contract Execution, an initial, critical path-method oriented, project schedule for the implementation phase of the Contract, presented in Gantt chart format. This initial submittal shall be considered the preliminary project timeline. One hundred and twenty (120) days after Contract Execution, Motorola shall submit the final project timeline. The schedule shall include all major tasks and milestones both on and off the implementation schedule's critical path. The PD shall maintain the status of all tasks and milestones, and reissue to the State schedule updates concurrently with Motorola's project status reports as required below. Motorola's schedule shall indicate clearly all milestones and tasks requiring any State action, participation, review, approval, or presence and shall provide reasonable times for the State to complete its action items. The schedule shall indicate all major installation events, user equipment deliveries, and any work performed by subcontractors. Baseline, actual, and forecasted, task durations and milestone dates shall be presented in the schedule. The schedule shall indicate that all Systems shall be complete, deployed, operational, tested, and accepted by the third anniversary of Contract Execution.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

3.4.2.4 Project Management Reports

Beginning no later than ninety (90) days after Contract Execution, Motorola shall generate and present to the State a project implementation progress report. This report shall be presented to the State by Motorola via a round-table forum/format in Springfield, Illinois, every month during the implementation phase of the Contract. Each report shall discuss Motorola's performance to the Contract work plan during the past month's activities, and provide a look-ahead of activities to be accomplished by Motorola during the following month. Topics in each report shall include:

- Work performed/Major Events
- Technical/Management problems encountered
- Technical/Management problems resolved, noting respective actions taken by Motorola.
- System Performance Events and benchmarks (e.g. coverage, availability, and service level)
- Discussion items
- Action items

An updated System implementation and delivery schedule shall be enclosed in each report supplied by Motorola.

3.4.3 Installation Documentation and Cut-over Plan

3.4.3.1 System Documentation

In addition to the data, analyses, reports, and plans required by the State from Motorola under **Paragraph 3.4.1** of this **Attachment TS** and all subparagraphs thereunder, Motorola shall prepare and provide copies of engineering documentation to the State on the System's design and installation. This documentation shall include, but not necessarily be limited to:

- Theory of Operation for the STARCOM21 System
- Programming templates for the mobile, portable, and control station, radios
- System-wide, Zone-wide, and District-wide, System block diagrams
- Site equipment block diagrams
- Site interconnect (audio, data, and RF) wiring diagrams
- Site equipment facility (power, grounding, lightning suppression, alarm, etc.) wiring diagrams
- Site equipment rack layout and plan drawings
- Site antenna installation drawings

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- Site architectural construction plans (for all State-owned Greenfield Sites used).
- Site electrical power and heat load-budgets (State-owned Tower/Antenna sites only)
- Control center equipment block diagrams (all installations)
- Control center equipment interconnect (audio, data, and RF) wiring diagrams
- Control center equipment facility (power, grounding, alarm, etc.) wiring diagrams
- Control center electronics bank and console computer equipment layout and plan drawings
- Cabling and wiring lists (inventory) for all State-owned sites and all control centers

3.4.3.2 System Cutover Plan

The STARCOM21 System shall be implemented by Motorola generally in three (3) regions, each corresponding to one of the three major System "Zones" established by Motorola within the overall System design. Motorola shall stage each of the three completed Zones at a System integration and factory test facility supplied by Motorola. The staging shall also include the System management and supervisory platforms specified herein, all radio control consoles assigned to and to be installed by Motorola for that Zone, and a second Zone control point for testing of Zone-to-Zone communications. Motorola shall completely assemble, test and demonstrate the entire radio System, on a Zone-by-Zone basis, in Motorola's System integration facility prior to shipment such that troubleshooting and re-work by the field technicians is minimized.

System installation, optimization and testing of the infrastructure will be a major undertaking, as will the installation and programming of the subscriber and console units. To accomplish this task on schedule, Motorola shall use multiple crews of technicians and installers. Motorola may complete work before shipment to any site such as, antenna and transmission line installation, electrical work, programming, power installations and grounding prior to shipment.

Motorola shall coordinate with the State to schedule the execution of the training program in the same, regionalized manner that the System shall be installed, and towards the end of each Zone's installation. Scheduling of training classes shall be done to ensure users receive and retain knowledge and skills from training prior to the distribution of subscriber units, but not so far in advance that knowledge and skill retention may be lost.

Zone-based System testing in the field shall be performed by Motorola as described under **Paragraph 3.5** of this **Attachment TS**.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

Motorola shall configure the System cutover plan to accommodate the use of parallel (legacy and STARCOM21) radio communication systems at each control center console position until the entire Zone's installation is completed and successfully tested, with minimum additional workload on ISP telecommunicators and call-takers. The State will accomplish mobile radio installations only after all console positions within a Zone are installed, successfully tested, and placed into operation. Motorola's cutover plan shall be arranged in a manner such that ongoing ISP activities and operations are allowed to continue, and communication between ISP troopers and telecommunicators may continue, with as little disruption to the ISP as possible.

3.4.4 Technical Literature

Motorola shall deliver to the State the following Motorola and third-party technical manuals, literature, handbooks, for Motorola and third-party equipment and software delivered as user equipment, and System management and supervisory platforms, as specified herein. Additionally, Motorola shall place at every System tower/antenna location, one (1) set of maintenance manuals for the equipment installed at those sites:

<u>Manual</u>	<u>Requirement</u>
User handbook, Mobile radio	One (1) with each Unit delivered, plus 100 additional copies
User handbook, Portable radio	One (1) with each Unit delivered, plus 100 additional copies
User handbook, Control station radio	One (1) with each Unit delivered, plus 20 additional copies
User manual, Radio Control Console (client and audio panel)	One (1) with each Unit delivered, plus 20 additional copies
Administration Manual, Radio Control Console	Two (2) per control center installed, plus 5 additional copies
User manual, System Management platform	Two (2) per installation, plus 3 additional copies
User manual, System Supervisory platform	Two (2) per installation, plus 3 additional copies
Programming Manual, Mobile radio	10 copies per radio type
Programming Manual, Portable radio	10 copies per radio type
Programming Manual, Control Station radio	10 copies

**ATTACHMENT TS
TECHNICAL SPECIFICATIONS**

Manual	Requirement
OEM computer manuals, radio control console client	One (1) each per console client installed. Includes computer handbook, display handbook, operating System handbook, and handbooks provided with all other software applications installed.
OEM computer manuals, radio control console server	One (1) each per console server installed. Includes computer handbook, display handbook, operating System handbook, and handbooks provided with all other software applications installed.
OEM Network equipment manuals, LAN and interconnect/transport equipment, control centers	One (1) each per control center installed. Includes routers, hubs, LAN switches, and any other user configurable equipment.
Maintenance Manual, electronics rack, control center	One (1) each per control center, plus 5 additional copies.
Maintenance Manual, audio panel, radio control console	Two (2) each per control center, plus 5 additional copies.
Maintenance Manual, mobile radio, shop-level	10 copies per radio type
Maintenance Manual, portable radio, shop-level	10 copies per radio type
Maintenance Manual, control station radio, shop-level	10 copies
Maintenance Manual, radio equipment, site and Zone controllers, and audio switches, radio sites	Five (5) complete sets of maintenance and programming manuals for all System site radio and controller equipment installed.
OEM maintenance manuals, interconnect/transport equipment, radio sites	Five (5) complete sets of maintenance and programming manuals for all System site radio and controller equipment installed.

3.5 System Acceptance

The following section describes the acceptance test plan that contractors are required to complete "Final System Acceptance" by the State of the STARCOM21 System and related user equipment. Preliminary incremental System acceptance may be sought by Motorola, but Final System Acceptance shall not be achieved until all acceptance tests have been successfully completed.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

3.5.1 General Plan

It is the intention of this test program to maximize Motorola's effort to inspect and discover any deficiencies in the designed and installed System prior to the State participating in the test.

As such, Motorola shall assemble, test, and demonstrate, on a Zone-by-Zone basis, complete functionality of the System to the State at Motorola's System integration facility prior to field installation. This factory-level demonstration shall not constitute acceptance of any functionality, but only serve as a confidence test for Motorola and the State that the System has been properly designed, configured, and prepared, for installation.

3.5.2 Development of Procedures

Motorola shall develop a set of customized test procedures for each major test element. Each procedure shall individually indicate the unit or functionality under test, the test objective, pass/fail criterion, the step-by-step procedure used, any test/measurement equipment employed, what specific State resources or manpower are required to support each test element, and actual test result recorded.

Motorola shall submit to the State for approval, all factory and final acceptance test procedures and associated documentation methods no less than ninety (90) days prior to the scheduled start of the respective factory or final acceptance test.

All final acceptance test procedures and related documentation shall be approved in writing by the State before execution of the Final System Acceptance program begins.

3.5.3 Test Equipment

All test, measurement, and diagnostic equipment ("TMDE"), interconnect cables, radios, recorders, computers, power supplies, printers, application programming, testing software, etc. used to perform all acceptance tests specified herein shall be provided by Motorola. Where it is impractical to use actual System equipment to test performance, an alternate equipment configuration may be used by Motorola that emulates the performance characteristics of the actual equipment package. A valid calibration label shall be attached to each piece of measurement equipment requiring periodic calibration (e.g. power meters, oscilloscopes, spectrum analyzers, etc.).

3.5.4 Reports and Documentation

No less than ninety (90) days prior to the scheduled start of any formal Final System Acceptance test, Motorola shall submit the testing procedure accepted

ATTACHMENT TS TECHNICAL SPECIFICATIONS

by the State, along with all pro-forma test inspection forms, and the anticipated index for the required corresponding acceptance test summary report. After review by the State, Motorola may be required to further change, add, or delete various aspects to conform to the specification requirements. Motorola shall make all associated modifications and no additional compensation will be granted to Motorola for these alterations. No Final System Acceptance testing shall be started by Motorola until it has written approval from the State for its associated procedures and documentation, and has been authorized to begin. Motorola shall submit a test report for the Factory, Field-Functional, Coverage, and System Reliability, acceptance tests performed by Motorola no more than thirty (30) days after the successful completion of each respective test.

3.5.5 Retesting

If Motorola fails any Final System Acceptance test, Motorola shall make any needed System modifications, pre-test those changes, and request the acceptance test for those items that failed within a given test to be retested, unless otherwise specified herein.

Retesting procedures and scheduling will be determined by the State in conjunction with the specific System implementation and migration activity underway at that time, such that the State's beneficial use of any System resources are left undisturbed.

3.5.6 Factory Tests

Prior to any installation and Final System Acceptance testing of the System, and radio control console suite, and System management and supervisory platform, Motorola shall conduct pretests at its System integration facility and document test results. The State and its representatives shall be notified no less than thirty (30) days prior to, and shall be allowed to witness, all factory testing. Copies of all factory test data and summary reports, showing compliance with this **Attachment TS**, shall be forwarded in writing to the State along with a Statement of "readiness" and a request for the corresponding installation and final System acceptance test to begin.

3.5.6.1 Factory Acceptance Test – Radio Control Consoles

Motorola shall successfully demonstrate to the State the specific User configuration, and total functionality, of each radio control console to be delivered and installed under this Contract. Motorola shall also demonstrate the functionality between consoles, and the ability of the consoles to run the radio control management module. Motorola shall inventory all physical characteristics, and demonstrate all functional characteristics, of the radio control consoles as specified under **Paragraph 3.3.1.1** of this **Attachment TS**.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

3.5.6.2 Factory Acceptance Test – System Management/Supervisory Platform

Motorola shall successfully demonstrate to the State the specific User configuration, and total functionality, of each System management and System supervisory platform to be delivered and installed under this Contract. Motorola shall inventory all physical characteristics, and demonstrate all functional characteristics, of the platform as specified under **Paragraph 3.2.5 of this Attachment TS**. All platforms shall be subject to factory acceptance testing. The test program shall be oriented in such a manner as to show how the platforms cooperate with the customer's master Network operations center responsible for overseeing and maintaining compliant operation of the STARCOM21 infrastructure.

Motorola shall demonstrate Network Management by testing the following categories and sub-categories as a minimum:

1. Fault Management
 - Site alarm status
 - Status history
 - Diagnostics available for a given System "Zone"
 - Inter-Zone status
 - Device capability control
 - Alert notes entered
 - Alarm data update beyond transport fault
 - Event filtering
2. Configuration Management
 - Subscriber Management
 - Infrastructure Management
 - Radio profiles
 - User profiles
3. Performance management
 - Monitoring at a Zone-level
 - Site and channel status display
 - Filtered displays
 - Call-activity templates
 - System utilization traffic displays
 - Busy count graph
 - Site affiliation
 - Basic statistics reporting for airtime use, traffic activity during a period, etc.
4. Radio control management
 - Monitoring of emergency alarms
 - Selective radio inhibit

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- Dynamic regrouping
 - Zone/Radio request
 - Radio check
 - Command control
 - Target radio/Zone
 - Storm plans
5. Security management
- Management database security
 - Password control
 - Security groups
 - Partitioned access by user categories
 - Partitioning via "talkgroup steering", if implemented
6. Account management
- Activity by talkgroup, individual
 - Transaction summary reports by day, month, year

Motorola shall also successfully demonstrate remote access and database backup for the User configuration database. Motorola shall demonstrate that the closure of a selected sample of "dry contacts" on the alarm System initiates and displays the correct alarm.

3.5.7 Final System Acceptance

Except where explicitly stated otherwise herein, Motorola shall provide all equipment, manpower, and resources required by Motorola to accomplish the Final System Acceptance tests. The State shall witness the Final System Acceptance tests using its State Program Manager or his or her designee. Motorola shall develop and submit, no later than six (6) months after Contract Execution, a Final System Acceptance Plan. This plan shall consist of a checklist of all deliverables and acceptance test sequences specified in this **Attachment TS**, and elsewhere in the Contract, that Motorola must submit to and/or receive approval from the State under the Contract. The State shall grant Final System Acceptance the day that Motorola has received State acknowledgement that all items enumerated in such plan have been received and approved by the State. Such deliverables shall include without limitation:

- Issuance of the Equipment Return Surety Bond and the System Performance Surety Bond
- Delivery of State-approved certificates of insurance as required by **Attachment TC**
- Certificate from Motorola that it is not in default under this Contract.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

To the extent that a delivery is required by the Specification, it is to be delivered at the times and in the manner provided in the Specifications.

The State shall grant Motorola a Final System Acceptance Certificate once Motorola has satisfied to the State's written consent all items enumerated in the State-approved Final System Acceptance Plan.

3.5.7.1 Radio Coverage Acceptance Test

This test shall consist of measuring the bit-error rate (BER) of the System's digital radio signal, documenting the time, date and location of the test performed, independent of System features and elements, throughout the coverage areas specified in **Paragraph 3.2.3.3** of this **Attachment TS**. All coverage tests shall be performed by Motorola during the period of May 1 through October 15. The formal, coverage acceptance test element shall be accomplished as described below.

3.5.7.1.1 Staffing & Resources

Each driving test group shall consist of at least three people; a State driver, one State inspector, and one Motorola representative responsible for documentation and operation of the coverage test equipment supplied by Motorola. The State will provide a vehicle from which to conduct the coverage test as specified herein, if so requested by Motorola in writing at least 30 days prior to such testing date. Motorola shall plan and perform all coverage acceptance tests using more than one test group in order to accelerate completion.

During any coverage test requiring assessment of delivered audio quality (DAQ), the team at the console location shall be staffed as described below.

3.5.7.1.3 Grid Testing – Mobile Statewide Radio Coverage

Motorola shall set up the test by dividing the State into grid tiles. Each tile shall be a square shape covering an area of 0.0625 square miles (i.e. one quarter-mile per side). Motorola shall measure the bit-error rate (BER) of the RF signal from the System using its BER measurement test set and actual mobile radio delivered under this Contract, according to the applicable ground rules and guidelines set for in TIA-TSB88A. Motorola shall take statistically relevant sub-sample BER measurements to achieve a 99% confidence interval from a randomly selected location within each tile, per TIA-TSB88A. After reducing the sample data from each tile, Motorola shall determine the median BER from the sub-samples. For the purposes of evaluating the mobile coverage performance in a Statewide coverage framework, each tile that from its measurement sub-sample exhibited a median BER of 2.6% or less shall be considered a "pass"; greater than 2.6%, "fail".

ATTACHMENT TS TECHNICAL SPECIFICATIONS

Motorola shall have the option of performing mobile coverage acceptance testing on a "Zone"-basis, such that the mobile coverage acceptance test specified herein can be completed in close parallel with Motorola's implementation of the remaining STARCOM21 System's RF infrastructure. However, State will not consider the mobile coverage acceptance test completed, successfully or otherwise, until all accessible tiles Statewide are tested.

Motorola shall organize the mobile statewide coverage test plan such that all tiles that contain a public road shall be tested. Motorola shall provide the State, no less than ninety (90) days before the scheduled start of any mobile Statewide coverage test, a preliminary test map in the plan that identifies all tiles Motorola considers "inaccessible". The State will review and validate Motorola's inaccessible tiles, and determine if it has an operational need for such tiles to be tested. Should the State determine that it could acquire access to otherwise inaccessible tile locations, Motorola shall include these tiles in its mobile statewide coverage test plan. Any tiles that are determined jointly to be inaccessible shall not be used in determining the success or failure of the mobile statewide coverage test.

Once all accessible tiles are tested statewide and pass/fail determinations are made, Motorola shall tabulate the results to determine final mobile statewide coverage acceptance. The entire mobile statewide coverage test shall be considered a "pass" if 95% or more of all tiles measured exhibited a median BER of 2.6% or less; below 95% will be a "fail". There shall be no rounding up or down of the statewide coverage test's calculated value. Should Motorola fail the mobile statewide coverage test, Motorola shall analyze its design and implementation, affect whatever correction actions it determines are necessary, and repeat the entire test. Motorola shall repeat this retest cycle until it successfully passes the test. The final statewide coverage test results, by grid, shall be the benchmark for the life of the System. Motorola shall guarantee for the Contract Term, that all grids that passed during the successful statewide coverage test shall continue to pass during the Contract Term. Retesting for any future System coverage testing questions shall be based on the location of the BER or Voice test (see section below on voice DAQ testing). Future testing shall not be randomly conducted across the State.

3.5.7.1.4 Grid Testing – Portable In-building Radio Coverage

Motorola shall set up the test by dividing each city's or county's jurisdictional boundary listed under **Paragraph 3.2.3.3(c)** of this **Attachment TS** into grid tiles. The size of the grid tiles for each city and county shall be determined by the appropriate section of TIA-TSB88A titled "Estimate of Proportions", and the number of sub-samples taken per grid shall be sufficient to achieve a 99% confidence interval, per TIA-TSB88A. In no case shall the grid size be larger than $\frac{1}{4}$ by $\frac{1}{4}$ mile. The test shall be arranged to evaluate in-building "talk-in"

ATTACHMENT TS TECHNICAL SPECIFICATIONS

audio quality performance of the System delivered within each city's or county's jurisdictional boundary. As such, Motorola shall use a mobile radio in its test unit configured in such manner as to simulate a portable radio used with a SMA accessory attached at the shoulder level (approximately 1.5m AGL). The test set's radio antenna will also include another 8dB of attenuation beyond the SMA loss to simulate in-building loss as specified under **Paragraph 3.2.3.3(c)** of this **Attachment TS**. The field test team shall be comprised and outfitted the same as that specified for the mobile statewide coverage acceptance test. Accordingly, testing from the field test set shall be accomplished by the test team outside any buildings.

Motorola shall provide the State, no more than ninety (90) days before the start of any portable in-building coverage testing, phrase scripts to be used by Motorola's test personnel, and audio samples of these phrases to be used as evaluation benchmarks, for review, comment and written approval. The same set of phrases will be used for each tile tested. Motorola shall use the GPS receiver in the BER measurement test set to randomly select a location for the test within each tile. An evaluation team comprised of two contractor representatives and two State representatives, one of whom may be the State's consultant, shall be stationed at a radio control console configured to receive and listen to the in-bound audio from the field test unit. Once the BER test set selects a location within a given tile, Motorola's field test person will first make a radio call that a given tile is ready for test. Once confirmed by the evaluation team, Motorola's field test person shall re-key the mobile radio and recite into the radio's palmset a pre-established set of Harvard phrases. Each evaluator shall independently, and in a double-blind fashion, score each audio sample according to the criteria set forth in TIA-TSB88A, in relation to the benchmark audio sample specified above, for delivered audio quality (DAQ). Motorola shall gather all scores from each evaluator, and compute the average DAQ value for each tile.

Motorola shall have the option of performing portable in-building coverage acceptance testing on a region-by-region basis, such that the portable in-building coverage acceptance test specified herein can be completed in close parallel with Motorola's implementation of the remaining STARCOM21 System. However, State will not consider the portable in-building coverage acceptance test completed, successfully or otherwise, until all grid tiles accessible within all regions are tested. No retesting of any grid tile, for the purpose of measuring a new or revised BER or DAQ test result shall be conducted by Motorola for purposes of Final System Acceptance unless expressly approved in writing by the State.

For the purposes of evaluating the portable in-building coverage performance in a regional coverage framework, each tile that from its measurement population exhibited a mean DAQ of 3.0 or better shall be considered a "pass"; less than 3.0 shall be scored as "fail".

ATTACHMENT TS TECHNICAL SPECIFICATIONS

Motorola shall organize the portable in-building coverage test plan such that all tiles that contain a public road shall be tested. Motorola shall provide the State, no less than ninety (90) days before the scheduled start of any portable in-building coverage test, a preliminary test map in the plan that identifies all tiles Motorola considers "inaccessible". The State will review and validate Motorola's inaccessible tiles, and determine if it has an operational need for such tiles to be tested. Should the State determine that it could acquire access to otherwise inaccessible tile locations, Motorola shall include these tiles in its portable in-building coverage test plan. Any tiles that are determined jointly to be inaccessible shall not be used in determining the success or failure of the portable in-building coverage test.

Once all accessible tiles are tested statewide and pass/fail determinations are made, Motorola shall tabulate the results to determine final portable in-building coverage acceptance for each city or county region. The portable in-building coverage test for each city or county shall be considered a "pass" if 95% (without rounding) or more of all tiles measured therein exhibited an average DAQ of 3.0 or better; below 95% will be scored a "fail". Should Motorola fail the portable in-building coverage for any region, Motorola shall analyze its design and implementation, affect whatever correction actions in that region it determines are necessary, and repeat the test for that region. Motorola shall repeat this retest cycle until it successfully passes the test for that region.

3.5.7.2 System Reliability

Motorola shall comprehensively demonstrate failure behavior, fault tolerance/back-up, and any self-healing characteristics, of the System including all local and remote alarm capabilities. Such testing may be accomplished both at Motorola's factory and after System implementation. When all required alarm functions are demonstrated as complete, and after review by the State of these features, Motorola shall, at no additional cost, tailor one time the alarm functions and nomenclature within System limitations to the operating preferences of the State.

3.5.7.3 System Management and Control

After installation at each of the State's Network operations centers, all System management and supervisory platform features for billing, traffic analysis, System performance monitoring, adding/deleting units, remote programming of units, etc., shall be demonstrated by Motorola for compliant functionality. When all features/functions are demonstrated as complete, and after review by the ISP, the Vendor shall tailor, at no additional cost, the displays, reports, nomenclature, etc., within System limitations to the operating preferences of the ISP.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

3.5.6.4 Functional Acceptance Test

Motorola perform a comprehensive series of tests, on an ISP-District basis, demonstrating all System subscriber services specified under **Paragraph 3.2.6** in this **Attachment TS**, plus demonstrate inter-District and inter-Zone communications functionality as additional infrastructure is implemented. The State may grant incremental System functionality acceptance on a Zone-by-Zone basis, but it shall not acknowledge complete functional acceptance until all Zones have successfully completed testing. Motorola shall generate a custom field-functional acceptance test procedure for review, comment, and approval by the State no less than 90 days prior to the anticipated start date.

3.5.8 Delivered Audio Quality ("DAQ") Testing

If the State elects and pays the price listed in **Attachment PR**, Motorola shall conduct, with the State test team, a DAQ assessment at each of the 88,000 ISP-operating locations provided to Motorola during the detailed design phase of this Contract. This DAQ Test may be performed by Motorola concurrent with or immediately subsequent to the grid testing performed per **Paragraph 3.5.7.1 of this Attachment TS**. Motorola shall submit to the State with its test procedure for review, change and/or approval, an audio sample on CD-ROM of the representative DAQ sample Motorola intends to compare against the audio quality assessed at each of the 88,000 locations. Motorola shall not commence with this second coverage test until it receives from the State approval and concurrence of the audio sample. Motorola shall use ISP operation-indicative "Harvard phrases" for this audio sample. The State-member of the DAQ test team (comprised of the same number of Motorola and State personnel specified under **Paragraph 3.5.7.1.1** in this **Attachment PR**.) shall recite one of these phrases from a radio control console location or from a portable to the radio control console (depending on the type of coverage) one of these phrases to a mobile radio at each of the 88,000 test locations. Each of the 88,000 test locations will be referenced back to the appropriate coverage test (either mobile or in-building portable). The results will be shown on the appropriate coverage test map (either mobile or in-building portable). Up to five hundred (500) of these test points may be stationary test points. If the overall coverage test fails, the State team, in cooperation with Motorola, may retest the five hundred (500) spots by moving no more than five feet from the original stationary test point. If the test point passes the retest, the grid shall be deemed to be a "pass" for purposes of the overall test, but the coverage map will distinguish the grid with a color other than that used to indicate a passed or failed grid. If the DAQ test at any one test location fails, Motorola may move not more than five feet from the original test location and perform one retest. If the test point fails, and that test point is an inside a building, Motorola may, at their option, perform a study of the building to determine if it is attenuating the RF signal strength more than 8db. Should Motorola determine that the the RF signal strength loss is greater than 8db, a different test point will be identified by the State

ATTACHMENT TS TECHNICAL SPECIFICATIONS

and a test run from that point. Each member of the test team individually will, and without consultation with other DAQ assessment members, rank on a DAQ scale per TIA-TSB88-A, a DAQ judgment. All judgments shall be collected and averaged by Motorola. All grid tiles containing a DAQ test location that scored a mean DAQ judgment of 3.0 or better shall be considered a "pass"; less than 3.0, fail. A grid tile that passed the BER test, but failed the DAQ test, shall be considered "failed". Conversely, a grid tile that failed during the BER test, but passed during the DAQ test, shall be considered a "pass".

3.5.9 Mobile Radio Coverage Survey

If the State elects, and pays the price of this option listed in **Attachment PR**, Motorola shall conduct, concurrently with or immediately subsequent to the mobile statewide coverage acceptance test, a mobile radio coverage survey. Motorola shall use the same test set employed during the coverage acceptance tests to survey for the ISP the BER along all interstate highways, U.S. routes, State tollways, State-numbered roads and highways, and selected county-numbered roads, that traverse through or terminate in each grid tested. Laptop computers, audio and strip chart recorders, GPS receivers, and other required devices, shall be used by Motorola to automatically time-stamp and geo-stamp each BER measurement. The sample rate of Motorola's BER measurement test set shall be configured such that median measurements are recorded at intervals of no more than 400 feet along the roadway. The test set shall record GPS-located BER measurements continuously. Motorola shall record and archive all geo-location-based BER measurements, and reduce the data onto color-coded roadway maps.

Motorola shall produce two maps sets on an ISP District-basis. Motorola shall provide one copy of a map set for every ISP officer, as allocated on an ISP District-basis. The exact number of copies for each ISP District map will be provided by the State to Motorola during the detailed design phase of the Contract.

The map shall use a 6-arcsecond GIS database, and present map and data information on A-size paper using a map scale to be approved by the State during the detailed System design phase of the Contract. Each map shall indicate and label all roadways measured, county jurisdictional boundaries, and show the locations along surveyed roadways where BER measurements were taken. Each BER measurement equal to or less than 2.6% shall be shown as a small, green circle; those locations greater than 2.6% BER shall be shown as an open (white) circle. All map sheets shall have a legend key. Each map sheet shall be printed on card stock, three-hole punched, and front-laminated. Motorola shall provide the State two (2) additional, complete sets of these coverage survey maps, and the complete source database of all survey information used in Motorola's GIS package to produce and print additional map sets.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

The State shall retain complete, exclusive ownership and rights to all survey data, and the map sets produced therefrom. Subsequent use or reproduction by Motorola of such data or maps outside the Contract, unless expressly permitted in writing by the State otherwise, is strictly prohibited.

3.6 System and Equipment Training

Motorola shall develop for the State a comprehensive, customized training program for the State's radio Users, console Users, maintenance personnel, trainers, System administrators, and information technology personnel associated with the STARCOM21 System, System management and control platforms installed for the State's use, and User Equipment delivered to the State, as specified herein. All training courses shall employ "hands-on", practical exercises using actual User Equipment during the training phase as much as possible. Where hands-on practical training is not possible, training manuals using pictures of the actual equipment, features being used, or software screens being utilized, shall be provided to each student for each future reference.

Motorola shall present to the State for review, change/comments, and approval, a comprehensive training program plan during the detailed design phase of the Contract. The plan shall contain the following information for all State personnel training categories to be provided by Motorola:

- Title, description, objective, syllabus, and timeline, for each course
- Minimum and maximum class size for each course
- Recommended and mandatory student prerequisite skills, experience, and training
- List of materials to be provided by each student for each course
- List of student aids, practical training equipment, user manuals, and other written materials to be provided by Motorola for each course
- Class/session schedules
- Course schedules
- Training program master schedule

Motorola shall provide all instructors, student aids, instructor aids, commercial technical literature, presentation/lecture equipment, and training equipment for all course categories specified herein. Motorola's instructors shall be highly experienced in developing and providing successful instruction in the same course materials. Motorola shall provide to each student attending each class a set of student aids and materials. The student shall be allowed to keep all aids and materials supplied after completing the course. Motorola shall provide the State three (3) additional, copier or printer-reproducible, copies of each set of instructor and student materials used for each course in the training program plan.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

The State will be responsible for providing students that meet the recommended or mandatory prerequisite skills, experience, and training Motorola identified for each training course. The State will schedule specific State personnel to attend specific training courses according to the course schedules the established in the training program plan. Unless otherwise specified herein, all training classes shall be held at State facilities. Specific training sites will be identified by the State no less than sixty (60) calendar days before a given class is scheduled to begin. To conduct such training classes at State facilities, the State will provide Motorola an adequately sized, private room equipped with desks, tables, and chairs for both instructors and students. The State shall be responsible for time, travel and per diem costs for all State students.

Motorola shall provide instructor led, "train-the-trainer", and end-user oriented training approaches for all training required herein. Motorola shall provide training courses and materials for the following equipment:

Course	Type of Training	Student Category	Student Count
Radio Console (User)	End-user	Telecommunicator/Call-taker/Dispatcher	230
Radio Console (User)	Train-the-trainer	Supervisors/trainers	30
Radio Console (Admin)	Instructor led	Supervisors/trainers	30
Radio Console (Admin)	Instructor led	Technician	35
Radio Console (Maint)	Instructor led	Technician	35
Mobile Radio (User)	Train-the-trainer	Trainer	40
Mobile Radio (Admin)	Instructor led	Technician	35
Mobile Radio (Maint)	Instructor led	Technician	35
Portable Radio (User)	Train-the-trainer	Trainer	40
Portable Radio (Admin)	Instructor led	Technician	35
Portable Radio (Maint)	Instructor led	Technician	35
Control Station (User)	Train-the-trainer	Trainer	40
Control Station (Admin)	Instructor led	Technician	20

**ATTACHMENT TS
TECHNICAL SPECIFICATIONS**

Course	Type of Training	Student Category	Student Count
Control Station (Maint)	Instructor led	Technician	20
System Management Platform (User)	Instructor led	System Technologist/Network Manager	12
System Supervisory Platform (User)	Instructor led	System Technologist/Network Manager/Technician	12
Report Generation, pre-formatted (User)	Instructor led	System Technologist/Network Manager	12
Report Generation, template design (Admin)	Instructor led	System Technologist/Network Manager	12
Fundamentals, Trunked Radio System (Admin)	Instructor led	System Technologist/Network Manager/Technician	30
Fundamentals, Radio System Architecture (Admin)	Instructor led	System Technologist/Network Manager/Technician	30

All courses shall utilize both classroom instruction, and practical exercises using actual equipment delivered by Motorola under the Contract. All courses shall be provided during normal business hours and days, scheduled to accommodate a seven and one-half hour work day and shall allow for a one-hour lunch period and one each mid-morning and mid-afternoon break consistent with the AFSME and Fraternal Order of Police Lodge #41 collective bargaining contracts.

3.7 Support and Maintenance

Motorola shall implement and maintain throughout the Contract Term, a comprehensive warranty and maintenance program for the STARCOM21 System and user equipment delivered under the Contract.

3.7.1 System Maintenance

Motorola shall cooperate with the State to help the State test the System prior to Final System Acceptance. If the parties elect to use the System prior to Final System Acceptance, they will enter into a mutually agreeable beneficial use agreement. Motorola shall be responsible for continuously maintaining System performance, availability, coverage, and functionality, as specified herein for the State, beginning on Final System Acceptance and throughout the Contract Term. Maintenance responsibilities shall also include any

ATTACHMENT TS TECHNICAL SPECIFICATIONS

support structures and resources either provided by Motorola for the System, any specific State-owned resources placed into use by Motorola for the System, and all System-management and System-supervisory platforms provided and installed by Motorola at the State's central and remote Network operations centers.

Motorola shall establish, appoint, and maintain a System Manager who will act as the central point-of-contact for all System management, fault recognition, maintenance team dispatching, spare parts allocation, and maintenance action tracking. Motorola shall provide a toll-free, 7-day per week, 24 hour per day (7 x 24), 365 days per year, coordination point for all System service requests. All requests shall be tracked and monitored from beginning to end with a case number. Automatic, time driven escalation, to management of all open Severity 1 and Severity 2 issues and monthly reporting of all open Severity 3 and Severity 4 issues shall be an integral part of this process. Notification to the State of any System faults, and escalation shall also be reported immediately to the State Project Manager. Monthly repair activity reports detailing all activities performed on the Network shall be provided to the State by Motorola. The reports shall provide but not be limited to, post-mortem list of events causing the outage along with names of repair staff sent to fix the outage, what was done to repair the problem and what action is recommended to preclude recurrences. Motorola shall receive all calls and coordinate appropriate technical support. If on-site service is required, Motorola shall dispatch service to the site and track the call to closure. Response time shall be defined as having a Motorola service representative on-site or, if the fault can be isolated and fixed from Motorola's central Network operations management center, by Motorola's remote System service representative. Motorola's response and repair times shall be categorized by "severity codes". The following defines these severity codes, their respective Motorola maximum response and repair times:

	Response Times	Repair Times
Severity 1	2 hours	8 hours
Severity 2	4 hours	24 hours
Severity 3*	8 hours	72 hours
Severity 4*	N/A	30 days

* During non-holiday weekdays days only

Definition of Severity Codes:

Severity 1: System/Site Down, total loss of communications or functionality. Dispatched 7 x 24 x 365 days.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

- Severity 2: System/Site Impaired. Affected equipment is not in excess of 33% of any one site's capacity. Dispatched 7 x 24 x 365 days.
- Severity 3: Intermittent System problems that are under monitoring. Minor problems not affecting User operations. Dispatched as scheduled during normal business hours.
- Severity 4: Scheduled maintenance and upgrades shall be scheduled and coordinated with the State to insure the least disruption to State operation. Motorola shall schedule such maintenance and upgrades with the State's Project Manager and the State Project Manager shall have the right to approve or disapprove such times as presented by Motorola. Dispatched as scheduled during normal business hours.

On-site service shall be provided by Motorola's fully-trained and qualified technicians. Motorola's system engineering and technologist staff shall support these technicians and assist in the response and repair of System faults and failures, when necessary. Motorola shall provide and stage geographically all service staff, spare parts, repair parts, test, measurement, and diagnostic equipment (TMDE), and any computer equipment and associated third-party and Motorola software, required to recognize, isolate, diagnose, repair, retest, and re-commission, any failed equipment or software in the System provided by Motorola to meet the response and repair times specified herein. Field repairs shall typically be accomplished down to the field-replaceable unit (FRU). Each on-site service team or technician shall carry a complement of FRU's to immediately affect most repairs. Motorola's response times for System faults shall be contingent only upon the follow conditions:

- Motorola has unrestricted access to all State-owned resources employed by Motorola to support the System. However, all Motorola employees, and those of Motorola's subcontractors, shall be required to submit, along with the each employee's name and social security number (SSN), to fingerprinting by the State that will be used to conduct a criminal background check. The State reserves the right to refuse access to any State property by any employee the State deems unacceptable. The background check may include, but not be limited to, financial activities, arrest and conviction information, driving records and exploration of any activities the person may have or is currently involved in that may not be in the best interest of the State. Under no circumstances shall an employee or sub-contractor of Motorola be allowed access any State property,

ATTACHMENT TS TECHNICAL SPECIFICATIONS

unsupervised by a State employee until submitting to and successfully completing the finger print submission and background check.

- Motorola shall be able to have access to the portion of the System being affected by the fault for the duration of the fault established by the severity code as defined herein.
- Circumstances of civil unrest, labor action, or Force Majeure, as defined in **Attachment TC**, that prevent Motorola staff from being dispatched to, and completing service on, a particular System fault.

Recognizing the critical nature of the voice radio System for public safety operations, should Motorola fail to act and/or remedy any System fault affecting the critical operation of the STARCOM21 System within the response and repair times, and conditions, set forth hereabove, the State may, at its own option, dispatch its own or third-party, appropriately trained and experienced, service staff to isolate and affect repairs. Should it elect to exercise this option under these circumstances, the State will be entitled to recover from Motorola, through a reduction any Monthly Access Fee, any actual labor and costs incurred.

During the Contract Term after Final System Acceptance, Users may notify the State that the former is noticing degradation in coverage in specific areas where coverage performance was previously known—either through coverage testing or through normal use of the System after Final System Acceptance—to be satisfactory. The State Project Manager or his/her designee will be the contact point for the State and will provide all complaint information and validation data to Motorola's System Manager. Motorola shall immediately investigate as outlined above the State's service request by following an check list of tests coordinated with the State that shall include but not be limited to first validating that the System infrastructure, equipment, antenna systems, etc. are continuing to perform to those same levels benchmarked at Final System Acceptance. If Motorola determines that the condition of the System infrastructure has degraded, Motorola shall promptly remedy the problem at no cost to the State as a "Severity 2" maintenance category. Should Motorola determine that the infrastructure is still performing according to those initial benchmarks, but that the cause of the coverage performance degradation is due to third-party interference or intermodulation, Motorola and the State will jointly work together to resolve the interference at no cost to the State. Motorola shall collaborate with the State to identify the solution, which may include being permitted to temporarily remove a given channel as an available resource incurring interference/intermodulation with written approval from the State, and thereby temporarily reducing the service level performance available, from that site. The State and Motorola agree to review whether additional training or other remediation is needed to reduce the propensity for false negative reports of outages.

ATTACHMENT TS TECHNICAL SPECIFICATIONS

3.7.2 Basic User Equipment Warranty

All User Equipment delivered by Motorola, and the installation of any User Equipment accomplished by Motorola, under the Contract shall be warranted by Motorola against defects in materials or workmanship for a period of not less than two (2) years from the date of Final System Acceptance by the State or 30 days after acceptance of the equipment, whichever is later.

- a) Control Center Consoles and System Management/Supervisory Platforms: Motorola shall be responsible for parts, labor, and shipping costs, for warranty repair and/or replacement of all defective user equipment installed by Motorola at each control center. Motorola shall accomplish all warranty repairs or replacements at the site where such faulty/failed equipment is located. Motorola shall respond to, and repair or replace, any faulty or failed central radio control console equipment (e.g. servers, LAN and transport equipment, electronics rack, etc.) and System management and supervisory platforms, supplied by Motorola under warranty according to the same severity definitions and response/repair conditions set forth in **Paragraph 3.7.1** of this **Attachment TS**.

- b) Mobile, Portable, and Desktop Control Station, radio sets and related equipment and accessories: The State will be responsible for removing and returning to Motorola for warranty repair or replacement any radio Equipment or related accessories provided by Motorola and installed by the State. Motorola shall be responsible for all shipping costs to and from the repair location and replace any equipment lost or damaged during shipping. Motorola shall provide the State an account number Motorola establishes with its carrier that the State will use when shipping such Equipment to Motorola's repair depot. Motorola shall repair or replace all failed radio Equipment or accessories, or return any Equipment that Motorola determines has no problem (failure or fault), such that the State will receive the Equipment within seven (7) business days after the Equipment was sent to Motorola. Motorola shall be required to document to the State any Equipment sent in for repair found by Motorola to be functioning in compliance with its respective specifications set forth herein. Motorola shall discuss with the State the possible reasons that may have compelled the State to consider the Unit failed when it, in fact, was operating properly, and how the State can better avoid such returns from recurring thereafter. Motorola may be entitled to recoup any shipping and diagnosis charges it incurred for Units returned by the State for which no problem was found, or the fault or failure was due to causes or circumstances outside the terms of warranty.

The basic warranty program shall include a software maintenance, update, and upgrade service. Motorola shall provide licensed software patches, updates, and commercial upgrades to the State for all software installed or provided under the Contract, at no additional cost during the term of the warranty. .

ATTACHMENT TS TECHNICAL SPECIFICATIONS

Motorola shall install for the State all patches, updates, and upgrades for any consoles and System/supervisory management platforms.

3.7.3 Extended User Equipment Warranty – Consoles (OPTION)

Motorola shall provide the State an extended warranty program for all console equipment and software described and delivered under the Contract per **Paragraph 3.3.1.1** of this **Attachment TS**. This extended warranty program shall continue the same level of service provided by Motorola under the same terms set forth in **Paragraph 3.7.2** of this **Attachment TS** on an annually renewable basis, for each year that initial warranty period expires, through the entire Contract Term. The extended warranty program shall include a software maintenance, update, and upgrade service. Motorola shall provide licensed console, and System management and supervisory platform, software patches, updates, and commercial upgrades to the State for all software installed by Motorola during the term of extended warranty. The State will be responsible for installing all patches, updates, and upgrades delivered by Motorola per the instructions accompanying the source media or FTP/download location.

3.7.4 Extended User Equipment Warranty – Mobile & Portable Radios (OPTION)

Motorola shall provide the State an extended warranty program for all mobile and portable radios equipment and software described and delivered under the Contract per **Paragraph 3.3.1.1** of this **Attachment TS**. This extended warranty program shall continue the same level of service provided by Motorola under the same terms set forth in **Paragraph 3.7.2** of this **Attachment TS** on an annually renewable basis, for each year that initial warranty period expires, through the entire Contract Term. The extended warranty program shall include a software maintenance, update, and upgrade service as specified under **Paragraph 3.7.7** of this **Attachment TS**. Motorola shall provide licensed software patches, updates, and commercial upgrades to the State for all radio programming software delivered under **Paragraph 3.3.9** of this **Attachment TS**, during the term of extended warranty. The State will be responsible for installing all patches, updates, and upgrades delivered by Motorola per the instructions accompanying the source media or FTP/download location.

3.7.5 Software Maintenance – Consoles and System Management Platforms (OPTION)

Motorola shall provide to the State a software maintenance program in accordance with **Exhibit SSA to Attachment EX** on all radio control console client and server software, and all System management and supervisory platforms, published by Motorola and installed for the State under the Contract. This service shall commence immediately after the basic warranty

ATTACHMENT TS TECHNICAL SPECIFICATIONS

term concludes, and extend throughout the Contract Term. This service shall include all updates, upgrades, patches, and bug fixes, necessary to maintain suitable and compliant operation of Motorola's software and compatibility with updated, upgraded, or new versions of radio control client and/or server operating systems. The State will be responsible for installing all patches, updates, and upgrades, delivered by Motorola per the instructions accompanying the source media or FTP/download location.

3.7.6 **Software Maintenance – Mobile, Portable, and Control Station Radios (OPTION)**

Motorola shall provide to the State a software maintenance program in accordance with **Exhibit SLA to Attachment EX** on all mobile, portable, and control station radio programming software published by Motorola and delivered to the State to support the equipment delivered. This service shall commence immediately after the basic warranty term concludes, and extend throughout the Contract Term. This service shall include all updates, upgrades, patches, and bug fixes, necessary to maintain suitable and compliant operation of Motorola's software and compatibility with updated, upgraded, or new versions of radio host operating systems, and compatibility with future mobile, portable, and control station radio purchases/deliveries by the State. The State will install all patches, updates, and upgrades, delivered by Motorola per the instructions accompanying the source media or FTP/download location.