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1. ACCEPTANCE TESTING

This Exhibit addresses the acceptance testing and final acceptance requirements of the CERS.

Motorola shall perform all tests necessary to demonstrate that the system fully and completely meets the requirements and specifications of the Master Agreement. All necessary personnel, labor, materials, documentation, and test equipment to perform all acceptance tests shall be provided by Motorola. All test plans must be reviewed and approved by the City prior to execution.

The City may, at its sole discretion, require the presence of City personnel to witness the testing of all or part of the CERS.

All acceptance re-testing will be done in accordance with Section 7.03 of the Master Agreement.

2. ACCEPTANCE TEST PLAN

Motorola shall prepare a detailed Acceptance Test Plan (ATP), and include it in the Detail Design. The ATP shall demonstrate that all system components, both individually and collectively, meet the CERS Exhibit A, Performance Specifications. The ATP shall also demonstrate the proper operation of the protection switching and/or fall-back modes for all critical system elements. The ATP shall include factory acceptance, staging, and field test sections. The field test section shall include equipment level, system level, and coverage testing elements. The test methodology and list of required test equipment shall be included in the Detail Design.

Detailed acceptance test procedures for all equipment and systems shall be developed by Motorola and presented to the City for review and approval at least 30 days prior to acceptance testing.

The City reserves the right to modify the test plans and to add additional test requirements that verify compliance with the Exhibit A, Performance Specifications. At the conclusion of testing (during Implementation), all test results shall be turned over to the City.

2.1 FACTORY ACCEPTANCE TESTING

Motorola shall verify to the City that Factory Acceptance Testing has been conducted on all equipment provided for the CERS. Factory Acceptance Testing shall be conducted and acceptance criteria noted for each piece of equipment to be shipped. The equipment shall be tested prior to shipment and the test results recorded in a readily useable format. Equipment which does not meet the test criteria shall not be shipped without the express written approval of the City.

2.2 STAGING AREA ACCEPTANCE TESTING

The CERS is considered sufficiently complex to warrant system testing at Motorola's facility. The system shall be assembled and tested in a configuration as near as practical to the operational configuration in a staging area. All fixed electronic equipment shall be staged for CERS, with exception of the MTS, staging shall be conducted at CCSI. Staging test for the MTS shall be at the Harris facilities. The staging shall duplicate equipment organization and use actual cabling to be installed. Staging requirements for some sub-systems, such as the MTS, may be waived, upon express written approval from the City. Motorola shall provide, during Detail Design, a Staging Area Acceptance Test plan.

2.3 CIVIL ACCEPTANCE

Following successful completion of applicable inspections required by the City of San Francisco construction permit process, Motorola will notify the City's CERS project manager in writing that the facility upgrade(s) and/or new sites are complete and ready for verification of compliance with the approved Statement of Work and installation plans. An inspection of the work will be conducted by the City's CERS project manager or authorized representative within 10 workings days.

Any deviations from the approved Statement of Work or installation plans will be addressed in accordance with the "punchlist " process. Upon notification of the correction of the punch list items, the City PM or authorized representative will verify correction of these punchlist items within 10 working days, and said verification will constitute final acceptance.

City building completion and site acceptance will not be subject to the installation of equipment hardware provided under other phases of the project.

2.4 FIELD ACCEPTANCE TEST PLAN

Overview:

Motorola's Field Acceptance Test Plan is divided into three sections.

Section One - Site Compliance Tests

Section one deals with the physical installation of the fixed network equipment. This includes equipment mounting, grounding practices, antenna mountings, and RF coaxial

cable installation. A walk through inspection by representatives of the City and the Motorola project manager is planned for this portion of the ATP.

Section Two - Performance Tests

Section two documents compliance with published specifications. It is our intent to provide documentation verifying compliance and showing recorded measurements. No witnessed tests are scheduled for this portion of the ATP. The City is encouraged to spot check any measurements they deem appropriate. The City will notify Motorola of any equipment test they desire prior to beginning the test to ensure appropriate test equipment is available to verify compliance.

Section Three - RF Coverage

Section three is the R.F. coverage tests and documentation.

The Field Acceptance Test Plan is organized as follows:

1. Table of Contents.
2. Site Compliance Tests.
3. Performance Tests.
4. RF coverage tests.

Each section is concluded with a sign off sheet signifying compliance with agreed upon performance.

A word of caution is in order. Verifying compliance through system/equipment tests may require the system, or a portion thereof, to be disabled to perform the test. The ability to use the system will be impacted during these tests. Careful planning and notification of system users is highly recommended before performing tests.

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SECTION 2

PERFORMANCE TESTS

SECTION 3

RF COVERAGE TESTS

2.4.1 Site Compliance Test

CITY AND COUNTY OF SAN FRANCISCO

FIELD

ACCEPTANCE TEST PLAN

SECTION 1

SITE COMPLIANCE TESTS

CENTRAL RADIO MASTER SITE INSTALLATION

ANTENNA MOUNTINGS

Both transmit and receive antennas are mounted on the tower in accordance with industry accepted mounting practices and manufactures installation instructions. Antenna installation conforms to the City approved antenna mounting diagrams. All antenna coaxial cables are labeled at both ends.

RF COAXIAL CABLE

All RF coaxial cables are installed in accordance with Motorola cabling installation practices as defined in Motorola publication **Quality Standards - FNE Installations**. All RF connectors are properly sealed to prevent moisture intrusion. All transmission lines are properly grounded at both ends of the runs. Lightning protection devices are installed in each transmission line. All coaxial cables are labeled at both ends.

EQUIPMENT RACKS & CABINETS

Equipment racks and cabinets are bolted together and physically attached to the floor in such a manner as to provide support in the event of violent earth movements. Equipment racks and cabinet mountings conform to UBC zone 4 earthquake standards.

Equipment racks and cabinets are grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

ZONE CONTROLLER

The Zone Controller cabinet is installed in accordance with installation instructions contained in the Zone Controller Technical Manual and conform with City approved rack Drawings.

DATA BASE SERVERS

The Data Base servers are installed in accordance with installation instructions contained in the Data Base Server Technical Manual and conform with City approved rack Drawings.

TRUNKING CENTRAL CONTROLLERS

Both the Prime Trunking Central Controller and the Redundant Prime Trunking Central Controller are installed in accordance with installation instructions contained in the Trunked Central Controller Technical Manual and conform with City approved rack Drawings.

TRUNKING REMOTE SITE CONTROLLER

The Remote Trunking Site Controller is installed in accordance with installation instructions contained in the Trunked Central Controller Technical Manual.

T-BAR SWITCH

T-Bar switches for prime trunking controllers are installed in a rack in accordance with manufactures recommend installation instructions and in conformance to the Exhibit A, Performance Specifications and County of San Francisco approved rack mounting diagrams.

ASTRO-TAC COMPARATORS

The Astro-Tac comparators are mounted in racks in accordance with the City approved racking diagrams and as per installation instructions found in the Astro-Tac technical manual.

UNIVERSAL SIMULCAST CONTROLLER INTERFACE (USCI)

The USCI is mounted in a rack in accordance with City approved racking diagrams and as per installation instructions found in Motorola publication "Trunked Radio System Dual Path and Digital Path Simulcast Equipment" manual.

TeNSr CHANNEL BANKS

The TeNSr channel banks are mounted in racks in accordance with the City approved racking diagrams and as per installation instructions found in the TeNSr technical manual.

QUANTAR REPEATERS

All Quantar repeaters are installed in their designated racks in accordance with the City approved rack diagrams. Repeaters are installed in accordance with Motorola mounting instructions as defined in the Quantar installation manual.

TRANSMITTER COMBINERS

Transmitter Combiners are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings. Insure each combine port is connected to the proper transmitter.

RECEIVER MULTICOUPLERS

Receiver multicouplers are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings.

DIGITAL INTERFACE UNITS (DIU)

Digital Interface Units are mounted in a rack in accordance with installation instructions found in the DIU technical manual and in conformance to the City approved rack mounting drawings.

GPS RECEIVER AND FREQUENCY STANDARD

The GPS receiver and frequency standards are mounted in a rack in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment is mounted in a rack in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MICROWAVE RADIO EQUIPMENT

All Microwave radio equipment is mounted in racks in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings. Microwave antennas are mounted on the tower in accordance with manufactures recommended installation instructions and in conformance to the City approved tower mounting diagrams.

AMBASSADOR CEB (AUDIO SWITCH)

The Ambassador Central Electronics Bank and power supplies are mounted in a cabinet in accordance with the City approved rack mounting diagrams. The Ambassador Electronics Bank and power supplies are mounted in accordance with Motorola installation instructions as defined in the installation manual.

CENTRACOM GOLD CENTRAL ELECTRONICS BANKS (CEBS)

All CEBs are mounted in racks in accordance with installation instructions found in the Centracom Gold series technical manual and in conformance to the City approved rack mounting drawings.

INTERCONNECT CABLING

Interconnect wiring within the racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations.**

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

FOREST HILL SITE INSTALLATION

ANTENNA MOUNTINGS

Both transmit and receive antennas are mounted on the roof in accordance with industry accepted mounting practices and manufactures installation instructions. Antenna installation conforms to the City approved antenna mounting diagrams. All antenna coaxial cables are labeled at both ends.

RF COAXIAL CABLE

All RF coaxial cables are installed in accordance with Motorola cabling installation practices as defined in Motorola publication **Quality Standards - FNE Installations**. All RF connectors are properly sealed to prevent moisture intrusion. All transmission lines are properly grounded at both ends of the runs. Lightning protection devices are installed in each transmission line. All coaxial cables are labeled at both ends.

EQUIPMENT RACKS & CABINETS

Equipment racks and cabinets are bolted together and physically attached to the floor in such a manner as to provide support in the event of violent earth movements. Equipment racks and cabinet mountings conform to UBC zone 4 earthquake standards.

Equipment racks and cabinets are grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

TRUNKING REMOTE SITE CONTROLLER

The Remote Trunking Site Controller is installed in accordance with installation instructions contained in the Trunked Central Controller Technical Manual.

TENSR CHANNEL BANKS

The TeNSr channel banks are mounted in racks in accordance with the City approved racking diagrams and as per installation instructions found in the TeNSr technical manual.

QUANTAR REPEATERS

All Quantar repeaters are installed in their designated racks in accordance with the City approved rack diagrams. Repeaters are installed in accordance with Motorola mounting instructions as defined in the Quantar installation manual.

TRANSMITTER COMBINERS

Transmitter Combiners are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings. Insure each combine port is connected to the proper transmitter.

RECEIVER MULTICOUPLERS

Receiver multicouplers are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings.

GPS RECEIVER AND FREQUENCY STANDARD

The GPS receiver and frequency standards are mounted in a rack in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment is mounted in a rack in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MICROWAVE RADIO EQUIPMENT

All Microwave radio equipment is mounted in racks in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings. Microwave antennas are mounted on the tower in accordance with manufactures recommended installation instructions and in conformance to the City approved tower mounting diagrams.

INTERCONNECT CABLING

Interconnect wiring within the racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

BERNAL HEIGHTS SITE INSTALLATION

ANTENNA MOUNTINGS

Both transmit and receive antennas are mounted on the tower in accordance with industry accepted mounting practices and manufactures installation instructions. Antenna installation conforms to the City approved antenna mounting diagrams. All antenna coaxial cables are labeled at both ends.

RF COAXIAL CABLE

All RF coaxial cables are installed in accordance with Motorola cabling installation practices as defined in Motorola publication **Quality Standards - FNE Installations**. All RF connectors are properly sealed to prevent moisture intrusion. All transmission lines are properly grounded at both ends of the runs. Lightning protection devices are installed in each transmission line. All coaxial cables are labeled at both ends.

EQUIPMENT RACKS & CABINETS

Equipment racks and cabinets are bolted together and physically attached to the floor in such a manner as to provide support in the event of violent earth movements. Equipment racks and cabinet mountings conform to UBC zone 4 earthquake standards.

Equipment racks and cabinets are grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

TRUNKING REMOTE SITE CONTROLLER

The Remote Trunking Site Controller is installed in accordance with installation instructions contained in the Trunked Central Controller Technical Manual.

TENSR CHANNEL BANKS

The TeNSr channel banks are mounted in racks in accordance with the City approved racking diagrams and as per installation instructions found in the TeNSr technical manual.

QUANTAR REPEATERS

All Quantar repeaters are installed in their designated racks in accordance with the City approved rack diagrams. Repeaters are installed in accordance with Motorola mounting instructions as defined in the Quantar installation manual.

TRANSMITTER COMBINERS

Transmitter Combiners are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings. Insure each combine port is connected to the proper transmitter.

RECEIVER MULTICOUPLERS

Receiver multicouplers are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings.

GPS RECEIVER AND FREQUENCY STANDARD

The GPS receiver and frequency standards are mounted in a rack in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment is mounted in a rack in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MICROWAVE RADIO EQUIPMENT

All Microwave radio equipment is mounted in racks in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings. Microwave antennas are mounted on the tower in accordance with manufactures recommended installation instructions and in conformance to the City approved tower mounting diagrams.

INTERCONNECT CABLING

Interconnect wiring within the racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations.**

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

CLAY JONES SITE INSTALLATION

ANTENNA MOUNTINGS

Both transmit and receive antennas are mounted on the tower in accordance with industry accepted mounting practices and manufactures installation instructions. Antenna installation conforms to the City approved antenna mounting diagrams. All antenna coaxial cables are labeled at both ends.

RF COAXIAL CABLE

All RF coaxial cables are installed in accordance with Motorola cabling installation practices as defined in Motorola publication **Quality Standards - FNE Installations**. All RF connectors are properly sealed to prevent moisture intrusion. All transmission lines are properly grounded at both ends of the runs. Lightning protection devices are installed in each transmission line. All coaxial cables are labeled at both ends.

EQUIPMENT RACKS & CABINETS

Equipment racks and Cabinets are bolted together and physically attached to the floor in such a manner as to provide support in the event of violent earth movements. Equipment racks and cabinet mountings conform to UBC zone 4 earthquake standards.

Equipment racks and cabinets are grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

TRUNKING REMOTE SITE CONTROLLER

The Remote Trunking Site Controller is installed in accordance with installation instructions contained in the Trunked Central Controller Technical Manual.

TENSR CHANNEL BANKS

The TeNSr channel banks are mounted in racks in accordance with the City approved racking diagrams and as per installation instructions found in the TeNSr technical manual.

QUANTAR REPEATERS

All Quantar repeaters are installed in their designated racks in accordance with the City approved rack diagrams. Repeaters are installed in accordance with Motorola mounting instructions as defined in the Quantar installation manual.

TRANSMITTER COMBINERS

Transmitter Combiners are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings. Insure each combine port is connected to the proper transmitter.

RECEIVER MULTICOUPLERS

Receiver multicouplers are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings.

GPS RECEIVER AND FREQUENCY STANDARD

The GPS receiver and frequency standards are mounted in a rack in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment is mounted in a rack in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MICROWAVE RADIO EQUIPMENT

All Microwave radio equipment is mounted in racks in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings. Microwave antennas are mounted on the tower in accordance with manufactures recommended installation instructions and in conformance to the City approved tower mounting diagrams.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

SAN FRANCISCO STATE UNIVERSITY INSTALLATION

ANTENNA MOUNTINGS

Both transmit and receive antennas are mounted on the tower in accordance with industry accepted mounting practices and manufactures installation instructions. Antenna installation conforms to the City approved antenna mounting diagrams. All antenna coaxial cables are labeled at both ends.

RF COAXIAL CABLE

All RF coaxial cables are installed in accordance with Motorola cabling installation practices as defined in Motorola publication **Quality Standards - FNE Installations.** All RF connectors are properly sealed to prevent moisture intrusion. All transmission lines are properly grounded at both ends of the runs. Lightning protection devices are installed in each transmission line. All coaxial cables are labeled at both ends.

EQUIPMENT RACKS & RACKS

Equipment racks and Racks are bolted together and physically attached to the floor in such a manner as to provide support in the event of violent earth movements. Equipment racks and cabinet mountings conform to UBC zone 4 earthquake standards.

Equipment racks are grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations.**

TRUNKING REMOTE SITE CONTROLLER

The Remote Trunking Site Controller is installed in accordance with installation instructions contained in the Trunked Central Controller Technical Manual.

T-BAR SWITCH

T-Bar switches for the remote trunking site controllers are installed in a cabinet in accordance with manufactures recommend installation instructions and in conformance to the City approved rack mounting diagrams.

TENSR CHANNEL BANKS

The TeNSr channel banks are mounted in Racks in accordance with the City approved racking diagrams and as per installation instructions found in the TeNSr technical manual.

QUANTAR REPEATERS

All Quantar repeaters are installed in their designated Racks in accordance with the City approved rack diagrams. Repeaters are installed in accordance with Motorola mounting instructions as defined in the Quantar installation manual.

TRANSMITTER COMBINERS

Transmitter Combiners are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings. Insure each combine port is connected to the proper transmitter.

RECEIVER MULTICOUPLERS

Receiver multicouplers are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings.

GPS RECEIVER AND FREQUENCY STANDARD

The GPS receiver and frequency standards are mounted in a cabinet in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment is mounted in a cabinet in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MICROWAVE RADIO EQUIPMENT

All Microwave radio equipment is mounted in Racks in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings. Microwave antennas are mounted on the tower in accordance with manufactures recommended installation instructions and in conformance to the City approved tower mounting diagrams.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations.**

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

ONE MARKET PLAZA INSTALLATION

ANTENNA MOUNTINGS

Both transmit and receive antennas are mounted on the tower in accordance with industry accepted mounting practices and manufactures installation instructions. Antenna installation conforms to the City approved antenna mounting diagrams. All antenna coaxial cables are labeled at both ends.

RF COAXIAL CABLE

All RF coaxial cables are installed in accordance with Motorola cabling installation practices as defined in Motorola publication **Quality Standards - FNE Installations**. All RF connectors are properly sealed to prevent moisture intrusion. All transmission lines are properly grounded at both ends of the runs. Lightning protection devices are installed in each transmission line. All coaxial cables are labeled at both ends.

EQUIPMENT RACKS & RACKS

Equipment racks and Racks are bolted together and physically attached to the floor in such a manner as to provide support in the event of violent earth movements. Equipment racks and cabinet mountings conform to UBC zone 4 earthquake standards.

Equipment racks are grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

TRUNKING REMOTE SITE CONTROLLER

The Remote Trunking Site Controller is installed in accordance with installation instructions contained in the Trunked Central Controller Technical Manual.

T-BAR SWITCH

T-Bar switches for the remote trunking site controllers are installed in a cabinet in accordance with manufactures recommend installation instructions and in conformance to the City approved rack mounting diagrams.

TENSR CHANNEL BANKS

The TeNSr channel banks are mounted in Racks in accordance with the City approved racking diagrams and as per installation instructions found in the TeNSr technical manual.

QUANTAR REPEATERS

All Quantar repeaters are installed in their designated Racks in accordance with the City approved rack diagrams. Repeaters are installed in accordance with Motorola mounting instructions as defined in the Quantar installation manual.

TRANSMITTER COMBINERS

Transmitter Combiners are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings. Insure each combine port is connected to the proper transmitter.

RECEIVER MULTICOUPLERS

Receiver multicouplers are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings.

GPS RECEIVER AND FREQUENCY STANDARD

The GPS receiver and frequency standards are mounted in a cabinet in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment is mounted in a cabinet in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MICROWAVE RADIO EQUIPMENT

All Microwave radio equipment is mounted in Racks in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings. Microwave antennas are mounted on the tower in accordance with manufactures recommended installation instructions and in conformance to the City approved tower mounting diagrams.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

SOUTH SITE INSTALLATION

ANTENNA MOUNTINGS

Both transmit and receive antennas are mounted on the tower in accordance with industry accepted mounting practices and manufactures installation instructions. Antenna installation conforms to the City approved antenna mounting diagrams. All antenna coaxial cables are labeled at both ends.

RF COAXIAL CABLE

All RF coaxial cables are installed in accordance with Motorola cabling installation practices as defined in Motorola publication **Quality Standards - FNE Installations**. All RF connectors are properly sealed to prevent moisture intrusion. All transmission lines are properly grounded at both ends of the runs. Lightning protection devices are installed in each transmission line. All coaxial cables are labeled at both ends.

EQUIPMENT RACKS & RACKS

Equipment racks and Racks are bolted together and physically attached to the floor in such a manner as to provide support in the event of violent earth movements. Equipment racks and cabinet mountings conform to UBC zone 4 earthquake standards.

Equipment racks are grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

TRUNKING REMOTE SITE CONTROLLER

The Remote Trunking Site Controller is installed in accordance with installation instructions contained in the Trunked Central Controller Technical Manual.

TENSR CHANNEL BANKS

The TeNSr channel banks are mounted in Racks in accordance with the City approved racking diagrams and as per installation instructions found in the TeNSr technical manual.

QUANTAR REPEATERS

All Quantar repeaters are installed in their designated Racks in accordance with the City approved rack diagrams. Repeaters are installed in accordance with Motorola mounting instructions as defined in the Quantar installation manual.

TRANSMITTER COMBINERS

Transmitter Combiners are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings. Insure each combine port is connected to the proper transmitter.

RECEIVER MULTICOUPLERS

Receiver multicouplers are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings.

GPS RECEIVER AND FREQUENCY STANDARD

The GPS receiver and frequency standards are mounted in a cabinet in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment is mounted in a cabinet in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MICROWAVE RADIO EQUIPMENT

All Microwave radio equipment is mounted in Racks in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings. Microwave antennas are mounted on the tower in accordance with manufactures recommended installation instructions and in conformance to the City approved tower mounting diagrams.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

FORT MILEY WATER INSTALLATION

ANTENNA MOUNTINGS

Both transmit and receive antennas are mounted on the tower in accordance with industry accepted mounting practices and manufactures installation instructions. Antenna installation conforms to the City approved antenna mounting diagrams. All antenna coaxial cables are labeled at both ends.

RF COAXIAL CABLE

All RF coaxial cables are installed in accordance with Motorola cabling installation practices as defined in Motorola publication **Quality Standards - FNE Installations**. All RF connectors are properly sealed to prevent moisture intrusion. All transmission lines are properly grounded at both ends of the runs. Lightning protection devices are installed in each transmission line. All coaxial cables are labeled at both ends.

EQUIPMENT RACKS & RACKS

Equipment racks and Racks are bolted together and physically attached to the floor in such a manner as to provide support in the event of violent earth movements. Equipment racks and cabinet mountings conform to UBC zone 4 earthquake standards.

Equipment racks are grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

TRUNKING REMOTE SITE CONTROLLER

The Remote Trunking Site Controller is installed in accordance with installation instructions contained in the Trunked Central Controller Technical Manual.

TENSR CHANNEL BANKS

The TeNSr channel banks are mounted in Racks in accordance with the City approved racking diagrams and as per installation instructions found in the TeNSr technical manual.

QUANTAR REPEATERS

All Quantar repeaters are installed in their designated Racks in accordance with the City approved rack diagrams. Repeaters are installed in accordance with Motorola mounting instructions as defined in the Quantar installation manual.

TRANSMITTER COMBINERS

Transmitter Combiners are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings. Insure each combine port is connected to the proper transmitter.

RECEIVER MULTICOUPLERS

Receiver multicouplers are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings.

GPS RECEIVER AND FREQUENCY STANDARD

The GPS receiver and frequency standards are mounted in a cabinet in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment is mounted in a cabinet in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MICROWAVE RADIO EQUIPMENT

All Microwave radio equipment is mounted in Racks in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings. Microwave antennas are mounted on the tower in accordance with manufactures recommended installation instructions and in conformance to the City approved tower mounting diagrams.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

SAN FRANCISCO INTERNATIONAL AIRPORT SITE INSTALLATION

ANTENNA MOUNTINGS

Both transmit and receive antennas are mounted on the tower in accordance with industry accepted mounting practices and manufactures installation instructions. Antenna installation conforms to the City approved antenna mounting diagrams. All antenna coaxial cables are labeled at both ends.

RF COAXIAL CABLE

All RF coaxial cables are installed in accordance with Motorola cabling installation practices as defined in Motorola publication **Quality Standards - FNE Installations**. All RF connectors are properly sealed to prevent moisture intrusion. All transmission lines are properly grounded at both ends of the runs. Lightning protection devices are installed in each transmission line. All coaxial cables are labeled at both ends.

EQUIPMENT RACKS

Equipment racks are bolted together and physically attached to the floor in such a manner as to provide support in the event of violent earth movements. Equipment racks and cabinet mountings conform to UBC zone 4 earthquake standards.

Equipment racks are grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

QUANTAR REPEATERS

All Quantar repeaters are installed in a cabinet in accordance with the City approved rack diagrams. Repeaters are installed in accordance with Motorola mounting instructions as defined in the Quantar installation manual.

TRANSMITTER COMBINERS

Transmitter Combiners are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings. Insure each combine port is connected to the proper transmitter.

RECEIVER MULTICOUPLERS

Receiver multicouplers are rack mounted in accordance with manufactures recommended instructions and in conformance to the City approved rack mounting drawings.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment is mounted in a cabinet in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

COMBINED EMERGENCY COMMUNICATIONS CENTER SITE INSTALLATION

ANTENNA MOUNTINGS

Control station antennas are mounted on the tower in accordance with industry accepted mounting practices and manufactures installation instructions. Antenna installation conforms to the City approved antenna mounting diagrams. All antenna coaxial cables are labeled at both ends.

RF COAXIAL CABLE

All RF coaxial cables are installed in accordance with Motorola cabling installation practices as defined in Motorola publication **Quality Standards - FNE Installations**. All RF connectors are properly sealed to prevent moisture intrusion. All transmission lines are properly grounded at both ends of the runs. Lightning protection devices are installed in each transmission line. All coaxial cables are labeled at both ends.

EQUIPMENT RACKS

Equipment racks are bolted together and physically attached to the floor in such a manner as to provide support in the event of violent earth movements. Equipment racks and cabinet mountings conform to UBC zone 4 earthquake standards.

Equipment racks are grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

TENSR CHANNEL BANKS

The TeNSr channel banks are mounted in racks in accordance with the City approved racking diagrams and as per installation instructions found in the TeNSr technical manual.

CONTROL STATIONS

All control stations are installed in accordance with the City approved room layout diagrams. Control stations are installed in accordance with Motorola mounting instructions as defined in the installation manual.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment is mounted in a rack in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings.

MICROWAVE RADIO EQUIPMENT

All Microwave radio equipment is mounted in racks in accordance with manufactures recommended installation instructions and in conformance to the City approved rack mounting drawings. Microwave antennas are mounted on the tower in accordance with manufactures recommended installation instructions and in conformance to the City approved tower mounting diagrams.

CENTRACOM GOLD CENTRAL ELECTRONICS BANKS (CEBS)

All CEBs are mounted in racks in accordance with installation instructions found in the Centracom Gold series technical manual and in conformance to the City approved rack mounting drawings.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

DEPARTMENT OF PARKING AND TRAFFIC SITE INSTALLATION

CENTRACOM ELITE DISPATCH OPERATOR POSITIONS

All Centracom Elite series consoles are mounted in furniture in accordance with installation instructions found in the Centracom Gold series technical manual and in conformance to the City approved room layout drawings.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

SHERIFFS DEPARTMENT SITE INSTALLATION

CENTRACOM ELITE DISPATCH OPERATOR POSITIONS

All Centracom Elite series consoles are mounted in furniture in accordance with installation instructions found in the Centracom Gold series technical manual and in conformance to the City approved room layout drawings.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations**.

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

WATER DEPARTMENT SITE INSTALLATION

CENTRACOM ELITE DISPATCH OPERATOR POSITIONS

All Centracom Elite series consoles are mounted in furniture in accordance with installation instructions found in the Centracom Gold series technical manual and in conformance to the City approved room layout drawings.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations.**

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

DEPARTMENT OF TELECOMMUNICATIONS AND INFORMATION SERVICES SITE INSTALLATION

CENTRACOM ELITE DISPATCH OPERATOR POSITIONS

All Centracom Elite series consoles are mounted in furniture in accordance with installation instructions found in the Centracom Gold series technical manual and in conformance to the City approved room layout drawings.

INTERCONNECT CABLING

Interconnect wiring within the Racks, MDF, and between other equipment is installed in accordance with industry standard practices. All cables are cut to the proper length and in conformance to interconnect cabling diagrams found in Motorola's System Installation Guide. Each cable is labeled at both ends.

EQUIPMENT GROUNDING

All Motorola supplied rack and cabinet mounted equipment is properly grounded in accordance with Motorola grounding and bonding practices as defined in Motorola publication **Quality Standards - FNE Installations.**

The signatures below signify that the installation of Motorola supplied equipment complies with the requirements of the City.

City Representative _____ date _____

Motorola Representative _____ date _____

CITY
FIELD ACCEPTANCE TEST PLAN SIGN OFF SHEET

The attached document represents the Field Acceptance Tests required.

This document along with the following shall constitute Final Acceptance of the Citywide 800 MHz Radio System (CERS).

1. Completion of all facility work, system, component, hardware and software delivery, installation, testing, optimization, phaseover, documentation, and training.
2. Acceptance of the CERS, facilities, individual systems, and equipment by the City and the correction of defects.

3. Written certification by Motorola of compliance with the Exhibit A, Performance Specifications, including RF coverage performance.
4. Successful completion of the 30-day Confidence test.
5. Successful completion of a 90 day Proof of Performance Test.

FORMAT SIGN OFF

This is to verify that the City and Motorola agree on the Scope of Work contained in the attached "FIELD ACCEPTANCE TEST PLAN".

City Representative: _____ Date: _____

Motorola Representative: _____ Date: _____

COMPLETION ACCEPTANCE SIGN OFF

Upon successful compliance with each section of the attached document, both the City and Motorola shall sign below signifying the system has successfully passed the FIELD ACCEPTANCE TEST.

City Representative: _____ Date: _____

Motorola Representative: _____ Date: _____

2.4.2 Performance Test

CITY AND COUNTY OF SAN FRANCISCO

FIELD

ACCEPTANCE TEST PLAN

SECTION 2

PERFORMANCE TESTS

FIELD ACCEPTANCE TEST PLAN

ZONE CONTROLLER

The Motorola Zone controller complies with the specifications set forth in Motorola's published specifications.

ZONE MANAGER TERMINALS

The Motorola Zone Manager terminals comply with the specifications set forth in Motorola's published specifications.

TRUNKING PRIME CONTROLLERS

The Motorola Prime trunking controllers comply with the specifications set forth in Motorola's published specifications.

T-BAR SWITCH

The T-BAR complies with the specifications set forth in the manufactures published specifications.

TRUNKING REMOTE SITE CONTROLLERS

The Motorola remote site trunking controllers comply with the specifications set forth in Motorola's published specifications.

T-BAR SWITCH

The T-BAR complies with the specifications set forth in the manufactures published specifications.

ASTRO-TAC COMPARATORS

The Astro-Tac comparators comply with the specifications set forth in Motorola's published specifications.

UNIVERSAL SIMULCAST CONTROLLER INTERFACE (USCI)

The USCI complies with the specifications set forth in Motorola's published specifications.

TENSR CHANNEL BANK EQUIPMENT

The TeNSr channel bank equipment supplied complies with the specifications set forth in the manufactures published specifications.

QUANTAR REPEATERS

The Quantar repeaters comply with the specifications set forth in Motorola's published specifications. Separate documentation is provided along with this document on actual measured values.

TRANSMITTER COMBINERS

All Motorola supplied RF Transmitter Combining equipment complies with the specifications set forth in the suppliers specifications. Separate documentation is provided along with this document on actual measured values. Check and document forward and reflected power of each transmitter at the output of the combine.

RECEIVER MULTICOUPLERS

All Motorola supplied RF Receive Multicoupler equipment complies with the specifications set forth in the supplier's specifications. Separate documentation is provided along with this document on actual measured values. Receiver will be checked for desensitization from it's associated transmitter, as well as the other transmitters on the site.

BI-DIRECTIONAL AMPLIFIERS (BDA)

The BDA's comply with the specifications set forth in the manufactures published specifications.

DIGITAL INTERFACE UNITS (DIU)

The DIUs comply with the specifications set forth in Motorola's published specifications.

GPS/FREQUENCY STANDARDS

The GPS/Frequency comply with the specifications set forth in the manufactures published specifications.

MOSCAD ALARM AND CONTROL EQUIPMENT

The MOSCAD equipment complies with the specifications set forth in Motorola's published specifications.

MICROWAVE RADIOS

The Microwave radios comply with the specifications set forth in the manufactures published specifications.

AMBASSADOR AUDIO SWITCH

The Ambassador audio switch complies with the specifications set forth in Motorola's published specifications.

CENTRAL ELECTRONICS BANK (CEB)

The CEB complies with the specifications set forth in Motorola's published specifications.

CENTRACOM GOLD ELITE CONSOLE POSITIONS

The Centracom Gold Elite Console positions comply with the specifications set forth in Motorola's published specifications.

BACK UP POWER SYSTEMS

The battery system and UPS systems at each site will be tested to the final specifications of the detail design.

CAD INTERFACE TO SMARTZONE CONTROLLER

The battery system and UPS systems at each site will be tested to the final specifications of the detail design.

CAD INTERFACE TO CONSOLE SYSTEM

CAD Interface to the Console System will be tested to the final specifications of the detail design.

REDUNDANCY TESTING

Redundant equipment as determined by the final detail design shall be tested at each site through out the system.

The signatures below signify that the Motorola supplied equipment detailed above complies with the specifications set forth by the City.

City Representative _____ date _____

Motorola Representative _____ date _____

2.4.3 Radio Frequency (RF) Coverage Test

CITY AND COUNTY OF SAN FRANCISCO

FIELD

ACCEPTANCE TEST PLAN

SECTION 3

RF COVERAGE
TESTS

1. COVERAGE TESTS

The follow section defines the Coverage Acceptance Test Plans for the CERS. Three basic categories of tests will be conducted to demonstrate the ability of the voice radio system to perform as designed. The initial tests will be made to demonstrate the subjective voice quality of the system over the desired coverage areas. Then a set of detailed signal level and Bit Error Rate (BER) measurements will be taken in the prescribed areas to evaluate the distribution of RF power levels BER for the specified configurations. The last set of measurements will be taken outside of the City boundaries to determine conformance with minimizing radiation in the direction of other radio users.

1.1 COVERAGE TEST PREREQUISITES AND PREPARATION

The City and Motorola shall agree on the number of test vehicles and the test schedule well in advance of the commencement of testing to allow adequate preparation by both parties. Team members shall be assigned in advance and trained in the test procedures. Each test team shall consist of at least three people: a City representative a Motorola representative and an independent observer.

The City and Motorola shall supply the test vehicles and test team members for each vehicle. The test vehicle shall be of sufficient size to carry the team members and all the required test equipment in a safe manner. The test team representatives shall consist of a driver and at least one person to oversee the testing procedure. The driver and the overseer may be the same person.

Prior to the commencement of the test, the test equipment shall be installed in the test vehicle and thoroughly checked out, and all representatives shall be trained in the test procedures. FACTWare(SM) test grids of an area shall be prepared in advance for examination. The days and times of testing will be mutually agreed upon by Motorola and the City prior to testing.

2. DELIVERED AUDIO QUALITY TEST PLAN

Motorola will perform subjective audio quality testing within the coverage area of the optimized simulcast radio system using Circuit Merit evaluations by a field team composed of City and Motorola representatives. A vehicle and a driver supplied by the City and Motorola will be utilized. The field audio quality test team shall consist of an equal number of representatives from the City and Motorola plus one independent observer. The team members shall be trained and certified to evaluate audio quality by Circuit Merit. Also, a dispatcher will be assigned to provide pre-defined transmit audio test messages from the appropriate dispatch facility to the team in the field.

The voice coverage service area will be divided into approximately 200 equal sized test grids to insure a relatively even distribution of test samples. The default test location for the subjective audio quality test is the approximate center of each grid, or if that is not practical, at some other mutually agreed upon test point within any particular grid. Only one test transmission will be evaluated at each test point. The test radio will be of the same type and configuration that will be most commonly used on the system. Attenuators shall be placed between the antenna and the unit as described for Voice Coverage Testing as appropriate for the area of the test to approximate portable in-building coverage.

A) The subjective test will be conducted by the field audio quality team. This subjective test team will listen to an agreed upon five to ten second message while driving through each grid. They will then evaluate the received audio quality in this grid on a 1 to 5 scale, based on the Telecommunication Industry Association Standard below:

Circuit Merit Table

Circuit Merit	Grade of Circuit Performance
1	Signal not present or present less than half the time. Speech not perceptible.
2	Speech understandable only with considerable effort. Frequent repetition required for intelligible conversation.
3	Speech understandable with slight effort. Occasional repetitions required for clarification.
4	Speech easily understandable. Some continuous noise or distortion.
5	Speech perfectly understandable. Negligible noise or distortion.

B) Each members score for each grid location will be recorded for evaluation and inclusion in the final test report. If the majority of the members of the audio quality test team agree that the audio quality equals or exceeds CM 3 for a grid, that grid will be declared passed. In the event that the test team cannot reach a majority opinion, then that test grid shall be considered to have failed. The criteria for acceptable performance will be to have at least 95% of the grids tested achieve CM3 or better.

3. VOICE COVERAGE ACCEPTANCE TEST PLAN

The Voice System Coverage Acceptance Test Plan (CATP) is designed to demonstrate that the Voice Coverage provided by the 800 MHz Trunked System has at least 95 percent coverage reliability. Ninety-five percent coverage reliability means that at least 95 percent of the area indicated as being in the coverage area is guaranteed to have radio communications with an audio quality of Circuit Merit 3 or better. A signal of -105 dBm or higher is required to provide Circuit Merit 3 audio quality. A Bit Error Rate (BER) of 2.62% or less is required to deliver a Circuit Merit 3 audio quality.

The coverage areas are illustrated in the coverage maps provided as part of Exhibit B, Statement of Work. The shaded area of each composite map illustrates the area of guaranteed radio coverage. The Mobile coverage is shown on one set of maps and will be referred to as the "Mobile Coverage". The other set of maps define areas of portable coverage on the street and in buildings with penetration losses up to 30 dB in the Downtown area, up to 23 dB in selected portions of the City and up to 15 dB in the remaining portion of the City's service area as shown by the shaded portions of the included composite in-building coverage maps. These maps will be referred to as "Portable on the street" maps and "Portable in building" maps.

The maps will be verified to reflect adjustments to the predication parameters identified during the detailed design. If the coverage reliability requirements or system design is changed, the coverage maps and CATP may require modification with the agreement of the City and Motorola to reflect the changes.

The Voice System Coverage Acceptance Test will consist of signal level and BER measurements for the mobile coverage area, the portable on the street area and, the portable in building coverage area. The Mobile Coverage Acceptance Test Plan is designed to evaluate s signal level and BERs for a mobile configuration for the area of the City and County of San Francisco shown as covered on the mobile coverage maps. The Portable Coverage Acceptance Test Plan is designed to evaluate portable coverage on the street and in buildings within the City and County of San Francisco defined in the Portable Test Area section which follows.

Mobile and portable coverage testing will be conducted simultaneously from a moving vehicle. Portable with 30 dB, 23 dB, and 15 dB loss above the on the street signal level coverage measurements will be taken by coverage test equipment calibrated to simulate portable coverage inside these three types of building loss. The CATP will be conducted on public paved roads or other readily accessed public roads as shown on the San Francisco test grid map sets. Motorola reserves the right to test all additional inaccessible test grids within agreed areas up to the maximum number of test grids.

3.1 MOBILE COVERAGE TEST AREA

The mobile coverage test area is the area inside the borders of San Francisco that shows predicted coverage at ninety-five (95) percent reliability. Any area outside of the City an County of San Francisco borders or outside of the predicted coverage area will not be tested.

3.2 PORTABLE COVERAGE TEST AREA

The portable on the street coverage test area is the area inside the borders of San Francisco that shows predicted coverage at ninety-five (95) percent reliability on the street. Portable in building coverage test area is the area shown on the Composite Portable in building Coverage maps and is defined as that portion of San Francisco within the stated boundaries. Portable in building boundaries:

30 dB Area

- Leavenworth Street on the West
- The combination of Turk Street, Fifth Street and Howard Street on the South.
- The Embarcadero on the East.
- Broadway on the North.

23 dB Area

1. Portion surrounding the downtown area

- The combination of Lyon Street, West Pacific Avenue, Arguello Boulevard, Fulton Street, Stanyan Street, Fell Street, Webster Street, Oak Street, Buchannan Street, Herman Street, Guerrero Avenue, on the West
- Caesar Chavez Street (Army Street) on the South.
- San Francisco Bay on the East and North.

2. Portion surrounding University of California at San Francisco (Medical Center)

- 7TH Avenue on the West.
- The combination of Kirkham Street and Medical Center boundary on the South.
- The combination of Medical Center boundary, Parnassus Avenue, and Stanyan Street on the East.
- Lincoln Way on the North.

3. Portion surrounding San Francisco State University

- The combination of Middlefield Drive and Lake Merced Boulevard on the West.
- The combination of Vidal Drive, Pinto Avenue, and Holloway Avenue on the South.
- 19 TH Avenue on the East.
- Eucalyptus on the North.

15 dB Area

The areas of the City and County of San Francisco not inside the defined 30 dB and 23 dB areas or within the 23 dB areas where the predicted signal levels is less than 23 dB , but greater than 15 dB.. This is the area bounded on the West by the Pacific Ocean and on the North and East by the San Francisco Bay and by the South by the San Francisco - San Mateo County Line.

3.3 AREAS EXCLUDED FROM COVERAGE TESTING

The following areas are considered as inaccessible for coverage testing:

1. Federal Government property or military bases unless City provides access
2. Within roadway tunnels or similar structures

3.4 COVERAGE TEST EQUIPMENT

A quantitative method of measurement, called FACTWare(SM) (Fully Automated Coverage Test), will be used to test the radio system coverage. FACTWare(SM) equipment will be provided by Motorola for each test vehicle. Motorola shall provide the City with a copy of the receiver calibration certificate which clearly shows the period of calibration viability prior to conducting testing. No receiver shall be used for testing that has passed beyond its viability period. If calibration of the receiver is to be conducted on-site, the calibration for any reference standards used shall be provided. The FACTWare(SM) test package includes a calibrated test receiver and mobile whip antenna for sampling the RF signal, a Global Positioning System (GPS) receiver for instantaneous location information, and a portable computer to automatically conduct the test and store the results. This equipment allows a high rate of sampling and automated recording of signal level and BER measurements. The FACTWare(SM) package allows automatic and manual modes of sampling. In the automatic mode, a quasi-random method of selecting uniformly distributed test locations will be performed by FACTWare(SM). The test locations will be uniformly distributed throughout the coverage area. Each specific test location within each tested grid will be automatically determined by FACTWare(SM) as the vehicle travels within the grid. When the computer detects that the vehicle has entered an untested grid based on information from the GPS receiver and stored grid information, it will begin the signal level and BER measurement on the outbound RF transmission from the transmitters.

When the measurement is complete, the computer will provide a display of the results to the operator and store the information on disk along with the location information from the GPS receiver.

The manual mode may be used in the event of loss of GPS synchronization or coverage or to force a test measurement in a particular location within a grid. In the manual mode of FACTWare(SM), an operator will be required to make the decision of where and when the measurement will take place. If the manual mode is to be used, an agreement between the Motorola and the City representatives will be made on where to take a measurement. In case of loss of GPS information, the default test location for a manual mode measurement is the approximate center of the grid, provided that it is within the coverage area.

The measurement will be determined by sampling signal level over a distance of 40 wavelengths (about 14 meters). For each sample, the computer commands the receiver to sample the RF signal. The receiver evaluates the signal and provides a signal level and BER number back to the computer. Over 500 samples of the signal will be obtained while the vehicle traverses the 14 meter distance. The average of these samples will be computed to determine a signal level and BER that is representative of the test location. An average of multiple samples is used rather than a single measurement to ensure that the measurement is not biased by taking a single sample that might be at a peak or null point on the radio wave. The resulting average will be referred to as the "signal level measurement" for that grid.

3.5 VOICE COVERAGE ACCEPTANCE TEST PLAN METHODOLOGY

Motorola will provide the FACTWare(SM) calibrated measurement equipment for each vehicle and test team representatives. An adequate number of test sets will be provided to conduct the mobile coverage test and the portable-in-building coverage test at the same time. The test team representatives will conduct the test and operate the test equipment.

This test will be used to evaluate the voice system coverage area.

The coverage test area as defined above will be subdivided into a uniform pattern of test grids distributed over the coverage area in which one signal level and BER measurement per grid will be taken. Grid size will be approximately 400 feet by 400 feet in the 30 dB area, 800 feet by 800 feet in the 23 dB area and 1600 feet by 1600 feet in the remainder of the area.

Only grids which are predicted to be mostly covered will be tested, unless otherwise mutually agreed by Motorola and the City. In no case will a signal measurement be

recorded as part of the coverage test at a location that the coverage map shows to be outside of the coverage area.

Coverage will be evaluated based upon receiver signal measurements acquired by calibrated measurement equipment. During the field test, a Motorola supplied FACTWare(SM) equipment package will be placed in a vehicle which will travel to each of the test grids. At each test location while the vehicle is moving, a signal measurement will be made by the equipment and stored on disk.

The mobile and portable test procedures will be the same but the tests will occur independently on separate test sets. The hardware configurations will also be the same except that the portable test setup will include a 11 dB attenuator between the antenna and the calibrated receiver to compensate for the less efficient portable antenna. The 11 dB accounts for the loss associated with a portable whip antenna while the portable is in a swivel case on the hip. The building loss will be accounted for by adding 30 dB, 23 dB or 15 dB additional loss to the measured signal in the defined areas. Even though the test is conducted from a vehicle traveling on the street, the portable test results, because of the 11 dB attenuator and the added loss, will be the same as if the test were conducted inside a building with that amount of loss. No testing will be conducted inside buildings. Should the decision be made to change the basis of the coverage prediction to account for portable antenna loss greater of less than 11 dB, the test equipment shall be modified to reflect that change for the current 11dB attenuation.

The ATP will only be conducted once unless the test is found to be unreliable because of equipment malfunction or failure. The ATP will be re-conducted for the portion of the test affected by the equipment malfunction or failure.

No major adjustments to simulcast parameters will be allowed during RF coverage testing. The City reserves the right, at its sole discretion, to require RF coverage to be completely reinitiated should it determine that major system adjustments were performed during RF coverage testing.

3.6 SIGNAL LEVEL TESTING PROCEDURE

The Mobile Coverage Test and the Portable-In-Building Coverage Test will be conducted simultaneously wherever practical. Portable-in-building testing will not be performed outside of the designated portable-in-building coverage area. The test procedure is the same for both tests, and the Pass/Fail criteria is the same for both tests. The mobile test procedure is presented below. The portable-in-building test procedure differs only in the use of attenuation to simulate portable-in-building conditions.

A) FACTWare(SM) equipment will be provided by Motorola for each of the test vehicles and will gather signal data which will be stored and analyzed. The

results will be immediately available and summary results will be printed at a later date. At the end of each day of testing, the signal data files will be duplicated. The City and Motorola will each receive a copy of the files each day. These file will be in computer format.

B) The test team shall ensure that all base stations required to conduct the day's testing are in a continuous transmit mode.

C) The test team shall program the FACTWare(SM) computer for the frequencies involved in testing, using one or more of the 23 channels assigned to the City, verify proper operation of the equipment, then drive to the beginning point of that day's route.

D) Calibration of the test equipment shall be verified weekly or on request of either Motorola or the City project staff. Calibration shall be witnessed by Motorola and the City project technical staff.

E) As the vehicle moves through each test grid, a signal measurement will be taken and the results will be displayed. The measurement will normally be triggered automatically by the GPS receiver. In some instances it may be necessary for the operator to manually initiate the measurement.

F) If the Grid signal is equal to or better than -105 dBm or 2.62% BER, that grid for that configuration will be declared passed. If the Grid signal is less than -105 dBm or greater than 2.62% BER, the grid for that configuration will be declared failed.

3.7 SPECIAL COVERAGE AREA TESTS

Acceptance testing for each special area will be designed primarily to prove that the installed system works as intended by the specifications. Each of the mandatory special coverage areas (Hall of Justice, San Bruno Jails, Moscone Center, Muni Tunnel Network and San Francisco International Airport) will have a custom designed configuration to match the needs at each respective location. Tunnel and in-building coverage design objectives will include a minimum signal level and circuit merit quality for users anywhere within the identified coverage areas. Each design will also take into consideration the maximum loading that can be experienced while maintaining the desired level of service. The following tests will be performed at each location after final optimization of each installation:

a. RF signal levels throughout the coverage area will be recorded using automated signal gathering and processing equipment. A successful test will be that 95% or more of the averaged samples taken meet or exceed the design level criteria.

b. Circuit Merit quality tests will consist of making calls and recording circuit merit values on both ends. The coverage areas will be divided into square grids (typically 100 by 100 feet) and data recorded for each grid. A successful test will be that 95% of the tested areas will attain CM3 or better.

c. A loading test will be performed consisting of filling the system with the designed maximum number of carriers and recording that signal levels or C/I ratios do not degrade below the minimums required to maintain the desired service in the specified areas.

City personnel will be notified before each test is to be performed so they may schedule personnel to participate in the activity. All records will be collected at the end of each set of tests to be included in the final test reports.

RF coverage testing of Optional Special Areas of Coverage will be conducted to evaluate or confirm where adequate coverage by the CERS is achieved. Should the decision be made by the City that coverage requires improvement by the installation of equipment, this will be accomplished as agreed by the City and Motorola. Following the installation of equipment the area shall be retested as above for acceptance by the City.

4. WIDE AREA RADIATION TESTS

Additional signal levels shall be measured outside the jurisdictional boundaries of San Francisco along major highways throughout the San Francisco Bay Area to develop a database for resolving frequency sharing issues with other users in adjacent public safety jurisdictions. FACTWare(SM) test grids will be developed to collect signal level measurements approximately at one mile intervals along all main highway routes enclosed by the 5 dBu coverage areas produced by the installed CERS. Test routes will be reviewed with the City until mutual agreement is obtained. The test team will be comprised of at least one representative from both the City and Motorola. Signal levels will be automatically recorded in computer files using the same configuration of FACTWare(SM) test equipment that was used for the detailed signal level tests performed within the City an County of San Francisco boundaries. The data files will be analyzed to determine the actual field strengths produced by CERS along each route with particular attention given to the boundaries of nearby counties which may be affected by the current frequency allocations in the Northern California 800 MHz Regional Communications Plan for Region 6. Any grids that record a signal level below the sensitivity of the test equipment will be considered to have a field strength of less than 5 dBu.

5. ANALYZING DATA AND GENERATING REPORTS

During the subjective audio quality field tests, logs will be kept by both the City and the Motorola field test teams detailing the exact location of each test, the time of the test, the date of the test, the members of the field test team, the Circuit Merit value assigned to each field test location by team member, the pass/fail status for each test location, and any other pertinent information.

During the voice system signal level and BER test, FACTWare(SM) computer files are generated which include the signal level and BER averages for each test grid. This data will be placed in a computer spread sheet during the analysis phase and summaries will be compiled.

A report outlining each test and test results will be submitted to the City by Motorola. An illustrative map will be supplied with the report. The time frame for the report submission will be agreed to by the City and Motorola. This report will include a form which is to be signed by both the City and Motorola indicating the acceptance of the coverage provided by the 800 MHz voice subsystem which has been tested. A sample of such a form follows, showing coverage acceptance.

6. VOICE COVERAGE ACCEPTANCE CRITERIA

The acceptance criteria will be based on the subjective demonstration that CM3 audio quality is available for 95% of the design coverage area.

For each signal level and BER test (mobile and portable on street, and portable in-building) if 95% of the grids tested within the coverage area pass, then that coverage test will be declared passed. In the event that the coverage ATP is passed but a portion of the 5% of permitted failed grids occur in other than a random distribution, Motorola will investigate the causes of the failures and make adjustments and/or recommend alternative solutions for improving the coverage. The City will be responsible for choosing a solution and incurring all costs associated with implementing the selected solution.

The wide area signal level and BER data will be collected and the test grids displayed in a format to correlate the associated dBu levels of prediction maps supplied to the Region 6 NPSPAC frequency coordination committee.

The City will have the option to accept the coverage at any time prior to the completion of any Coverage Acceptance Test.

The acceptance by the City of the mobile coverage of the system, portable on the street coverage and portable in-building coverage of the system will constitute coverage acceptance of the 800 MHz Mobile Voice System.

Sample Acceptance of Coverage Verification Test

San Francisco CERS Mobile Voice System

Total number of test grids: _____

Total number of grids passing: _____

Percent of test grids passing: _____

The undersigned, being a duly authorized representative of the City, hereby attests that the foregoing results are true and accurate, and that either the test results have been approved by the City or that the City has deemed the radio coverage for the 800 MHz Mobile Voice System acceptable for normal system operation; thus signifying the acceptance of the system's trunking radio coverage performance.

City	MOTOROLA, INC.
_____	_____
Signature	Signature
_____	_____
Name	Name
_____	_____
Position	Position
_____	_____
Date	Date

3. CONFIDENCE TEST

Motorola, during Detail Design, shall provide a Confidence Test Plan.

Motorola shall perform a 30-day Confidence Test to ensure that all hardware and software defects have been corrected prior to placing the CERS into public safety service and entering final proof of performance testing. The full integrated operation of the CERS, including all individual systems, shall be demonstrated during this test. The test shall be designed to demonstrate the reliability, long-term stability, and maintainability of the system. The CERS shall operate for 30 consecutive calendar days without a major failure during this period as defined in section 7.03 of the Master Agreement.

The confidence test shall also demonstrate the long-term stability of the simulcast operation of the CERS, including the RF reference sources, simulcast alignment and optimization components, MTS, and TRS. Manual optimization, alignment, or adjustment of the CERS or individual systems, including remote adjustments via the simulcast optimization features of the CERS, shall not be permitted during the test. This test shall ensure that the CERS does not require frequent manual adjustment to maintain the level of performance required by Exhibit A, Performance Specifications.

Any major failure or performance degradation which requires a manual adjustment of the simulcast features of the CERS during the 30-day test period shall require that the test be terminated, corrective action taken, and the entire 30-day test reinitiated.

4. FINAL ACCEPTANCE

Motorola shall provide, during Detail Design, a Final Acceptance Plan.

Motorola shall demonstrate to the City's satisfaction that the equipment fulfills all requirements of the Exhibit A, Performance Specifications. Final acceptance shall require, but not be limited to, the following:

1. Completion of all facility work, system, component, hardware and software delivery, installation, testing, optimization, documentation, and training.
2. Acceptance of the CERS, facilities, individual systems, and equipment by City and the correction at Motorola's sole expense of workmanship and operational/performance defects.
3. Written certification by Motorola of compliance with the Exhibit A, Performance Specifications, including RF coverage performance.
4. Successful completion of the 30-day Confidence Test.
5. Successful completion of a 90-day Proof of Performance Test.

5. PROOF OF PERFORMANCE TEST PLAN

Motorola shall prepare and include in the Detail Design a Proof of Performance Test Plan (PPTP). A Proof of Performance test is defined as a full operational test of the CERS conducted for a minimum of 90 consecutive calendar days. This 90 day period is defined in section 7.03 of the Master Agreement. This testing is to ensure that all elements of the CERS work together to provide a complete, operational, and reliable system which satisfies the Exhibit A, Performance Specifications.

The PPTP shall also demonstrate the long-term stability of the CERS, including the RF reference sources, simulcast alignment and optimization features, the MTS, and the TRS. Manual optimization, alignment, or adjustment of the CERS or its constituent systems, including remote adjustments of the simulcast optimization features, shall not be permitted during the test. This test shall demonstrate that the CERS meets the long-term stability requirements and does not require constant manual adjustment to satisfy the Exhibit A, Performance Specifications.

Motorola shall submit a PPTP in the Detail Design. A final PPTP shall be developed and presented to the City for review and approval at least 30 calendar days prior to PPTP execution. The City reserves the right to modify the test plan and to add additional test requirements that verify compliance with the Exhibit A, Performance Specifications.

The Proof of Performance test may be initiated, upon City approval, after the CERS' constituent systems have successfully passed acceptance testing and have been integrated with existing City equipment and systems. This period will likely occur at a time when the system has been cutover to public safety service and is handling design traffic.

Any major failure or performance degradation which requires a manual adjustment of the simulcast functionality of the CERS during the 90-day test period shall require that the test be terminated, corrective action taken, and the entire 90-day test reinitiated.