# ASTRO 25 Integrated Voice and Data Network Coverage & Traffic

## ASTRO 25 INTEGRATED VOICE AND DATA NETWORK COVERAGE & TRAFFIC

## COVERAGE PERFORMANCE GUARANTEES

Motorola will provide the ASTRO 25 Integrated Voice and Data Network wide area communication system to meet the coverage performance guarantees specified in this contract. The coverage performance guarantees are separately specified for ASTRO 25 voice and ASTRO 25 data and are described below:

### 4.1.1. ASTRO 25 Voice Coverage

In 95% of the predicted coverage area shown in each of the 14 coverage maps (reflecting the 14 VSP Communication Zones), provided in Appendix 13, Motorola will provide an independent talk-in (mobile to console) Push to Talk (PTT) Access and a talk-out (console to mobile) **B**it **E**rror **R**ate (BER) test of not more than 2.0% for the Commonwealth's communication system. Where the bit error rate is greater than 2.0% but less than or equal to 5%, Motorola will provide at least a talk-in and talk-out **D**elivered **A**udio **Q**uality (DAQ) of 3.4. (DAQ 3.4 is defined as speech understandable with repetition only rarely required, and with some noise and/or distortion.) The details of the testing procedures are included in the Coverage Acceptance Test Plan (CATP) in Section 12.

### 4.1.2. ASTRO 25 Data Coverage

In 95% of the predicted coverage area shown in each of the 14 coverage maps, provided in Appendix 13, Motorola will provide successful delivery of a 200 byte test message within a maximum of four (4) tries within a 20-second period (one original try and up to three retries), which is defined as a 95% area **M**essage **S**uccess **R**ate (MSR). A successful delivery is defined as transmitting a test message and receiving its corresponding acknowledgement within the allowed number of tries. Motorola will include inbound (mobile data terminal to host) and outbound (host to mobile data terminal) MSR testing in the CATP sequence in order to verify data coverage performance.

### 4.1.3. ASTRO 25 Voice Tunnel RF Coverage

In 95% of the bore length (except for 100 feet at each end) of the six (6) tunnels, Motorola will provide a DAQ of 3.4 for the VHF system. Motorola will provide a DAQ of 3.4 for the 800 MHz system in 95% of the bore length of the tunnel and extending 100 feet outside the tunnel entrance. Motorola will not guarantee coverage in bore cross connections, air ventilation shafts, or other service areas accessible by tunnel maintenance personnel, however, a baseline DAQ test will be performed for informational purposes.

### 4.1.4. ASTRO 25 Data Tunnel RF Coverage

In 95% of the bore length (except for 100 feet at each end) of the six (6) tunnels, Motorola will provide successful delivery of a 200 byte test message within a maximum of four (4) tries within 20 seconds (one original try and up to three retries). Motorola will include inbound and outbound MSR testing in the CATP sequence in order to verify data coverage performance. Motorola will not guarantee coverage for walkways exterior to the vehicular tunnels, including bore cross connections, air ventilation shafts, or other areas accessible by tunnel maintenance personnel.

## PERFORMANCE GUARANTEE DESIGN ASSUMPTIONS

The coverage performance guarantees in this Contract are based on the assumption that the Commonwealth obtains the necessary regulatory approvals and on the coverage assumptions listed below, including NRQZ requirements as of December, 2003, which Motorola will meet.

### 4.1.5. General Coverage Assumption

Motorola has designed the ASTRO 25 communication system to provide voice and data coverage for Motorola VHF ASTRO digital mobile radios using the following assumptions:

- A mobile unity gain antenna can be mounted at least (54) inches above ground level near the vehicle's roof center. Coverage testing will use patrol vehicles, fully equipped with all equipment (light bar, SIRS radio, vehicular repeater, VHF camera audio, cellular telephone, etc.). The dispatch antenna will be the same as mounted for the delivered system.
- The mobile radio will provide 50 watts of mobile RF power output.
- Motorola is responsible for the channel plan.
- The following criteria are used for the development of the Channel Plan. Variations to these criteria may require additional hardware that may be procured at the discretion of the Commonwealth.

- Fixed end equipment frequencies will transmit high and receive low using frequencies that are divisible by either 2.5 or 6.25 kHz.
- The total transmit to transmit frequency spread is within the radio and antenna network bandsplits/bandwidths limitations.
- Transmitter – transmitter channel spacing is greater than or equal to 150 kHz.
- Receive frequencies fall within the ASTRO 25 RF site's pre-selector's bandwidth limitation of 1.5 MHz and within the radio and antenna band-splits/bandwidths limitations.
- Receiver to receiver frequency separation is greater than or equal to 50 kHz.
- Receive frequencies are not multiples of the TX channel separations.
- Receive frequency spreads can be clustered together away from the transmit band.
- The total band spread of transmit and receive frequencies are within the 150-164 MHz range, which is the bandwidth of the ASTRO 25 RF site antennas and the limiting factor in the VHF RF network design.
- Transmitter – receiver channel spacing is greater than or equal to 3 MHz
- No 3rd order **I**nter-**M**odulation (IM) products exist on the ASTRO 25 RF site's receive frequencies from the Commonwealth's channels or other co-located channels or nearby channels.
- Co-channel C/I is greater than or equal to 34.2 dB
- Adjacent channel C/I is greater than or equal to 29.2 dB
- Receiver sensitivity degradation will not exceed assumed estimates used during coverage predictions and as listed in this section under the heading "Coverage Summary Reports".
- ASTRO 25 RF sites will be constructed according to the design parameters as detailed in this section under the heading "Coverage Summary Reports".

Prior to beginning the implementation of any stage, Motorola will provide to the Commonwealth for their review and approval, site drawings for all sites in that stage that conform to these conditions. This will be the baseline against which further changes or modifications to the coverage guarantee will be made.

### 4.1.6. ASTRO 25 Voice

Motorola has designed the ASTRO 25 communication system to provide a BER of not greater than 2% or a DAQ of at least 3.4 for a Motorola VHF ASTRO digital mobile radio under the following specific conditions:

- Talk out bit error rate testing will use an ITU-T V.52 (or newer equivalent as described in section 7.5.3 of TSB-88A) pseudo-random test pattern generated at the ASTRO 25 RF site's transmitter.

### 4.1.7. ASTRO 25 Data

Motorola has designed the ASTRO 25 communication system to provide a data MSR of 95% for Motorola VHF ASTRO digital mobile radios under the following specific conditions:

- Fleetmapping has not modified the designed transmitter site selection characteristics for mobile operation.
- MSR testing will be performed with the ASTRO 25 system unloaded and with test messages sent between the vehicles' mobile data terminal and a pseudo-host operating on the IV&D Network.

### 4.1.8. ASTRO 25 Voice Tunnel RF Coverage

Motorola has designed the ASTRO 25 communication system to provide at least a DAQ of 3.4 for a Motorola VHF ASTRO digital mobile radio and for a Motorola 700/800 MHz portable radio in the six (6) tunnels described in the "In-Tunnel System" Section 2 under the following specific conditions:

- The 700/800 MHz portable radio will use a portable antenna at head level for talk-in DAQ testing and a portable antenna at hip level in a swivel case for talk-out DAQ testing. It will also provide 3 watts of portable RF power output.
- VHF mobile and 700/800 MHz portable tunnel coverage is provided through the coverage enhancement system as described in the "In-Tunnel System Section.

### 4.1.9. ASTRO 25 Data Tunnel RF Coverage

Motorola has designed the ASTRO 25 communication system to provide a data MSR of 95% for a Motorola VHF ASTRO digital mobile radio in the six (6) tunnels described in the "In-Tunnel System" section under the following specific conditions:

- VHF mobile tunnel coverage is provided through the coverage enhancement system as described in the "In-Tunnel System" Section.
- Fleetmapping has not modified the designed transmitter site selection characteristics for mobile operation.
- MSR testing will be performed with the ASTRO 25 system unloaded and with test messages sent between the vehicle's mobile data terminal and a pseudo-host operating on the IV&D Network.

## COVERAGE MAPS AND SUMMARY REPORTS

Motorola has included coverage maps in Appendix 13 and summary reports in Appendix 15 which describes the guaranteed percentage of coverage for each Communications Zone. The coverage maps delineate the predicted 95% coverage area for each **C**ommunication **Z**one (CZ). The coverage summary reports lists the various design parameters and assumptions used to produce the maps.

Motorola has estimated the VHF RF and environmental noise levels at or near the STARS RF sites using general site information available to Motorola at the time that coverage predictions were modeled, and coverage maps and guarantees were provided. These levels were used to calculate estimated site receiver sensitivity degradation (caused by the "noise and interference floor"). The estimated figures are shown in the "ASTRO 25 IV&D System – Site Summary Report" provided in Appendix 15. Prior to beginning implementation of any site in each Division, Motorola will measure the noise and interference floor at each site providing coverage for that Division, and compare it with the original estimates. If the Commonwealth agrees that the measured noise and interference floor exceeds the original estimates used in the coverage predictions, then Motorola will model the coverage using the measured noise and interference floor and revise the coverage map(s)' predicted coverage area accordingly, and will provide the revised map(s) to the Commonwealth for review and approval.

If predicted coverage decreases by 1 or more percentage points from guaranteed coverage, then Motorola will use its best efforts to redesign the system, at no cost to the Commonwealth, in the affected area so that coverage will improve to within 1 percentage points of guaranteed coverage.

The following steps will be taken to determine if improved coverage is possible:

- Attempt to determine the cause of the receiver degradation
- Redesign the antenna and combining and filtering network to optimize local conditions
- Perform a radial search for alternative sites, including Commonwealth-owned and potential leased sites
- Review entire zone to determine if a reconfiguration of the Communications Zone site constellation will improve coverage
- Re-evaluate the frequency plan for that Communications Zone

If predicted coverage decreases by 5 or more percentage points from guaranteed coverage, then Motorola and the Commonwealth will share equally all equipment and installation costs associated with implementation of the redesigned system. The Commonwealth will acquire any additional land for sites needed for the redesigned system. If there are alternative actions available, then Motorola and the Commonwealth will agree on appropriate actions to be taken.

Likewise, Motorola has applied VHF RF and environmental noise levels values to the VHF ASTRO 25 mobile radio using categorized noise values as recommended in TSB-88A section 5. These levels were used to calculate estimated mobile receiver sensitivity degradation. If during CATP outbound testing a test grid fails due to suspected localized interference, Motorola will measure the mean mobile receiver sensitivity degradation within the failed test grid. Motorola will then compare the measured mean value with the estimated value and with the Commonwealth's concurrence, will determine if the failure is the result of localized interference. Should that be the case, the provisions of the CATP regarding localized interference will prevail.

### 4.1.10. Coverage Maps

Motorola has provided in Appendix 13 the coverage maps that document coverage guarantees for communication zones 1 – 13 plus a major waterway communication zone. On each coverage map, Motorola has defined the communication zone boundaries and delineated the guaranteed coverage area for and within each communication zone's boundary. Each map has a legend showing coverage guarantee shading. Appendix 13 also contains a predicted coverage map with the composite of all Communication Zones described above. Motorola will further provide this information in electronic format such that it may be compared with actual test data obtained during the CATP testing for informational purposes.

Each map is identified and associated with a specific summary report by a unique "Job ID" number. These numbers are listed in the Table 4-1 along with the filename of the electronic version.

| Map Description | Job ID Number | Filename |
|---|---|---|
| Communication Zone 1 | 2166716331.7.000.1.1 | COV_STARS_IV&D_CZ01_Run1_Coverage_Map-Final.pdf |
| Communication Zone 2 | 2721612642.6.000.1.1 | COV_STARS_IV&D_CZ02_Run1_Coverage_Map-Final.pdf |
| Communication Zone 3 | 369518852.3.000.1.1 | COV_STARS_IV&D_CZ03_Run1_Coverage_Map-Final.pdf |
| Communication Zone 4 | 286408639.4.000.1.1 | COV_STARS_IV&D_CZ04_Run1_Coverage_Map-Final.pdf |
| Communication Zone 5 | 42537371.8.000.1.1 | COV_STARS_IV&D_CZ05_Run1_Coverage_Map-Final.pdf |
| Communication Zone 6 | 16779817.7.000.1.1 | COV_STARS_IV&D_CZ06_Run1_Coverage_Map-Final.pdf |
| Communication Zone 7 | 97522840.5.000.1.1 | COV_STARS_IV&D_CZ07_Run1_Coverage_Map-Final.pdf |
| Communication Zone 8 | 2139212289.7.000.1.1 | COV_STARS_IV&D_CZ08_Run1_Coverage_Map-Final.pdf |
| Communication Zone 9 | 171366462.3.000.1.1 | COV_STARS_IV&D_CZ09_Run1_Coverage_Map-Final.pdf |
| Communication Zone 10 | 779725918.6.000.1.1 | COV_STARS_IV&D_CZ10_Run1_Coverage_Map-Final.pdf |
| Communication Zone 11 | 364320928.7.000.1.1 | COV_STARS_IV&D_CZ11_Run1_Coverage_Map-Final.pdf |
| Communication Zone 12 | 2493127910.7.000.1.1 | COV_STARS_IV&D_CZ12_Run1_Coverage_Map-Final.pdf |
| Communication Zone 13 | 2615913020.6.010.7267.3 | COV_STARS_IV&D_CZ13_Run3_Coverage_Map-Final.pdf |
| Major Waterway Communication Zone | 2137924342.12.000.1.1 | COV_STARS_IV&D_CZ-Water_Run1_Coverage_Map-Final.pdf |
| Commonwealth of Virginia | N/A | COV_STARS_RUN5_Coverage_Map.pdf |

Table 4-1 – Map Description and Associated Job ID Numbers

# COVERAGE SUMMARY REPORTS

Motorola has provided in Appendix 15 coverage summary reports for communication zones 1 – 13 plus the major waterway communication zones. Each summary report lists the various design parameters and assumptions used to produce the associated map. The construction and installation of the ASTRO 25 RF sites will incorporate these design parameters. These parameters include the following as a minimum:

| | |
|---|---|
| Subscriber Parameters – | Subscriber Type and Modulation/Coding |
| | Audio Quality |
| | Antenna Height, Location, and Gain |
| | Antenna Line Loss, Length and Type |
| | Transmitter Power |
| | Assumed Receiver Sensitivity Degradation |
| Radio Tower Parameters – | Site Latitude and Longitude |
| | Site Elevation |
| | Tower Height |
| | Station Type and Modulation/Coding |
| | Audio Quality |
| | Transmit Antenna Height, Type, and Azimuth |
| | Transmit Effective Radiated Power (ERP) |
| | Transmitter Power |
| | Receive Antenna Height, Type, and Azimuth |
| | Crystal Filter Type and bandpass filter Characteristics |
| | NRAO Requirements |
| | Receiver Multicoupler |
| | Transmit Multicoupler |
| | Antenna transmission line loss and type |
| | Assumed Receiver Sensitivity Degradation |

Each summary report is identified and associated with a specific map by a unique "Job ID" number. These numbers are listed in the Table 4-2 below matching the summary reports provided in Appendix 15.

| Summary Report Description | Job ID Number |
|---|---|
| Communication Zone 1 | 2166716331.7.000.1.1 |
| Communication Zone 2 | 2721612642.6.000.1.1 |
| Communication Zone 3 | 369518852.3.000.1.1 |
| Communication Zone 4 | 286408639.4.000.1.1 |
| Communication Zone 5 | 42537371.8.000.1.1 |
| Communication Zone 6 | 16779817.7.000.1.1 |
| Communication Zone 7 | 97522840.5.000.1.1 |
| Communication Zone 8 | 2139212289.7.000.1.1 |
| Communication Zone 9 | 171366462.3.000.1.1 |
| Communication Zone 10 | 779725918.6.000.1.1 |
| Communication Zone 11 | 364320928.7.000.1.1 |
| Communication Zone 12 | 2493127910.7.000.1.1 |
| Communication Zone 13 | 2615913020.6.010.7267.3 |
| Major Waterway Communication Zone | 2137924342.12.000.1.1 |

Table 4-2 – Summary Report and Associated Job ID Numbers

# COVERAGE DESIGN ELEMENTS AND SYSTEM DESCRIPTION

Motorola will provide the Commonwealth of Virginia the VHF RF network design and system for the tower sites that include VHF ASTRO 25 RF site equipment. The design is described in the network diagrams, site location list, and design parameters contained in the coverage summary reports. The VHF RF system includes the transmitter combiners, receiver multicouplers, associated filters, crystal filters, coaxial lines, coaxial connectors, coaxial cable accessories, antenna, and antenna mounting hardware.

## 4.1.11. Design Elements

Diagrams for the VHF RF network configurations that detail the various components that make up the VHF RF system are located in Appendix 16. There is one diagram for each basic type of site configuration (4-, 5-, 6-, 7-, and 8-channel ASTRO 25 RF site).

## 4.1.12. ASTRO 25 RF Sites

To meet the stated coverage guarantees Motorola will install forty-five (45) ASTRO 25 RF sites, strategically located throughout the Commonwealth. See Appendix 4 for RF site listings and details.

To meet the stated coverage guarantees Motorola assumed increased tower height availability at twenty (20) of the existing Commonwealth LMR towers. If this assumption is incorrect and as a result the predicted coverage decreases by 1 or more percentage points from guaranteed coverage, then, Motorola and the Commonwealth will seek the lowest cost alternatives to improve coverage to acceptable levels. Table 4-3 below lists the affected sites.

Table 4-3 has been removed.
[CONFIDENTIAL/PROPRIETARY Information – EXEMPT from public disclosure.]

Table 4-3 - Twenty (20) of the Affected Existing Commonwealth LMR Towers

Table 4-3 notes:
1. ASTRO 25 RF receive antenna requires height of 130 ft. ASTRO 25 RF transmit antenna is at the current licensed height of 60 ft.
2. ASTRO 25 RF receive antenna requires height of 90 ft. ASTRO 25 RF transmit antenna is at the current licensed height of 20 ft.
3. ASTRO 25 RF receive antenna requires height of 120 ft. ASTRO 25 RF transmit antenna is at the current licensed height of 50 ft. Remainder of tower height required by microwave subsystem.
4. ASTRO 25 RF receive antenna requires height of 155 ft. ASTRO 25 RF transmit antenna is at the current licensed height of 85 ft.

## 4.1.13. VHF RF Network System Description

Motorola has designed and will install 44 of the 45 ASTRO 25 RF sites with vertical antenna separations of at least 50 feet (tip-to-base) to provide the isolation between transmit and receive antennas. At the Leesburg AO site, the limited tower height allows vertical separation of only 10 feet. Motorola has designed and will mount the antennas at the Leesburg AO site such that the antennas may also be horizontally separated by at least 100 feet, providing isolation between the transmit and receive antennas. The final design will be addressed during the detailed design review.

Motorola will provide transmitter combiners that consist of individual, "high Q," bandpass cavity filters and dual isolators tuned to the frequencies of the transmitters to which it is connected. The output of each filter is connected to a junction that combines multiple transmitter outputs to a single output with each transmitter combiner supporting four transmitters.

To sharpen the selectivity of the receiver, Motorola will use an additional receiver preselector (multi-cavity bandpass filter) integrated as part of the receiver multicoupler to provide a flat bandpass window. This configuration will attenuate frequencies that fall outside the passband. This also requires that the receive frequencies allocated for this system must all fall within the preselector passband of 1.5 MHz for each site. Motorola will also provide crystal filters at each receiver, which further improves the overall selectivity and reduces receiver desense. The insertion loss and intermodulation characteristics of these crystal filters will not affect the coverage guarantee or talk-out/in balance.

To prevent radio signal degradation caused by Passive Inter-Modulation (PIM) interference, Motorola will provide and install transmit antennas, combiners, connectors, and surge suppressors with the PIM specifications required to minimize this type of interference. Motorola will provide the Commonwealth a VHF RF network designed using the following design practices for minimizing PIM degradation:

- 7/16 DIN connectors (with torque of 110 in/lb interior and 240 in/lb exterior) will be used on all transmit components after the transmitter combiner. (This includes the RF surge protector, RF power sensor, and the antenna.)
- All connectors are silver-plated with gold center pins
- No super-flex coaxial cable is used in multi-carrier transmitter components from combiner to antenna.
- No additional components are used after the combiner except the RF surge protector, RF power sensor, coaxial cable, connectors, grounding kits, and antenna.

- Antennas and combiners specifically designed to reduce PIM are used at all sites.
- All transmit antennas are mounted as far from the tower as possible (at least three to six feet or more).
- Motorola will use R-56 site installation practices, grounding, and maintenance procedures to greatly reduce the probability of on-site IM mixing.

For each radio site comprising a stage, Motorola will provide to the Commonwealth, for review, an engineering analysis of on-site IM specific to the frequencies at that site prior to commencing installation at any site within that stage.

Motorola has specified under the Performance Guarantee Design Assumptions heading in this section a design to maximize the guard band and minimize the transmit and receive passbands. Figure 4-1 shows the IM interference that extends outside the transmit band and how proper band planning can eliminate or reduce the chances for intermodulation. In Figure 4-1, the guard band mathematically eliminates third order IM and limits fifth order IM exposure within the receive band. Note that the 7th order harmonics (and higher) completely affect the receive band.

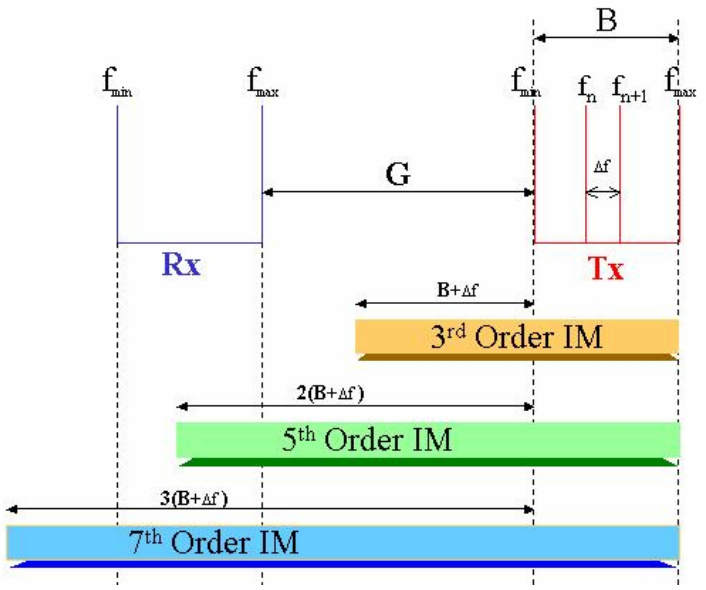


Figure 4-1 – IM Interference

## VOICE AND DATA TRAFFIC MAPS AND REPORTS

Motorola has used its coverage and traffic prediction tool called Hydra[SM] to prepare voice and data traffic maps and summary reports for the VHF ASTRO 25 IV&D system. These maps and reports are provided for informational use only and are expected to be accurate

based on the actual field use being the same as those parameters listed in the assumptions. As part of the acceptance test for Division 1, Motorola will provide a performance test during staging at the Customer Center for Systems Integration (CCSI) using a traffic simulation tool that will demonstrate that the traffic handling capacity complies with the specifications in this Contract. If the test demonstrates that the specifications in the Contract have not been met, then Motorola will provide the design and engineering necessary to increase the capacity and the additional equipment or installation cost to that required at no additional cost to the Commonwealth. The traffic report was developed from the following:

- Data derived from Hydra
- Data taken from field traffic analysis

Hydra[SM] is a Motorola proprietary tool based on industry standards that integrates coverage prediction into the traffic simulation, so the terrain and subscriber distribution effects on packet collisions and interference are modeled in the traffic simulation.

Hydra[SM] uses a "discrete event simulation" (a computer representation of the ASTRO 25 IV&D system's architecture and protocols) to modeled traffic. After the appropriate inputs are provided and the simulation is started, the modeling is "event driven"; that is, calls are processed, queued, etc., just as they would be in the real system. A simulation clock is maintained, and simulation time passes as events occur; there can be multiple concurrent events at any instant of simulation time (for example, simultaneous multiple call requests). With each event, the status of the simulated system is updated and statistics are collected for performance analysis and reporting.

### 4.1.14. Traffic Design Assumptions

The traffic design assumptions in this contract are based on the coverage and traffic assumptions listed below:

- Approximately 69% (7267 mobile units) of the 10512 total mobile users shown in Appendix 14, Communications Zone Unit Count, were assumed to be active registered users on the ASTRO 25 IV&D system. Approximately 41.3% (3003 mobile units) of the 7267 total units were assumed to be active data users with the remaining 4264 assumed to be active voice users.
- Mobile voice users and data users are separately distributed throughout the Commonwealth based on the percentage of units per jurisdictional district calculated from Appendix 14. Assumptions regarding usage statistics are found in Appendix 15.
- From the assumed 4264 active voice users a talkgroup load profile was created using the **T**alkgroup **L**oad **P**rofile (TLP) generator tool in Hydra.

(The TLP load profiles were developed from actual call activity statistics from several existing trunked systems. The load profiles differ based on the type of user and are detailed in the summary report.)

- The assumed 3003 active data users were modeled with Motorola's standard public safety message load profile, which is detailed in Appendix 15. Data is secondary to voice.

- Since data is secondary to voice, the number of channels per site was sized based on 7267 active voice users and no active data users, for a voice system **G**rade **O**f **S**ervice (GOS) of 3% or less, as an average of individual site GOS, with a system Erlang load of no more than 44. Voice and data traffic simulations were run from a statewide system view.
- The ASTRO 25 RF IV&D system provides voice and data coverage as described under the Coverage Performance Guarantees heading in this section.

## 4.1.15. Traffic Design Map & Summary Report

Appendix 15 contains the subscriber distribution map that delineates the concentration (distribution) of voice and data users throughout the Commonwealth. Distinct colors and/or lines define the map features. The map has a legend. This map will be provided in electronic format.

The map is identified and associated with a specific summary and traffic report by a unique "Job ID" number. This number is 493914049.44.111.7267.2. The summary report list the parameters used to produce the traffic report. These parameters include the following:

- Channel Assignment List
- Talk group to site involvement
- Active Voice Unit count (including locality and agency interfaces)
- Voice Talkgroup Load Profiles
- Voice Talkgroup List
- Active Data Unit count
- Data User Load Profile

The traffic report lists the results from the IV&D traffic simulation. These results include the following:

- Voice GOS per Site
- System GOS with Erlang load
- Mean voice wait in queue per site
- Data network response times

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