



Attachment F: US-VISIT RFID Evaluation Test Procedures

This appendix contains the test procedures developed and used during the RFID tests. The test procedure was developed as a stand-alone document to govern the tests. It is included here as documentation of that effort. The test procedures document has been reformatted here only for the purpose of being contained as an appendix of the RFID Feasibility Study Final Report.



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1.0 Introduction

The RFID feasibility evaluation tests are to quantify the ability to read RFID tags in vehicles as they pass through a detection region that simulates exiting a US border port of entry (POE). A two-lane test site at the Raytheon Falls Church, VA facility is used for this purpose. A platform to simulate a sign bridge or gantry and other support structures is provided to support RFID readers and antennas. In addition, two test lanes of a suitable length for vehicles to safely travel at speed up to 40 MPH are part of this test facility.

Equipment for reading RFID tags is provided by each of two vendors for testing. The reader systems are to be interfaced with computers that automatically collect data from the tests. Test vehicles of different types and carrying varying numbers of passengers (tags) are to be driven down the test site at different speeds during the evaluation of the performance of each vendor's system. The following sections describe the procedures to be followed in collecting the test data. Pass/Fail criteria is not specified here because of the nature of this evaluation. Determining such criteria is one of the objectives of this evaluation testing.



2.0 Applicable Documents

Inc 2C CONOPs v0.8 dated 9/28/2004

Raytheon US VISIT RFID Evaluation Testing Safety Procedures, dated 11/10/2004



3.0 Test Facility and Equipment

Primary testing is to be performed in the test evaluation facility described below.

3.1 Test Facility Description

The RFID test lanes are sited at the northern most edge of the parking lot behind the Raytheon facility at 7700 Arlington Blvd, Falls Church, VA. The test site is approximately 1000 feet from end to end and runs in an approximately East-West direction. The track has two lanes to accommodate two vehicles driving side by side for the length of the track, each lane being 14 feet wide, with an approximately 4 foot median between lanes. The test lanes are enclosed on two sides by concrete jersey barriers that extend the full length of the track with openings for cars to enter and exit at each end.

The tag detection area, depicted in Figure F3-1, begins approximately 500 feet from the start of the track and is approximately 100 feet in length. In the tag detection area, the median area is separated from the traffic lanes by concrete wheel stops.

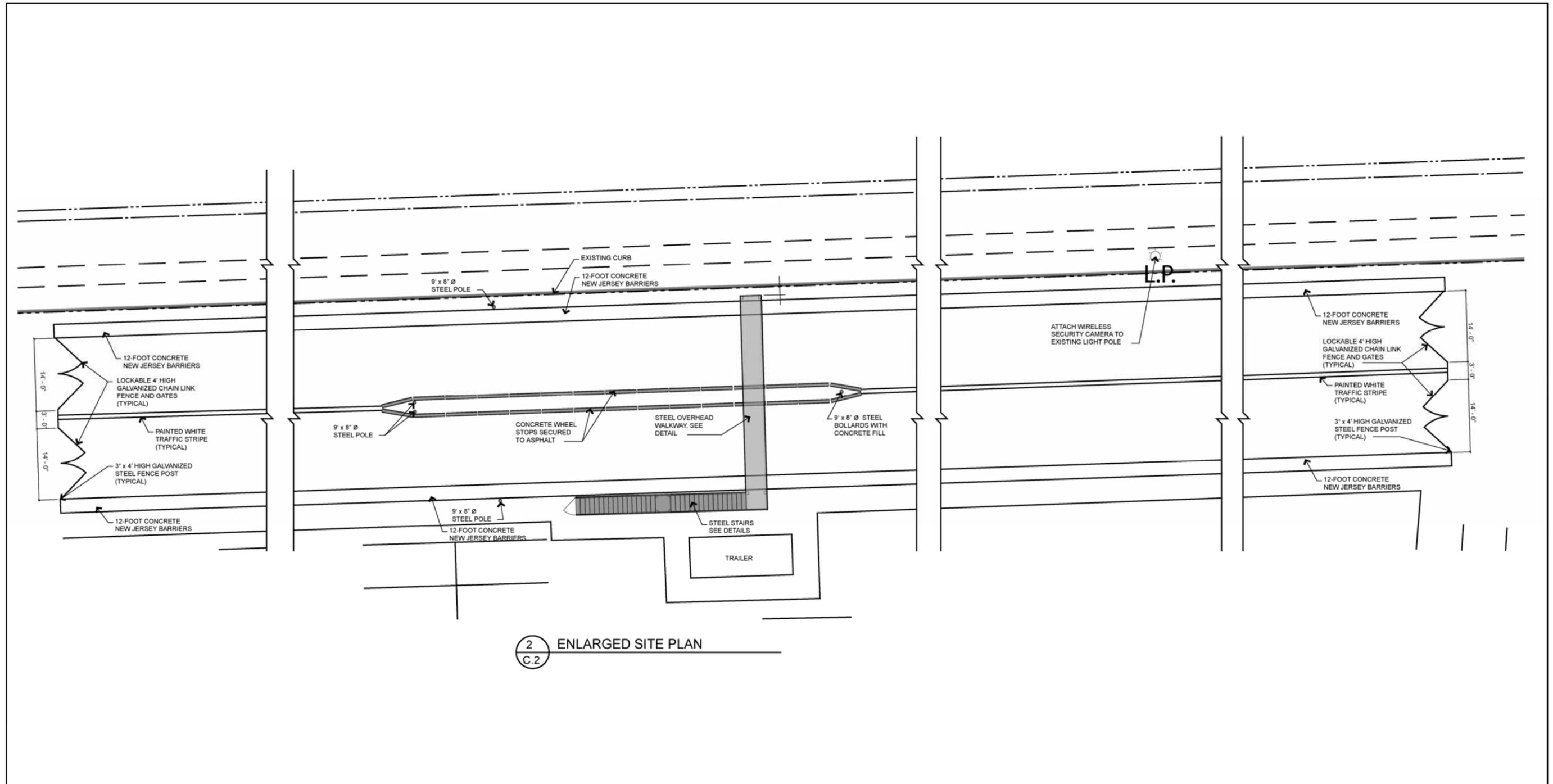


Figure F3-1 Test Lane Tag Detection Area - Plan

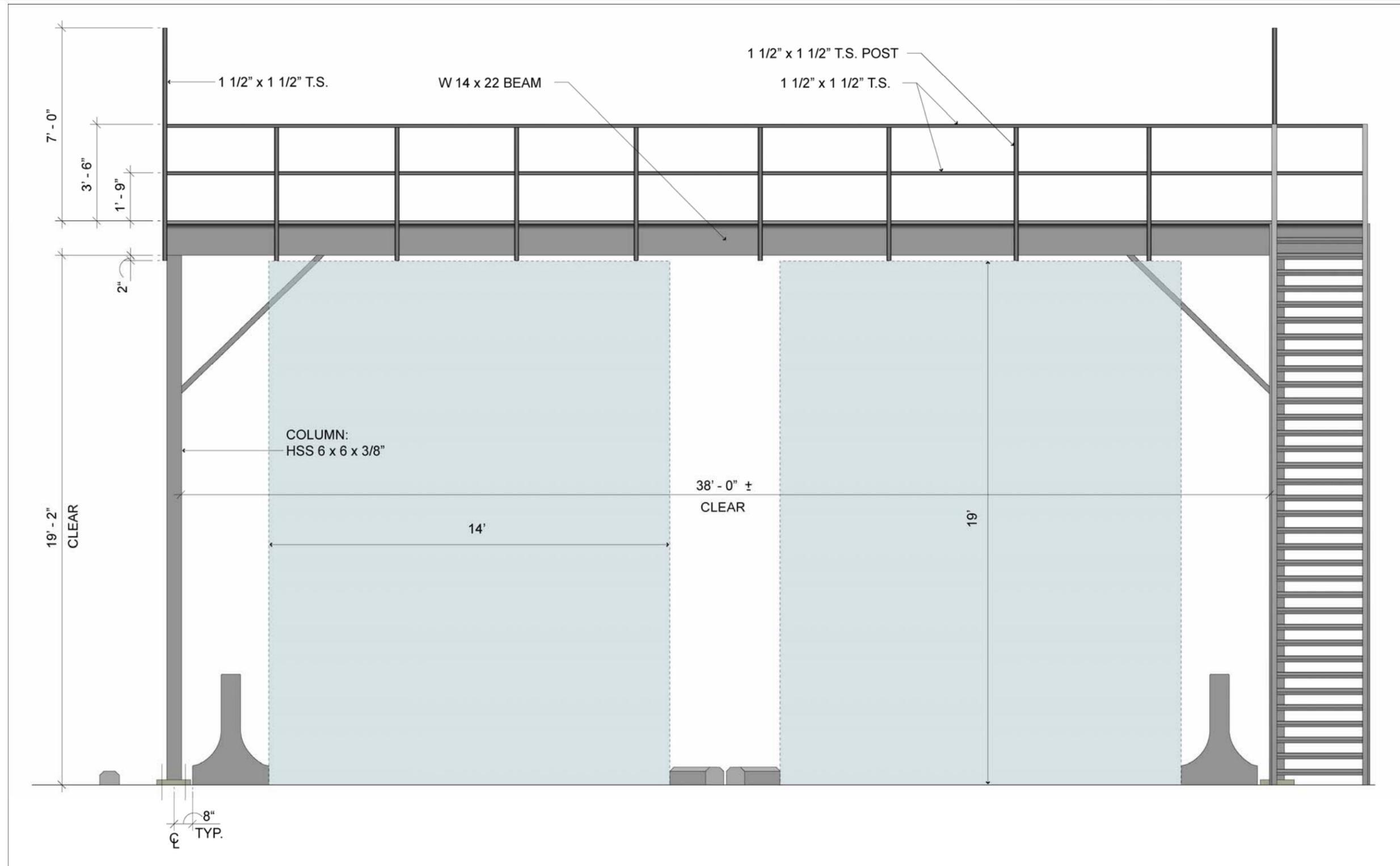


Figure F3-2 Detail of Overhead Structure - Elevation Looking East



A steel gantry is located at the midpoint of the test site. Figure F3-2 depicts the steel gantry elevation view. The steel gantry supports antenna and reader equipment that will be oriented to look down on vehicles as they pass underneath the bridge. The platform also carries the conduit for the power and data cable to these antennas/readers as well as for others that are located in the median area farther down the track. The platform has approximately 19 feet of ground clearance over the test site, as indicated in the figure. The platform includes a steel walk way overhead to access the antennas/readers. The walkway is accessed by a stairway on the south side of the track.

Two steel light poles are fixed approximately 50 feet from the centerline of the overhead platform, one on each outside edge of the test lanes. Two additional steel poles are located in the median area approximately 16 feet beyond the first two poles. These poles will support antennas/readers that illuminate toward the vehicles.

A construction office trailer is located near the platform area. This trailer contains the computers used to administer, collect, save and analyze the test data. The director for the test operations will oversee the tests from the trailer and observe test operations from that position through windows in the trailer. The test director will be in radio communication with all drivers during the tests. Video cameras and monitors are also provided to monitor activities.

A fence separates the test site area from the general parking lot. A five foot wide walkway area is provided between the fence and the jersey barriers along the full length of the test site.

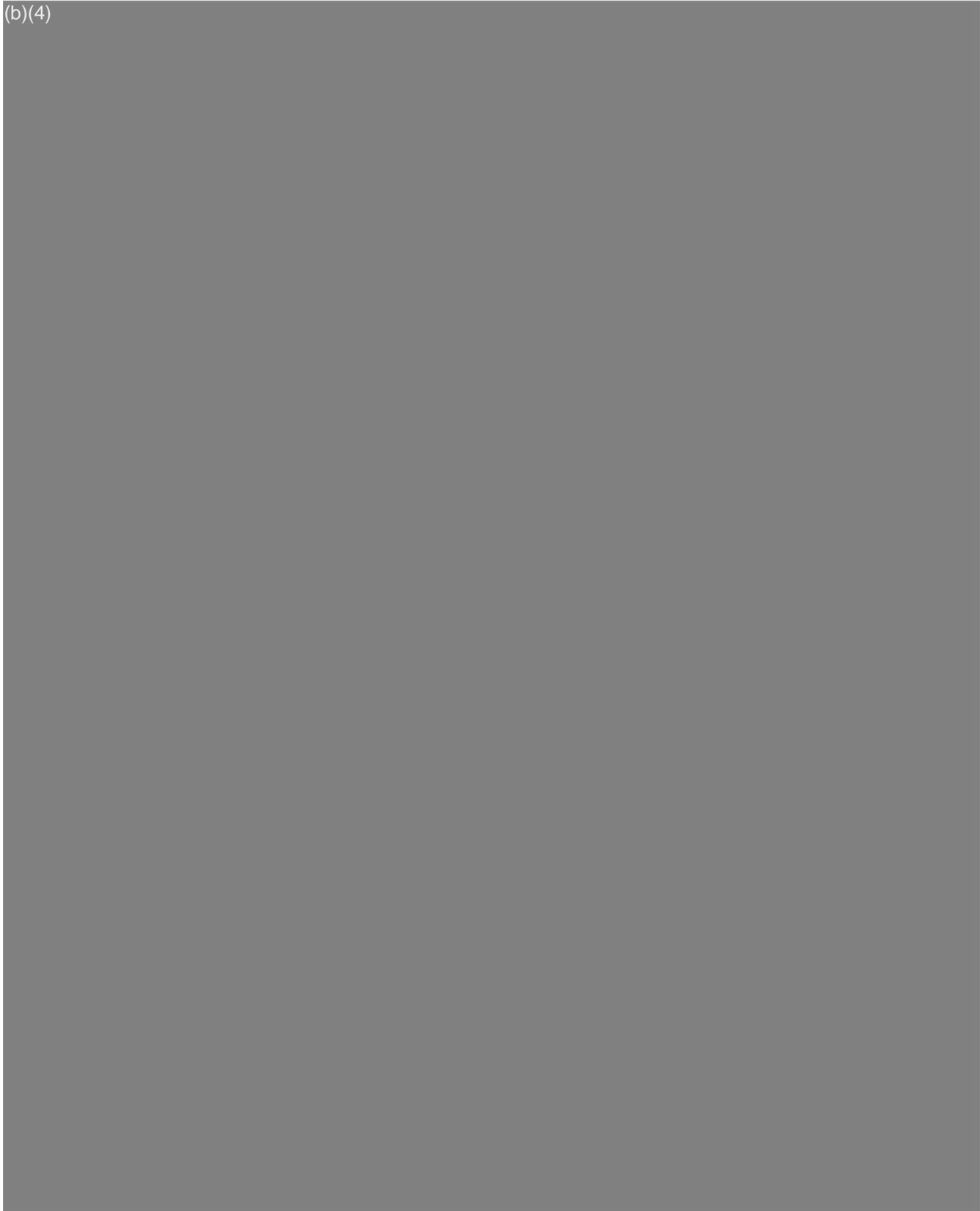
3.2 General Test Equipment

The general test equipment required for this procedure is as follows:

| | |
|----------------------------------|-----------------|
| Network/Spectrum Analyzer | Agilent 4396B |
| Low-noise Preamplifier | HP 87405A |
| Reflection/Transmission Test Set | HP _____ |
| Adjustable Dipole Antenna | Singer DM 105T3 |



(b)(4)





(b)(4)





4.0 Procedures

Testing will include testing of vendor supplied systems in various configurations and for different use conditions as contained described below. Refer to Appendix A for (b)(4) Test Set-up and to Appendix B for (b)(4) Test Set-up for Vendors under evaluation.

4.1 RFID Performance Test Approach

Predefined testing configurations will be executed repeatedly to quantify the performance of each vendor's equipment for a wide variety of use cases and for three configurations of the supplied RFID reader systems. The test cases will consist of permutations of the following use conditions:

1. Vehicle speed 20, 30, 40 or 50 mph
2. Orientations/Location Face front, windshield sleeve, face side, oblique, 90 degrees or dash and back deck, passive use (driver pocket, glove box, three empty passenger seats).
3. Window Tint No tint or with a metallic tint
4. Passengers 2 or 5 (same number of passengers in each vehicle, if more than one)
5. Number of vehicles 1 or 2
6. Vehicle type Passenger car (sedan), truck or bus (with 36 tags)
7. Tag Type Label on emigration's I-94 form (simulated) or ID card
8. Tag to tag variability Performed for each of the two tag types
9. Tag Handling Proper and with a finger/thumb overlapping the tag's antenna

In addition, as weather permits, operation under inclement conditions will be included. That is, testing will continue under adverse conditions, as long as the Falls Church facility is open and travel conditions in the test lanes are safe.

The RFID reader system configurations to be tested are as follows:

1. Readers and antennas conforming to the FCC's 47 CFR Part 90 rules. That is, systems that operate with a combined effective radiated power (radiated) of up to 30 watts mounted above the travel lanes. This configuration is designated here as an overhead Part 90 configuration.
2. Readers and antennas conforming to the FCC's 47 CFR Part 90 rules, that is mounted on opposite sides of the travel lanes. This configuration is designated here as a side Part 90 configuration.
3. Readers and antennas conforming to the FCC's 47 CFR Part 15 rules. That is, systems that operate with a combined effective radiate power (radiated) of up to 4 watts mounted on opposite sides of the travel lanes. This configuration is designated here as a side Part 15 configuration.

Note: See Appendix A or B for appropriate Vendor Set-ups.

Because of the large numbers of permutations represented by the combination of the use parameters and the system configurations, it will not be appropriate to test all possible permutations. Rather, a representative selection of approximately two percent of the all possible permutations was made. A test matrix of the selected permutations to be tested is provided in Appendix C. Further, a software application is provide to assist in the execution of this test procedure and to automate the collection of the test data. It is described in Appendix D.



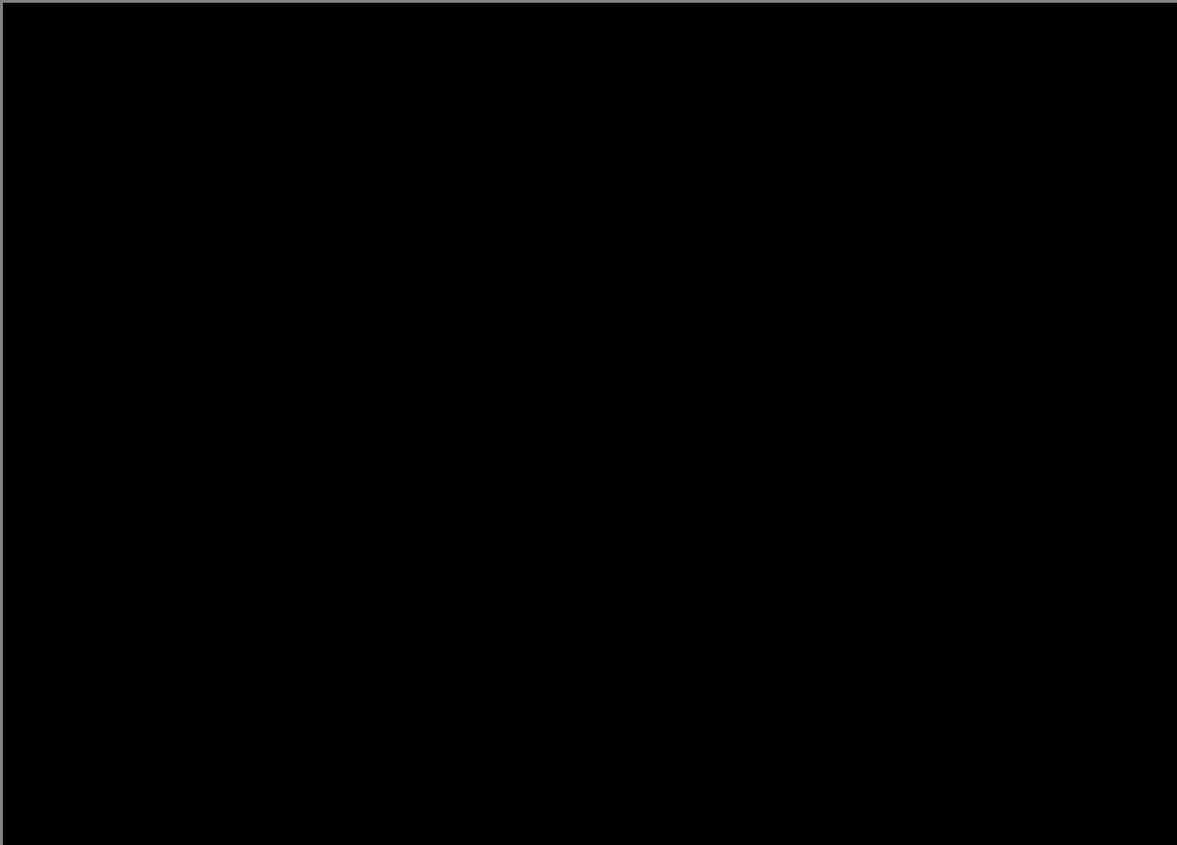
It is noted that systems operated under Part 90 of the FCC rules require site licenses. For the purposes of these tests, an experimental license under 47 CFR Part 5 covering the equipment and Part 90 power levels under test is substituted and will be in place before testing commences.

4.2 Ambient and Active Spectrum Scan Approach

A relative measurement of the ambient RF power level in the vicinity of the test facility over the 902 to 928 MHz frequency band of operation will be obtained before the test as described in the Test Procedures Section 4.4.2, below. The equipment required for the spectral scan measurements and its setup is given in Figure F4-1.

Data will be collected for two principal polarizations: vertical and horizontal. Data will also be collected with the dipole oriented to point its peak directional gain at two orthogonal orientations: North-South and East-West. The spectral scans will be collected and stored to the Network/Spectrum Analyzer's disk in both graphic and tabular formats. The antenna will be placed approximately 10 meters from the southern end of the overhead gantry platform with the antenna mounted on a non-metallic tripod at approximately seven feet above ground level.

(b)(4)





4.2.1 RFID Performance Data Collection

A test run has the following configuration data associated with it:

- Test Configuration ID
- Configuration run number
- Number of vehicles
- The lane assignment of each vehicle
- Assigned speed
- Enrolled tag serial numbers (Tag ID)
- Vehicle assignment of tags
- Seat assignment of tags
- The following parameters are the same for all tags in a particular run
 - Tag type (label or ID card)
 - Orientation of tags (front, side, oblique)
 - Handling of tags (nominal, finger overlap, passive use)
 - Location of tags (handheld, windshield sleeves [front and rear], dash and back deck)
 - The vehicle type (sedan, truck, bus)
 - Special test conditions (in a Comment field)

Data to be collected into the test database by the collection software from each run is as follows:

- Run data defined above
- Start time
- End time
- Measured speed (at entry to read area, per vehicle)
- Weather conditions (dry, rain, heavy rain, snow, heavy snow)
- Tag events which consist of the following data items:
 - Tag ID
 - The reader (and antenna, if multiplexed) from which the read occurred
 - Event Time stamp
- Comment

4.2.2 Tag Enrollment

The individual tags to be used in testing will be enrolled before use. This enrollment consists of using a desktop RFID reader installation (reader and antenna), provided as part of a vendor's test system, to read a tag's unique code, commonly designated its EPC (electronic product code). This code is assigned to a predetermined location in the test vehicle that carries it by the enrollment function of the Raytheon Test Director and Data Collection (TDDC) application. That is, the EPC is read and stored in a database record associated with the seat, vehicle and unique run number for the evaluation test. The tag is given a sequential number to use in future references of the tag. This 'friendly' number is indelibly marked on the face of the tag at the time of enrollment to aid in configuring the required conditions during testing.

The tags are automatically assigned by the TDDC to a vehicle and seat designation in the test configurations in sequential order as a default condition. The TDDC permits the assignment and reassignment of a tag to any role (e.g. run, seat, vehicle, etc.) during testing. Further, a particular tag may or may not be reused in more than one test run. The assigned role is marked directly onto the face of the tag for future reference. However, once assigned, it will be policy to use a



particular tag in only one role during testing. That is, it will not be reused in a different seat or vehicle from that initially assigned. This is done to avoid confusion, though this is not a requirement of either the RFID reader equipment or of the tags. If a tag is reused, its previously assigned friendly number is used to make the assignment in the database via a function of the TDDC. This is done without requiring the tag's EPC to be reread, though provision is made to verify the correct enrollment of tags by rereading them at the enrollment reader, as required.

4.3 Test Procedures

4.3.1 RFID Performance Test Procedures

At the beginning of each test day, the test equipment is to be inspected, powered on and checked out. The test director is responsible to review the sequence of tests to be conducted for that day with the test personnel (drivers, passengers, test software operators). An in-vehicle operation's coordinator will be designated for each vehicle for the duration of the current test session.

The test site, safety equipment and other test related equipment are also to be inspected before each test session, at a minimum twice daily.

In addition, periodically during the day and at the end of the day, all data is to be collected and log entries for the day were copied to backup storage.

Figure F4-2 illustrates the numbering for the designation of passenger seat positions (tags) in vehicles during test runs.

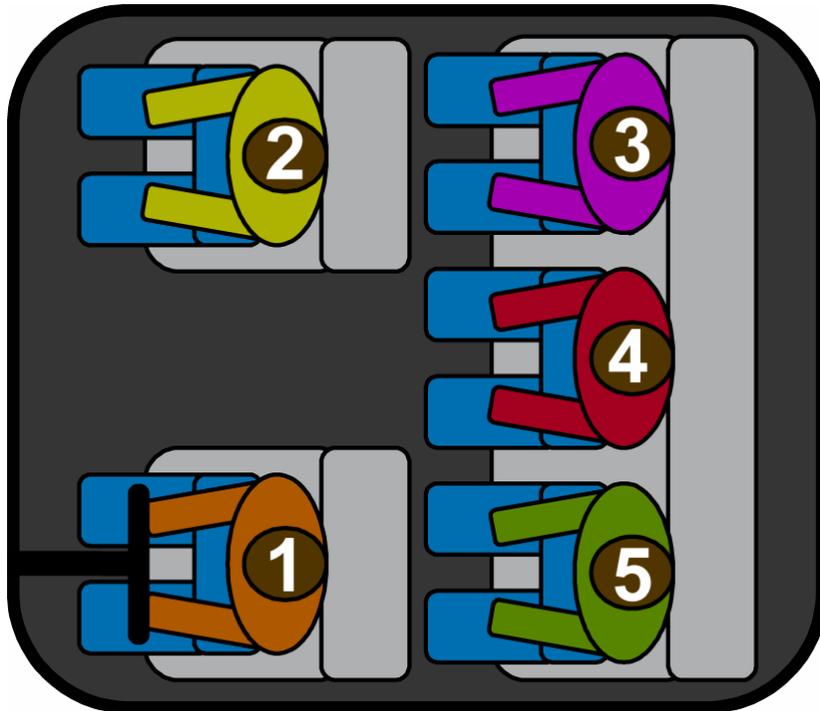


Figure F4-2 Seat (Tag) Numbering in Vehicles.

Figure F4-3 illustrates the positioning of tags in window mounted plastic sleeve for the tests designated to use this type of tag presentation. Figure F4-4 illustrates the placement for testing the passive use tags.

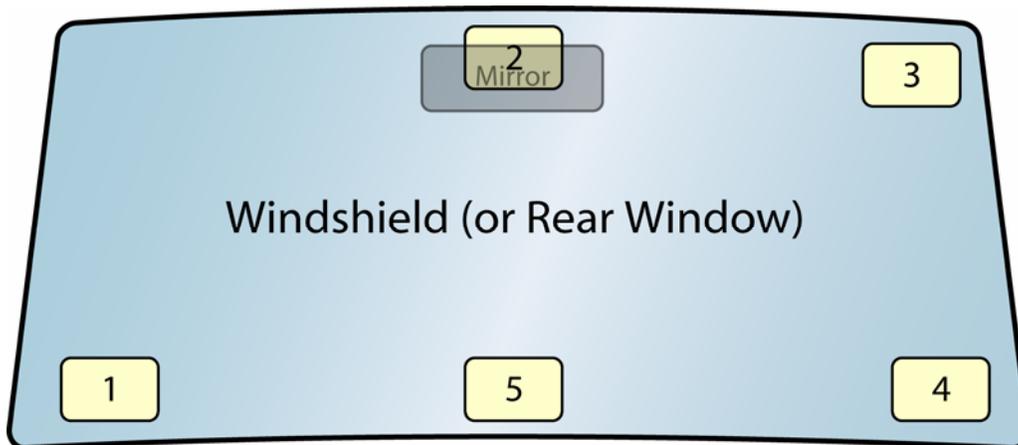


Figure F4-3 Tag placement in Window Sleeves.

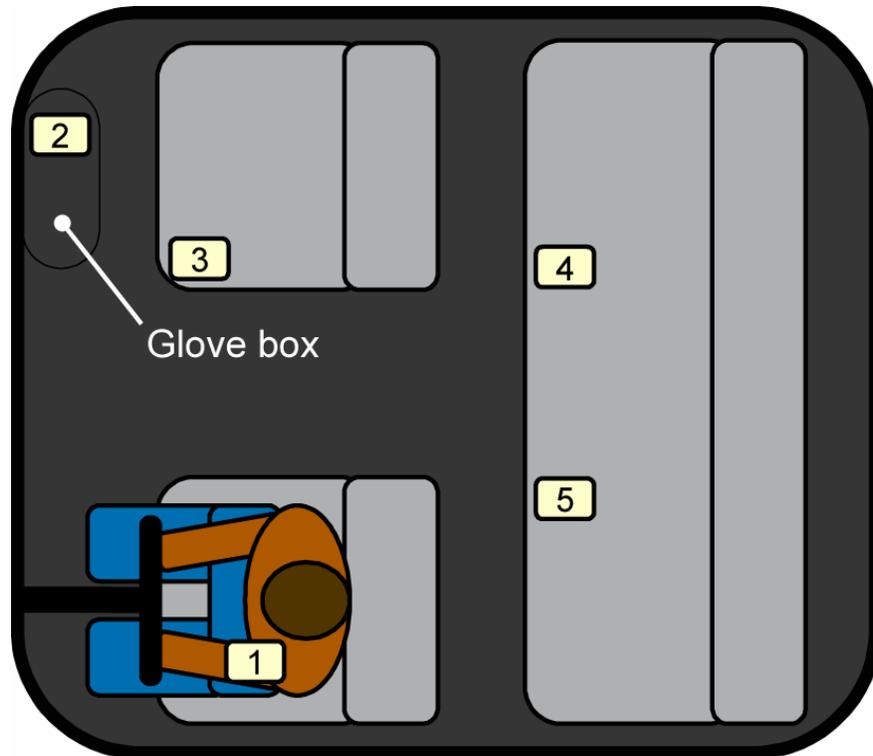


Figure F4-4 Tag Placement for Passive Use Case

Figure F4-5 illustrates the various conditions for holding the (b)(4) ID card type tag by the driver and passengers in the vehicle. Figure F4-6 presents the conditions for holding the (b)(4) tags, either in the ID card format or the label affixed to an I-94 and inserted into the simulated passport. Figures C4-7 and C4-8 provide the same information for the (b)(4) ID Card and label type tags

The overall procedure for each individual test run is as follows:

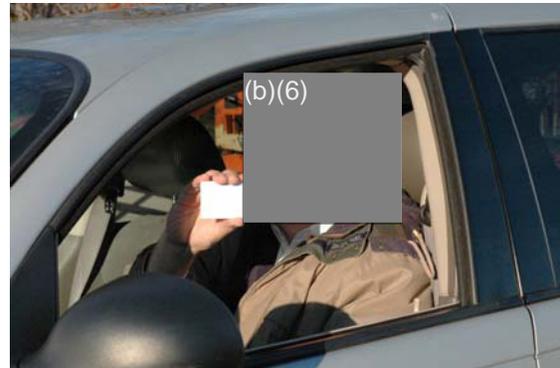
1. The test director selects the next test condition, assisted by the computer automated Test Director and Data Collection (TDDC) application.
2. The test director notes current weather condition and adjusts the default condition indicated in the TDDC
3. The test director announces the test ID number and reviews the key features of the test with driver(s) and passenger(s) via the radio link. As a minimum, the following will be confirmed before the initiation of a test run:
 - a. Tag presentation method
 - b. Number of tags in vehicle
 - c. Friendly ID number and relative position of each tag(Friendly ID referring to being a previously enrolled tag)
 - d. Intended vehicle speed
 - e. Any special conditions designated for that test configuration



4. Each vehicle coordinator (generally the front seat passenger) confirms that all personnel understand their current action and are ready for commencement of the run.
5. Upon readiness confirmation from vehicle(s), the test director confirms that the track is clear and safe for the test to commence.
6. The test director switches the track signal light from red to green when safety is confirmed.
7. The test director initiates the test by verbal order to the vehicle operators.



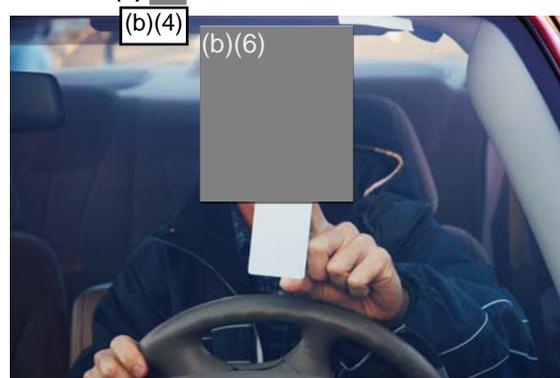
(a) Normal Face Front - Driver



(b) Normal Face Side - Driver



(c) Oblique Hold - Driver



(d) Turned 90° - Driver

(b)(4)

(b)(4)

Figure F4-5 Conditions for Presentation of Tag



(e) Normal Face Front - Front Passenger



(f) Normal Face Side - Front Passenger



(g) Oblique Hold - Front Passenger

(b)(4)



(h) Turned 90° - Front Passenger

(b)(4)

Figure F4-5 Conditions for Presentation of Tag (continued)



(i) Normal Face Front – Rear Side Passenger



(j) Normal Face Side – Rear Side Passenger



(k) Oblique Hold – Rear Side Passenger



(l) Turned 90° – Rear Side Passenger

(b)(4)

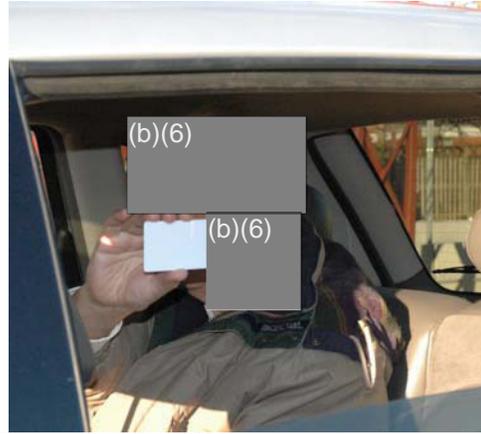
(b)(4)

Figure F4-5 Conditions for Presentation of Tag (continued)



(m) [redacted] Normal Face Front – Rear Center Passenger

[redacted] (b)(4)



(n) [redacted] Normal Face Side – Rear Center Passenger

[redacted] (b)(4)



(o) [redacted] Oblique Hold – Rear Center Passenger

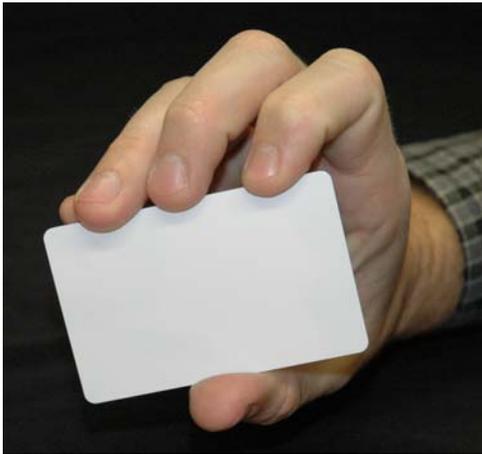
[redacted] (b)(4)



(p) [redacted] Turned 90° – Rear Center Passenger

[redacted] (b)(4)

Figure F4-5 Conditions for Presentation of Tag (continued)



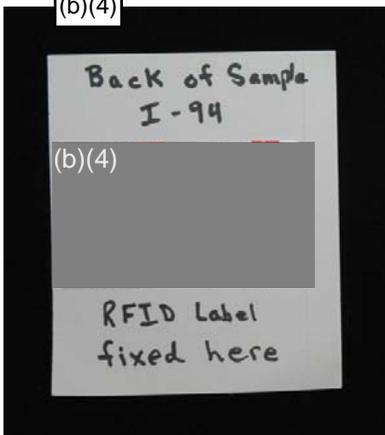
(a) Normal Card Holding

(b)(4)



(b) ID Card Finger Overlap

(b)(4)



(c) Label and I-94



(d) Label/I-94 in Passport

(b)(4)



(e) Normal I-94/Passport Holding

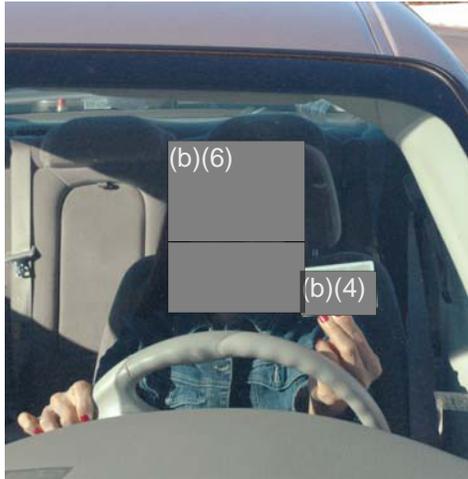
(b)(4)



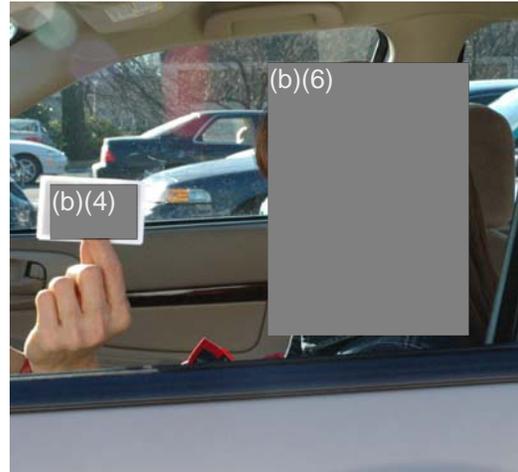
(f) Finger Overlap I-94/Passport Holding

(b)(4)

Figure F4-6 Conditions for Handling of Tag



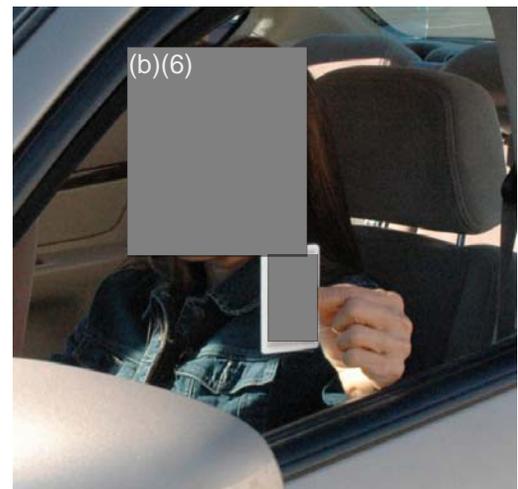
(a) (b)(4) Normal Face Front - Driver



(b) (b)(4) Normal Face Side - Driver

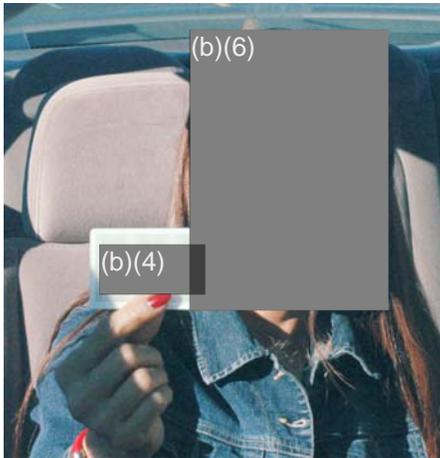


(c) (b)(4) Oblique Hold - Driver

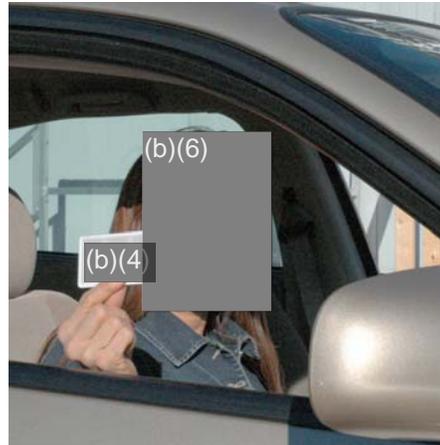


(d) (b)(4) Turned 90° - Driver

Figure F4-7 Conditions for Presentation of Tag - (b)(4)



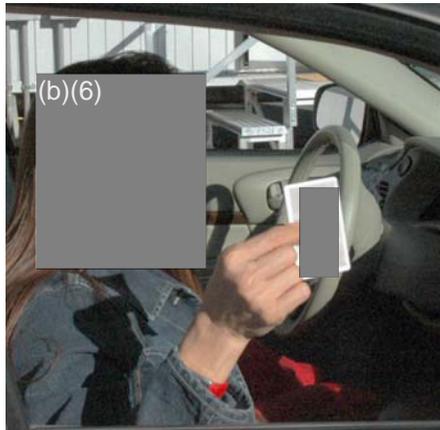
(e) (b)(4) Normal Face Front – Front Passenger



(f) (b)(4) Normal Face Side - Front Passenger

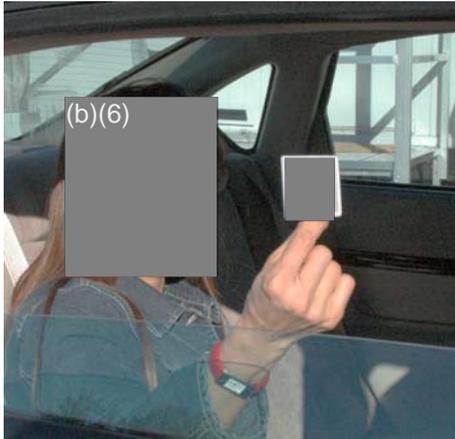


(g) (b)(4) Oblique Hold - Front Passenger

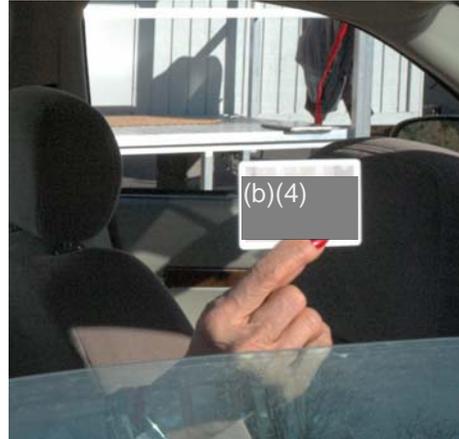


(h) (b)(4) Turned 90° - Front Passenger

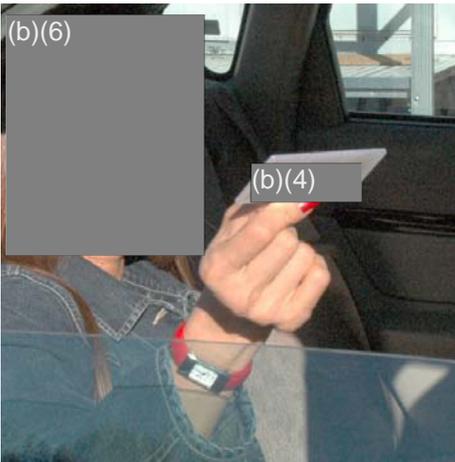
Figure F4-7 Conditions for Presentation of Tag - (b)(4) (continued)



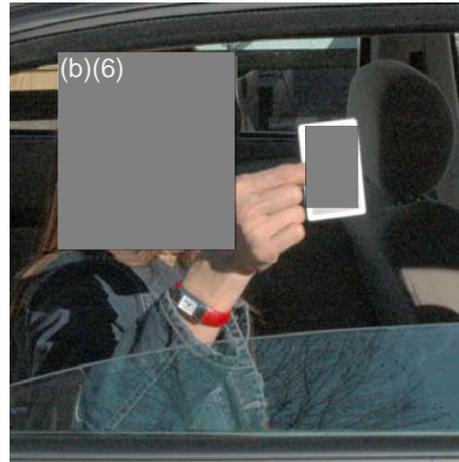
(i) (b)(4) *Normal Face Front – Rear Side Passenger*



(j) (b)(4) *Normal Face Side – Rear Side Passenger*



(k) (b)(4) *Oblique Hold – Rear Side Passenger*

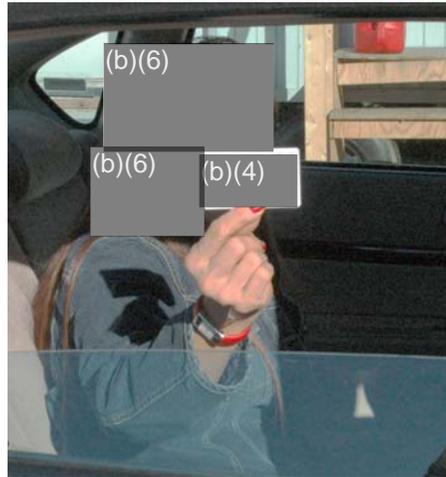


(l) (b)(4) *Turned 90° – Rear Side Passenger*

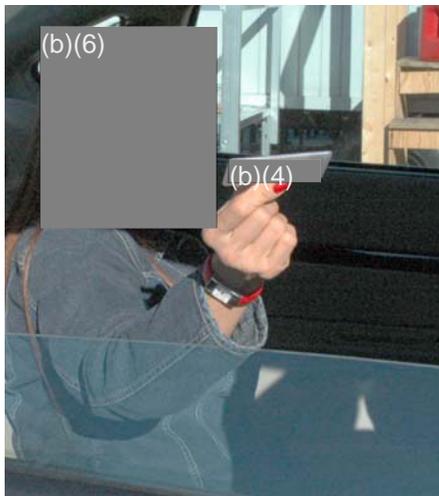
Figure F4-7 Conditions for Presentation of Tag - (b)(4) (continued)



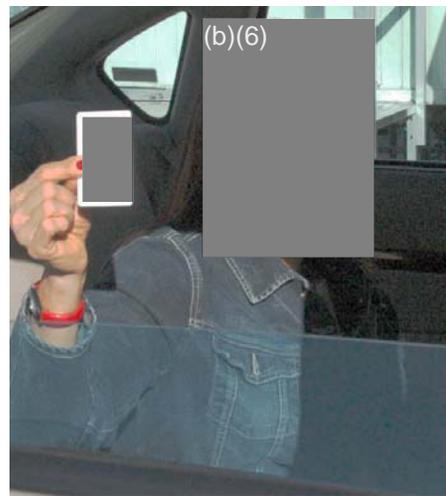
(m) (b)(4) Normal Face Front – Rear Center Passenger



(n) (b)(4) Normal Face Side – Rear Center Passenger

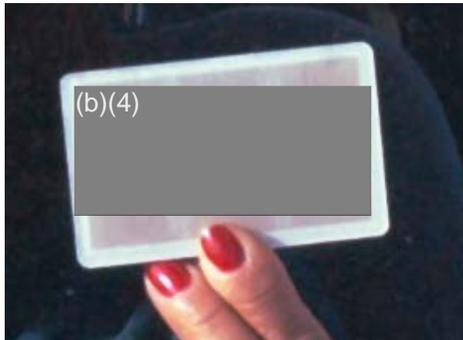


(o) (b)(4) Oblique Hold – Rear Center Passenger

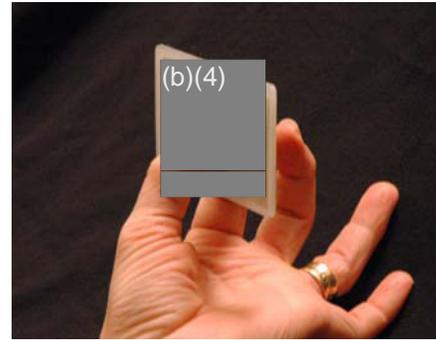


(p) (b)(4) Turned 90° – Rear Center Passenger

Figure F4-7 Conditions for Presentation of Tag - (b)(4) (continued)



(a) (b)(4) Normal ID Card Holding



(b) (b)(4) ID Card Finger Overlap



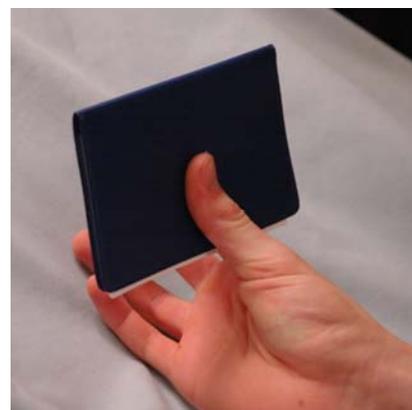
(c) (b)(4) Label and I-94



(d) (b)(4) Label/I-94 in Passport



(e) I-94/Passport Holding



(f) (b)(4) Finger Overlap I-94/Passport Holding

Figure F4-8 Conditions for Handling of Tag - (b)(4)



8. The driver(s) proceed down the track, accelerating to reach the intended speed, as indicated by the speed detection device displays, holding it until clearing the designated tag detection area. For test configurations where two vehicles are used, both vehicles are required to enter the tag detection area at approximately the same time or the run will be invalidated and that test run repeated.
9. After the vehicles exit the detection area, they are to slow and stop before exiting the track area. Then they return to the starting point via the return lane provided.
10. The test director confirms the “as tested” configuration with the in-vehicle operation’s coordinator(s) following the vehicle’s return to the start location. In particular, as a minimum, confirmation of indicated speed entering the detection area, the proper presentation of tags and, in cases where two vehicles are used, the relative position between vehicles, will be confirmed and deviations noted in the comments section of the data collection screen of the TDDC.
11. The procedure continues at Step 1 until all test configurations and planned evaluation conditions are completed.

The details of the configuration for each test configuration are given in below. Except for the configurations assigned as TBD, these conditions are to be applied equally to both vendors. Also, note that individual test conditions which are different between successive runs are indicated by the items shown in red.

Additional data, such as personnel in attendance and there duties will be noted in a test log, which is to be kept throughout the course of testing. In particular, the personnel in each vehicle and their seating will be noted.



4.4.1.1 Test Configuration 1

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 5 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.2 Test Configuration 2

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 5 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.3 Test Configuration 3

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 5 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.4 Test Configuration 4

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 5 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.5 Test Configuration 5

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.6 Test Configuration 6

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.7 Test Configuration 7

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.

4.4.1.8 Test Configuration 8

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.



4.4.1.9 Test Configuration 9

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.

4.4.1.10 Test Configuration 10

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.



4.4.1.11 Test Configuration 11

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 50 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.

4.4.1.12 Test Configuration 12

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 50 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.



4.4.1.13 Test Configuration 13

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Maximum safe speed for truck

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 2 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 1 |
| Vehicle Type: | TRUCK |
| Vehicle Speed: | 35 |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.14 Test Configuration 14

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Maximum safe speed for truck

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 2 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 1 |
| Vehicle Type: | TRUCK |
| Vehicle Speed: | 35 |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.15 Test Configuration 15

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: One Sedan and one truck. Maximum safe speed for truck

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 4 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN & TRUCK |
| Vehicle Speed: | 35 |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.16 Test Configuration 16

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: One Sedan and one truck. Maximum safe speed for truck

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 4 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN & TRUCK |
| Vehicle Speed: | 35 |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.17 Test Configuration 17

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face tag pointing downward approx 45° and halfway between front and side direction at nearest side window, see Figure 4.5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.18 Test Configuration 18

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Best of Front or Side, but axis of tag rotated 90 degrees

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face toward 'best' direction with LONG axis of tag vertical |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.19 Test Configuration 19

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Laid on FRONT DASH (2) & REAR WINDOW DECK (3) |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.20 Test Configuration 20

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Windshield top left, top center, top right, bottom right, bottom left

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|-------------------|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | In WINDOW sleeves |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.21 Test Configuration 21

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Rear window top left, top center, top right, bottom right, bottom left

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|-------------------|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | In WINDOW sleeves |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.22 Test Configuration 22

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL (as defined by vendor), see Figure F4-6 |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.23 Test Configuration 23

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL (as defined by vendor), see Figure F4-6 |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.24 Test Configuration 24

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Passive use, Driver pocket, front seat, glovebox, two rear seat

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Driver pocket, glove box, front passenger seat, and two rear seats |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.25 Test Configuration 25

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Passive use, Driver pocket, front seat, glovebox, two rear seat

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Driver pocket, glove box, front passenger seat, and two rear seats |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.26 Test Configuration 26

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: One Sedan and one Sedan with metallic tinted windows, closed

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|----------------|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.27 Test Configuration 27

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: One Sedan and one Sedan with metallic tinted windows, ajar

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|----------------|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.28 Test Configuration 28

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: 35 to 50 passengers (tags)

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | #VALUE! |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | |
| Number of Vehicles: | 1 |
| Vehicle Type: | |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.29 Test Configuration 29

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: 35 to 50 passengers (tags), Top speed on track TBD

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | #VALUE! |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | |
| Number of Vehicles: | 1 |
| Vehicle Type: | |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.30 Test Configuration 30

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: 35 to 50 passengers (tags)

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | #VALUE! |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | |
| Number of Vehicles: | 1 |
| Vehicle Type: | |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.31 Test Configuration 31

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: 35 to 50 passengers (tags), Top speed on track TBD

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | #VALUE! |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | |
| Number of Vehicles: | 1 |
| Vehicle Type: | |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.32 Test Configuration 32

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.33 Test Configuration 33

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.34 Test Configuration 34

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.



4.4.1.35 Test Configuration 35

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.

4.4.1.36 Test Configuration 36

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.



4.4.1.37 Test Configuration 37

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.

4.4.1.38 Test Configuration 38

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 50 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.



4.4.1.39 Test Configuration 39

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 50 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 10 times.

4.4.1.40 Test Configuration 40

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 5 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.41 Test Configuration 41

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 5 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.42 Test Configuration 42

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: Not used

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--------------|
| Tag Type: | _____ |
| Total Number of tags: | _____ |
| Tag Orientation: | |
| Tag Location: | |
| Tag Handling: | |
| Passengers per vehicle: | |
| Number of Vehicles: | |
| Vehicle Type: | |
| Vehicle Speed: | |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of times.



4.4.1.43 Test Configuration 43

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face tag pointing downward approx 45° and halfway between front and side direction at nearest side window, see Figure 4.5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.44 Test Configuration 44

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Best of Front or Side, but axis of tag rotated 90 degrees

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face toward 'best' direction with LONG axis of tag vertical |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.45 Test Configuration 45

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Laid on FRONT DASH (2) & REAR WINDOW DECK (3) |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.46 Test Configuration 46

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Windshield top left, top center, top right, bottom right, bottom left

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|-------------------|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | In WINDOW sleeves |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.47 Test Configuration 47

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Rear window top left, top center, top right, bottom right, bottom left

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|-------------------|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | In WINDOW sleeves |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.48 Test Configuration 48

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL (as defined by vendor), see Figure F4-6 |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.49 Test Configuration 49

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL (as defined by vendor), see Figure F4-6 |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.50 Test Configuration 50

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Passive use, Driver pocket, front seat, glovebox, two rear seat

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Driver pocket, glove box, front passenger seat, and two rear seats |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.51 Test Configuration 51

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Passive use, Driver pocket, front seat, glovebox, two rear seat

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Driver pocket, glove box, front passenger seat, and two rear seats |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.52 Test Configuration 52

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Extended runs to test tag to tag variability within tag type

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|----------------|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 4 times.



4.4.1.53 Test Configuration 53

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: Extended runs to test tag to tag variability within tag type

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|----------------|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 4 times.

4.4.1.54 Test Configuration 54

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: One Sedan and one Sedan with metallic tinted windows, closed

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|----------------|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.55 Test Configuration 55

System: Equipment for OVERHEAD Part 90 and SIDE Part 90

Special Parameter(s) or Comment: One Sedan and one Sedan with metallic tinted windows, ajar

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|----------------|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.56 Test Configuration 56

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: Maximum safe speed for truck

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 2 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 1 |
| Vehicle Type: | TRUCK |
| Vehicle Speed: | 35 |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.57 Test Configuration 57

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: Maximum safe speed for truck

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 2 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 1 |
| Vehicle Type: | TRUCK |
| Vehicle Speed: | 35 |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.58 Test Configuration 58

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: One Sedan and one truck. Maximum safe speed for truck

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 4 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN & TRUCK |
| Vehicle Speed: | 35 |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.59 Test Configuration 59

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: One Sedan and one truck. Maximum safe speed for truck

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 4 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN & TRUCK |
| Vehicle Speed: | 35 |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.60 Test Configuration 60

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 2 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.61 Test Configuration 61

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 2 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.62 Test Configuration 62

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 2 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.63 Test Configuration 63

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 2 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.64 Test Configuration 64

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 2 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.65 Test Configuration 65

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 2 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 1 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.66 Test Configuration 66

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 4 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.67 Test Configuration 67

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 4 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 2 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.68 Test Configuration 68

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.69 Test Configuration 69

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.70 Test Configuration 70

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.71 Test Configuration 71

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.72 Test Configuration 72

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.73 Test Configuration 73

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.74 Test Configuration 74

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face tag pointing downward approx 45° and halfway between front and side direction at nearest side window, see Figure 4.5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.75 Test Configuration 75

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face toward 'best' direction with LONG axis of tag vertical |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.76 Test Configuration 76

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Laid on FRONT DASH (2) & REAR WINDOW DECK (3) |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.77 Test Configuration 77

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: Windshield top left, top center, top right, bottom right, bottom left

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|-------------------|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | In WINDOW sleeves |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.78 Test Configuration 78

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: Rear window top left, top center, top right, bottom right, bottom left

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|-------------------|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | In WINDOW sleeves |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.79 Test Configuration 79

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL (as defined by vendor), see Figure F4-6 |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.80 Test Configuration 80

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL (as defined by vendor), see Figure F4-6 |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.81 Test Configuration 81

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: Passive use, Driver pocket, front seat, glovebox, two rear seat

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Driver pocket, glove box, front passenger seat, and two rear seats |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.82 Test Configuration 82

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: Passive use, Driver pocket, front seat, glovebox, two rear seat

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Driver pocket, glove box, front passenger seat, and two rear seats |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.83 Test Configuration 83

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: One Sedan and one Sedan with metallic tinted windows, closed

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|----------------|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.84 Test Configuration 84

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: One Sedan and one Sedan with metallic tinted windows, ajar

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|----------------|
| Tag Type: | ID CARD |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.85 Test Configuration 85

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: One Sedan and one Sedan with metallic tinted windows, closed

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|----------------|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.86 Test Configuration 86

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: One Sedan and one Sedan with metallic tinted windows, ajar

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|----------------|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.87 Test Configuration 87

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.88 Test Configuration 88

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.89 Test Configuration 89

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.90 Test Configuration 90

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 30 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.91 Test Configuration 91

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.92 Test Configuration 92

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.93 Test Configuration 93

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face tag pointing downward approx 45° and halfway between front and side direction at nearest side window, see Figure 4.5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.94 Test Configuration 94

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face toward 'best' direction with LONG axis of tag vertical |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.95 Test Configuration 95

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Laid on FRONT DASH (2) & REAR WINDOW DECK (3) |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.96 Test Configuration 96

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: Windshield top left, top center, top right, bottom right, bottom left

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|-------------------|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | In WINDOW sleeves |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.97 Test Configuration 97

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: Rear window top left, top center, top right, bottom right, bottom left

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|-------------------|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | In WINDOW sleeves |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.98 Test Configuration 98

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward FRONT of vehicle, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL (as defined by vendor), see Figure F4-6 |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.99 Test Configuration 99

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: None

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | Face of tag toward nearest SIDE window, see Figure F4-5 |
| Tag Location: | Passenger held |
| Tag Handling: | NORMAL (as defined by vendor), see Figure F4-6 |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

4.4.1.100 Test Configuration 100

System: Equipment for SIDE PART 15

Special Parameter(s) or Comment: Passive use, Driver pocket, front seat, glovebox, two rear seat

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|--|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Driver pocket, glove box, front passenger seat, and two rear seats |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 20 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.



4.4.1.101 Test Configuration 101

System: Equipment for SIDE PART 15

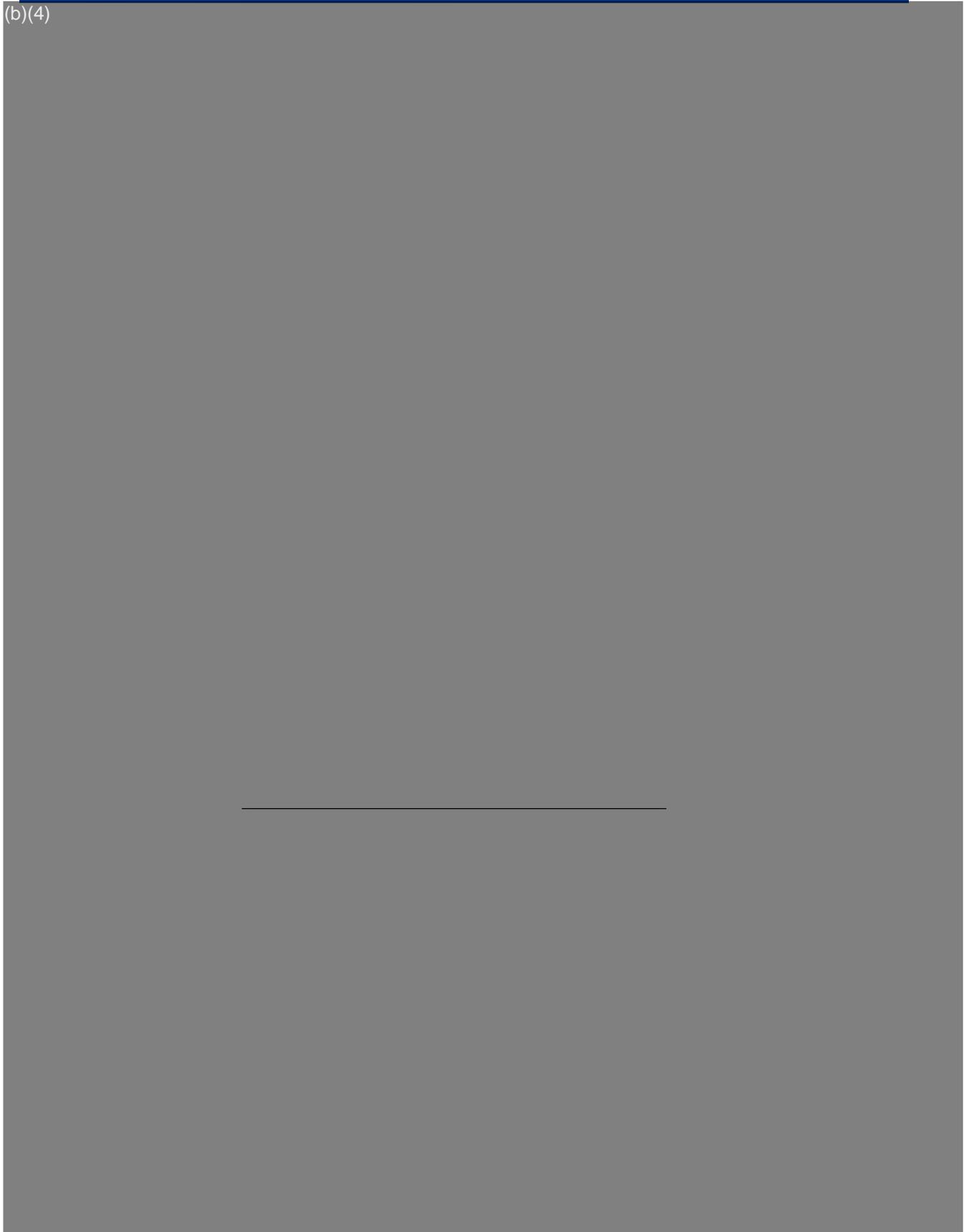
Special Parameter(s) or Comment: Passive use, Driver pocket, front seat, glovebox, two rear seat

| <u>Parameter</u> | <u>Value</u> |
|-------------------------|---|
| Tag Type: | LABEL |
| Total Number of tags: | 10 |
| Tag Orientation: | |
| Tag Location: | Driver pocket, glove box, front passenger seat, and two rear seats |
| Tag Handling: | NORMAL |
| Passengers per vehicle: | 5 |
| Number of Vehicles: | 2 |
| Vehicle Type: | SEDAN |
| Vehicle Speed: | 40 MPH |

Repeat the test sequence as described in 4.4.1 with the listed parameter values a minimum of 5 times.

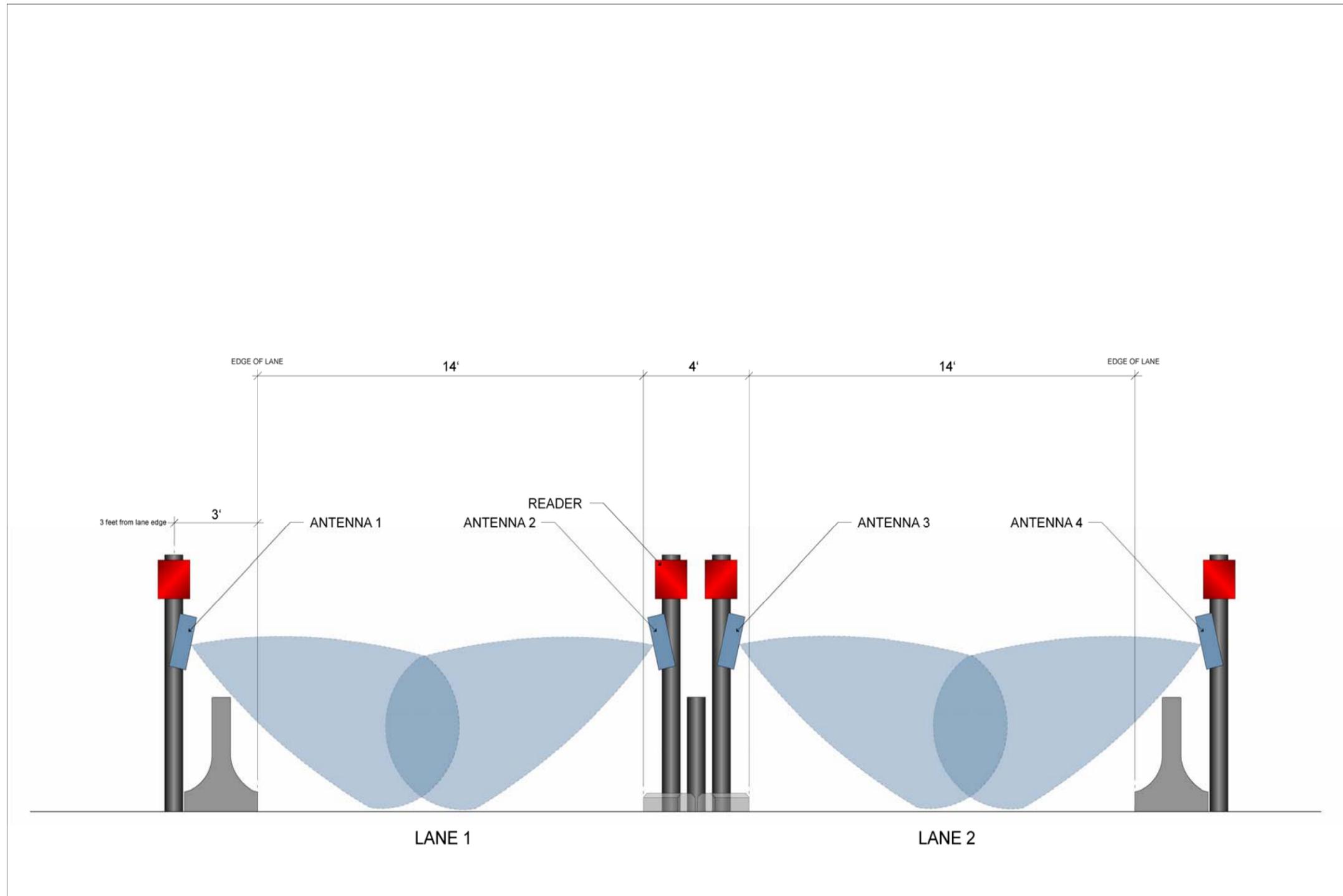


(b)(4)



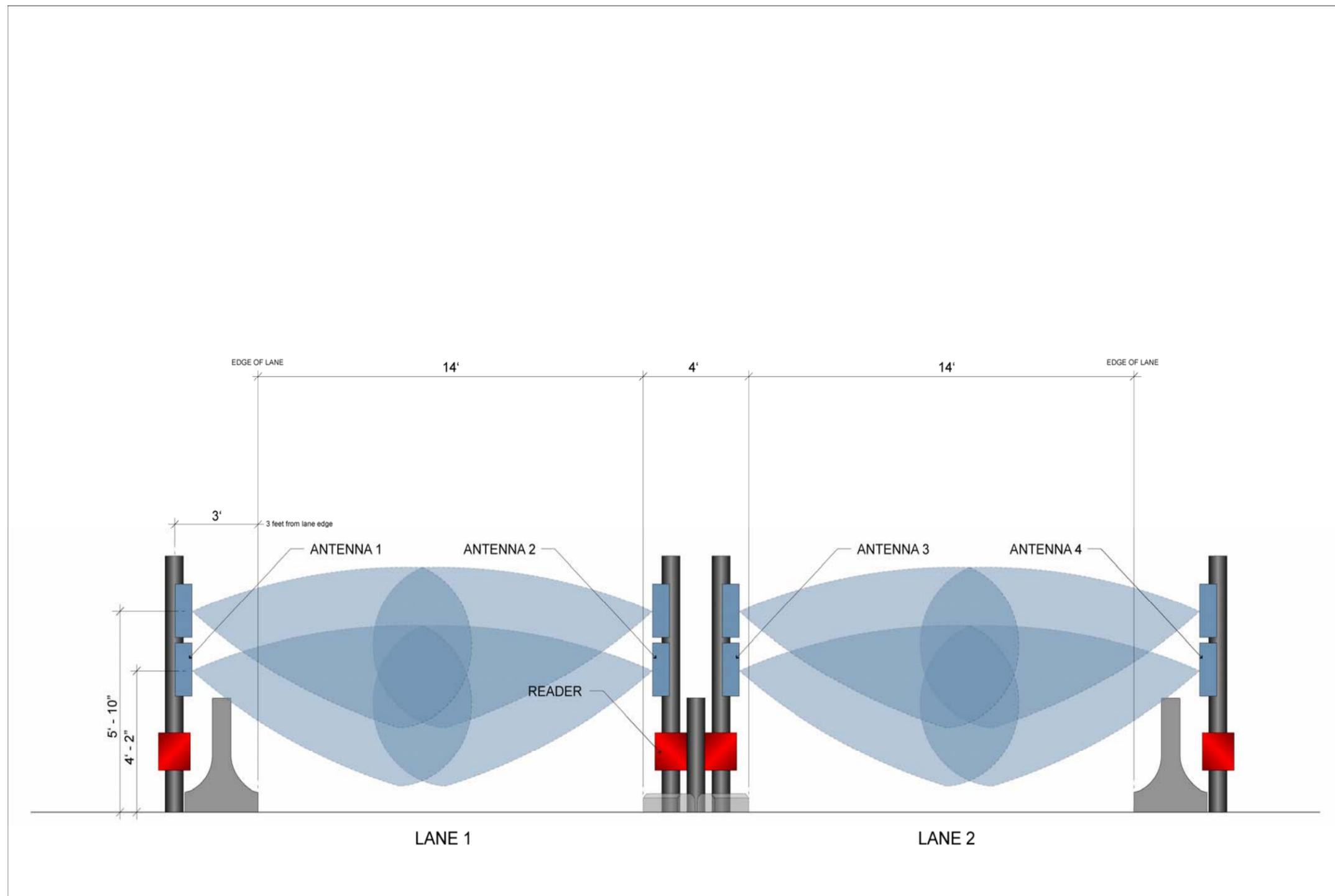


Appendix A: (b)(4)



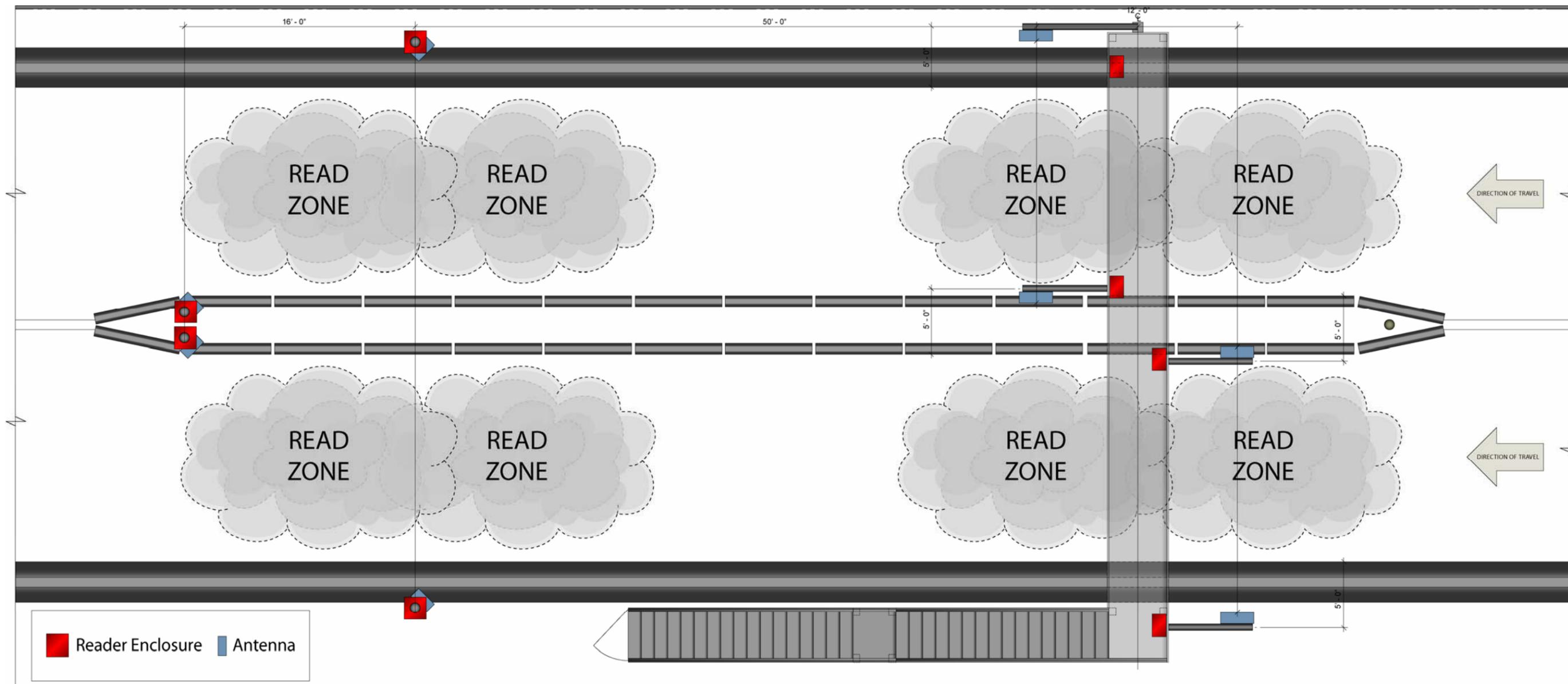
(b)(4)

Part 90 Layout - Elevation



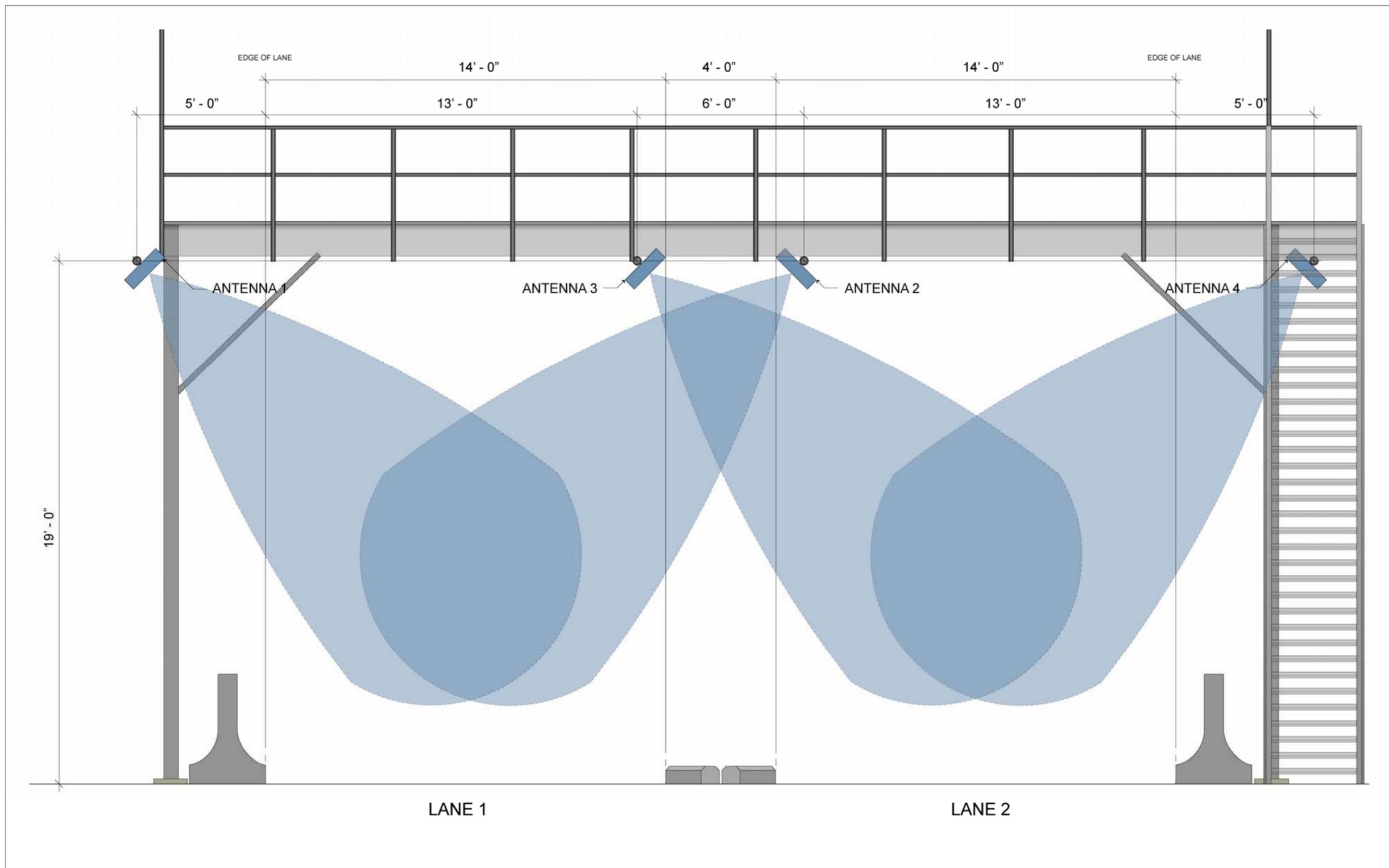
(b)(4)

Part 15 Layout - Elevation



(b)(4)

90 and Side Part 90 Layouts - Plan



(b)(4)

Part 90 Layout - Elevation

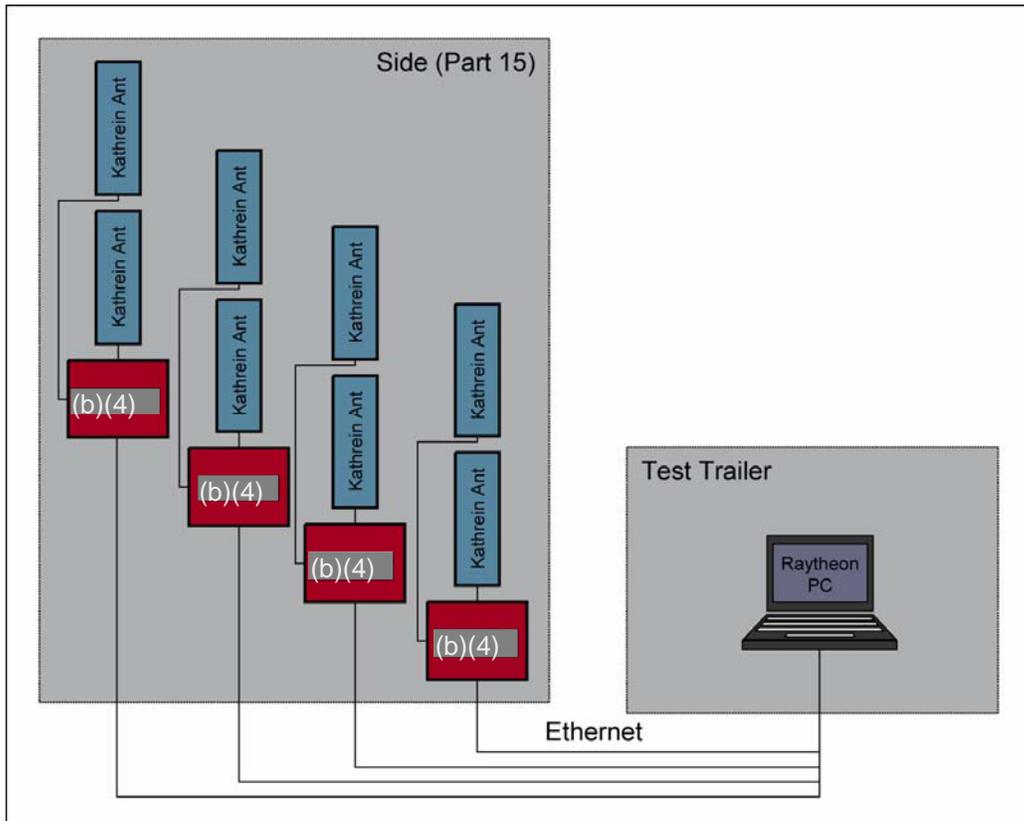


Figure FA-5 (b)(3), Side Part 15 Equipment Block Diagram

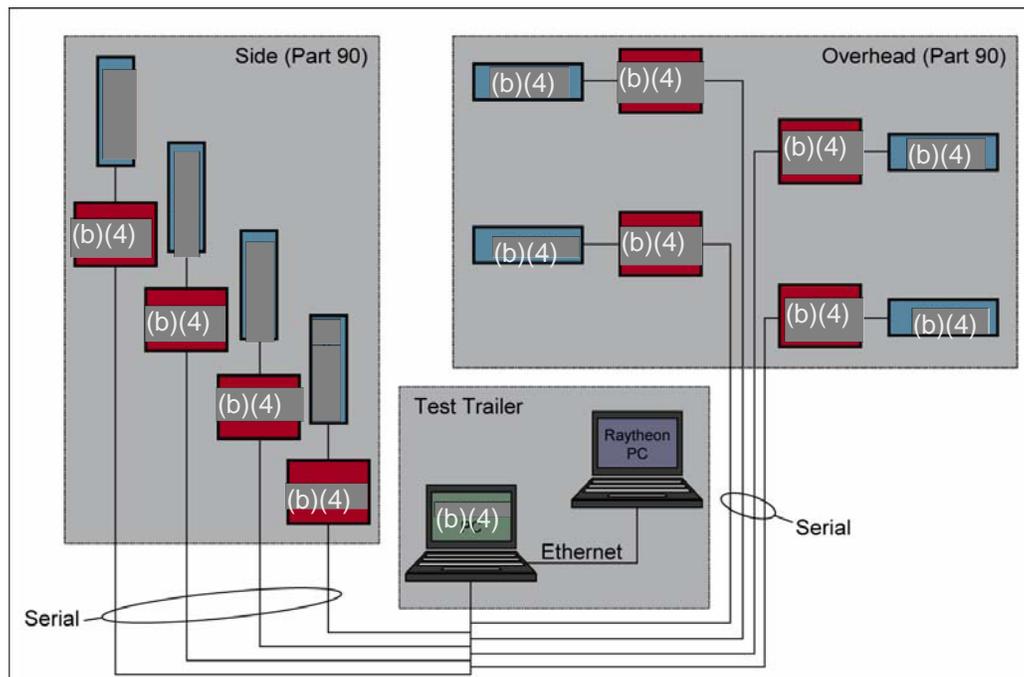


Figure FA-6 (b)(4), Overhead and Side Part 90 Equipment Block Diagram



(b)(4), (b)(5)

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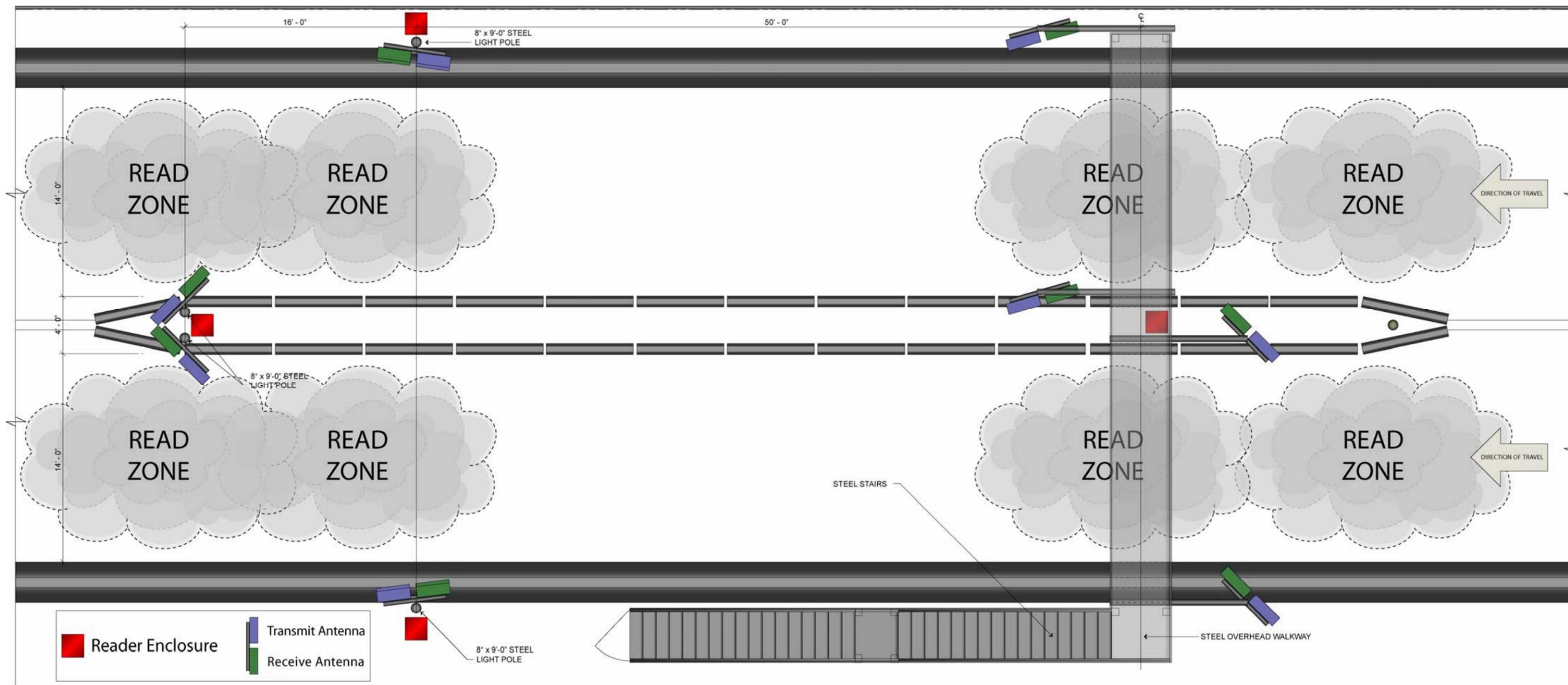
(b)(4), (b)(5)

(b)(4)



(b)(4), (b)(5)

(b)(4)



(b)(4)

Side Part 90 and Part 15 Layouts - Plan



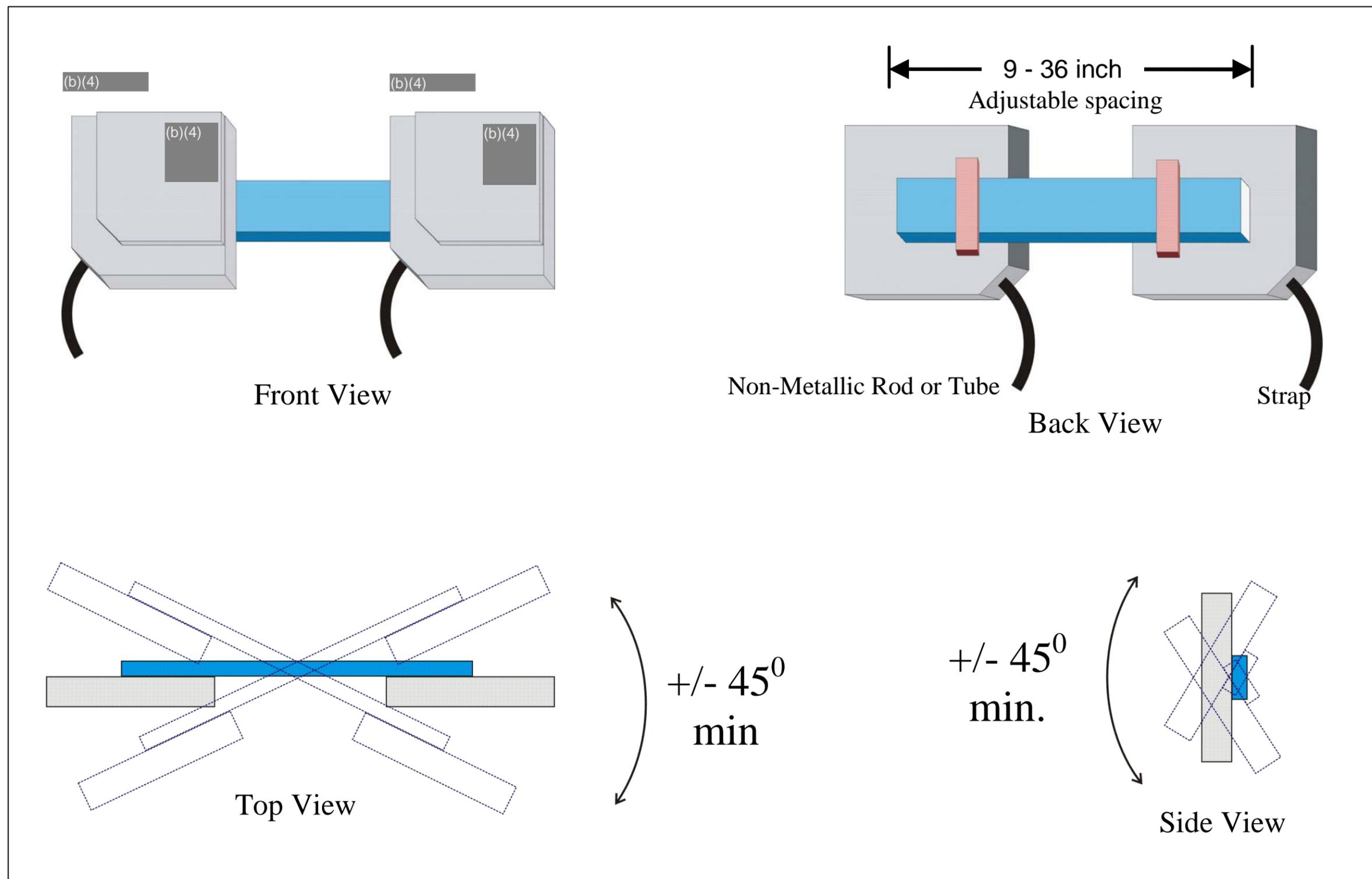
(b)(4)





(b)(4)

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Appendix C: Test Procedure for RFID Evaluation Testing - Test Matrix

| Config-uration | Number of Runs | Power | | Tag Type | | | Speeds | | | | Orientations | | | | Location | | Passive Use | Finger Overlap | Passengers | | No of Vehicles | | Vehicle Type | | | Comment | |
|----------------|----------------|---------|--------------|----------|-------|-----|--------|----|----|----|--------------|------|---------|--------|-------------|--------|-------------|----------------|------------|----|----------------|----|--------------|-------|-----|---|--|
| | | Part 90 | Side Part 15 | Card | Label | New | 20 | 30 | 40 | 50 | Front | Side | Oblique | 90 deg | Dash & Back | Window | | | 2 | 5 | 1 | 2 | Sedan | Truck | Bus | | |
| | | 50 | 46 | 55 | 41 | 0 | 16 | 12 | 56 | 4 | 27 | 31 | 4 | 4 | 4 | 8 | 8 | 8 | 16 | 76 | 16 | 80 | 88 | 8 | 4 | ← Count of occurrences (not including TBDs) | |
| 1 | 5 | X | | X | | | X | | | | X | | | | | | | | | X | X | | X | | | | |
| 2 | 5 | X | | X | | | X | | | | | X | | | | | | | | | X | X | | X | | | |
| 3 | 5 | X | | X | | | | | X | | X | | | | | | | | | | X | X | | X | | | |
| 4 | 5 | X | | X | | | | | X | | | X | | | | | | | | | X | X | | X | | | |
| 5 | 5 | X | | X | | | X | | | | X | | | | | | | | | | X | | X | | | | |
| 6 | 5 | X | | X | | | X | | | | | X | | | | | | | | | X | | X | | | | |
| 7 | 10 | X | | X | | | | X | | | X | | | | | | | | | | X | | X | | | | |
| 8 | 10 | X | | X | | | | X | | | | X | | | | | | | | | X | | X | | | | |
| 9 | 10 | X | | X | | | | | X | | X | | | | | | | | | | X | | X | | | | |
| 10 | 10 | X | | X | | | | | X | | | X | | | | | | | | | X | | X | | | | |
| 11 | 10 | X | | X | | | | | | X | X | | | | | | | | | | X | | X | | | | |
| 12 | 10 | X | | X | | | | | | X | | X | | | | | | | | | X | | X | | | | |
| 13 | 5 | X | | X | | | | 35 | | | X | | | | | | | | X | | X | | | X | | | Maximum safe speed for truck |
| 14 | 5 | X | | X | | | | 35 | | | | X | | | | | | | X | | X | | | X | | | Maximum safe speed for truck |
| 15 | 5 | X | | X | | | | 35 | | | X | | | | | | | | X | | | X | X | X | | | One Sedan and one truck. Maximum safe speed for truck |
| 16 | 5 | X | | X | | | | 35 | | | | X | | | | | | | X | | | X | X | X | | | One Sedan and one truck. Maximum safe speed for truck |
| 17 | 5 | X | | X | | | | | X | | | | X | | | | | | | X | | X | X | | | | |
| 18 | 5 | X | | X | | | | | X | | BEST | BEST | | X | | | | | | X | | X | X | | | | Best of Front of Side, but axis of tag rotated 90 degrees |
| 19 | 5 | X | | X | | | | | X | | | | | | X | | | | | X | | X | X | | | | |
| 20 | 5 | X | | X | | | | | X | | | | | | | X | | | | X | | X | X | | | | Windshield top left, top center, top right, bottom right, bottom left |
| 21 | 5 | X | | X | | | | | X | | | | | | X | | | | | X | | X | X | | | | Rear window top left, top center, top right, bottom right, bottom left |
| 22 | 5 | X | | X | | | | | X | | X | | | | | | | X | | X | | X | X | | | | |
| 23 | 5 | X | | X | | | | | X | | | X | | | | | | X | | X | | X | X | | | | |
| 24 | 5 | X | | X | | | X | | | | | | | | | | X | | | X | | X | X | | | | Passive use, Driver pocket, front seat, glovebox, two rear seat |
| 25 | 5 | X | | X | | | | | X | | | | | | | | X | | | X | | X | X | | | | Passive use, Driver pocket, front seat, glovebox, two rear seat |
| 26 | 5 | X | | X | | | | | X | | BEST | BEST | | | | | | | | X | | X | X | | | | One Sedan and one Sedan with metallic tinted windows, closed |
| 27 | 5 | X | | X | | | | | X | | BEST | BEST | | | | | | | | X | | X | X | | | | One Sedan and one Sedan with metallic tinted windows, ajar |
| 28 | 5 | X | | X | | | X | | | | | X | | | | | | | | | X | | | | X | | 35 to 50 passengers (tags) |
| 29 | 5 | X | | X | | | | | X | | | X | | | | | | | | | X | | | | X | | 35 to 50 passengers (tags), Top speed on track TBD |
| 30 | 5 | X | | X | | | X | | | | | X | | | | | | | | | X | | | | X | | 35 to 50 passengers (tags) |
| 31 | 5 | X | | X | | | | X | | | | X | | | | | | | | | X | | | | X | | 35 to 50 passengers (tags), Top speed on track TBD |
| 32 | 5 | X | | X | | | X | | | | X | | | | | | | | | X | | X | X | | | | |
| 33 | 5 | X | | X | | | X | | | | | X | | | | | | | | X | | X | X | | | | |
| 34 | 10 | X | | X | | | | X | | | X | | | | | | | | | X | | X | X | | | | |
| 35 | 10 | X | | X | | | | X | | | | X | | | | | | | | X | | X | X | | | | |
| 36 | 10 | X | | X | | | | | X | | X | | | | | | | | | X | | X | X | | | | |
| 37 | 10 | X | | X | | | | | X | | | X | | | | | | | | X | | X | X | | | | |
| 38 | 10 | X | | X | | | | | | X | X | | | | | | | | | X | | X | X | | | | |
| 39 | 10 | X | | X | | | | | X | | X | | | | | | | | | X | | X | X | | | | |
| 40 | 5 | X | | X | | | | | X | | X | | | | | | | | | X | X | | X | | | | |
| 41 | 5 | X | | X | | | | | X | | | X | | | | | | | | X | X | | X | | | | |
| 42 | | | | | | | | | | | | | | | | | | | | | | | | | | | Not used |
| 43 | 5 | X | | X | | | | | X | | | | X | | | | | | | X | | X | X | | | | |
| 44 | 5 | X | | X | | | | | X | | BEST | BEST | | X | | | | | | X | | X | X | | | | Best of Front of Side, but axis of tag rotated 90 degrees |
| 45 | 5 | X | | X | | | | | X | | | | | | X | | | | | X | | X | X | | | | |
| 46 | 5 | X | | X | | | | | X | | | | | | | X | | | | X | | X | X | | | | Windshield top left, top center, top right, bottom right, bottom left |
| 47 | 5 | X | | X | | | | | X | | | | | | | X | | | | X | | X | X | | | | Rear window top left, top center, top right, bottom right, bottom left |
| 48 | 5 | X | | X | | | | | X | | X | | | | | | | X | | X | | X | X | | | | |
| 49 | 5 | X | | X | | | | | X | | | X | | | | | | X | | X | | X | X | | | | |
| 50 | 5 | X | | X | | | X | | | | | | | | | | X | | | X | | X | X | | | | Passive use, Driver pocket, front seat, glovebox, two rear seat |
| 51 | 5 | X | | X | | | | | X | | | | | | | | X | | | X | | X | X | | | | Passive use, Driver pocket, front seat, glovebox, two rear seat |
| 52 | 4 | X | | X | | | | | X | | BEST | BEST | | | | | | | | X | | X | X | | | | Extended runs to test tag to tag variability within tag type |
| 53 | 4 | X | | X | | | | | X | | BEST | BEST | | | | | | | | X | | X | X | | | | Extended runs to test tag to tag variability within tag type |
| 54 | 5 | X | | X | | | | | X | | BEST | BEST | | | | | | | | X | | X | X | | | | One Sedan and one Sedan with metallic tinted windows, closed |
| 55 | 5 | X | | X | | | | | X | | BEST | BEST | | | | | | | | X | | X | X | | | | One Sedan and one Sedan with metallic tinted windows, ajar |

Figure FC-1 Test Matrix



| Config-uration | Number of Runs | Power | | Tag Type | | | Speeds | | | | Orientations | | | | Location | | Passive Use | Handling Finger Overlap | Passengers | | No of Vehicles | | Vehicle Type | | | Comment | |
|-------------------------------------|----------------|---------|--------------|----------|-------|-----|--------|----|----|----|--------------|------|---------|--------|-------------|--------|-------------|-------------------------|------------|----|----------------|---|--------------|-------|-----|---------|--|
| | | Part 90 | Side Part 15 | Card | Label | New | 20 | 30 | 40 | 50 | Front | Side | Oblique | 90 deg | Dash & Back | Window | | | 2 | 5 | 1 | 2 | Sedan | Truck | Bus | | |
| | | 0 | 46 | 29 | 17 | 0 | 8 | 6 | 28 | 0 | 14 | 14 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 12 | 34 | 8 | 38 | 44 | 4 | 0 | ← Count of occurrences (not including TBDs) |
| Part 15 Changeover and Setup | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56 | 5 | | X | X | | | | 35 | | | X | | | | | | | | X | | | X | | | | | Maximum safe speed for truck |
| 57 | 5 | | X | X | | | | 35 | | | | X | | | | | | | X | | | X | | | | | Maximum safe speed for truck |
| 58 | 5 | | X | X | | | | 35 | | | X | | | | | | | | X | | | X | X | X | | | One Sedan and one truck. Maximum safe speed for truck |
| 59 | 5 | | X | X | | | | 35 | | | | X | | | | | | | X | | | X | X | X | | | One Sedan and one truck. Maximum safe speed for truck |
| 60 | 5 | | X | X | | | X | | | | X | | | | | | | | X | | | X | | | | | |
| 61 | 5 | | X | X | | | X | | | | | X | | | | | | | X | | | X | | | | | |
| 62 | 5 | | X | X | | | | X | | | X | | | | | | | | X | | | X | | | | | |
| 63 | 5 | | X | X | | | | X | | | | X | | | | | | | X | | | X | | | | | |
| 64 | 5 | | X | X | | | | | X | | X | | | | | | | | X | | | X | | | | | |
| 65 | 5 | | X | X | | | | | X | | | X | | | | | | | X | | | X | | | | | |
| 66 | 5 | | X | X | | | | | X | | X | | | | | | | | X | | | X | X | | | | |
| 67 | 5 | | X | X | | | | | X | | | X | | | | | | | X | | | X | X | | | | |
| 68 | 5 | | X | X | | | X | | | | X | | | | | | | | | X | | X | X | X | | | |
| 69 | 5 | | X | X | | | X | | | | | X | | | | | | | | X | | X | X | | | | |
| 70 | 5 | | X | X | | | | X | | | X | | | | | | | | | X | | X | X | | | | |
| 71 | 5 | | X | X | | | | X | | | | X | | | | | | | | X | | X | X | | | | |
| 72 | 5 | | X | X | | | | | X | | X | | | | | | | | | X | | X | X | | | | |
| 73 | 5 | | X | X | | | | | X | | | X | | | | | | | | X | | X | X | | | | |
| 74 | 5 | | X | X | | | | | X | | | | X | | | | | | | X | | X | X | | | | |
| 75 | 5 | | X | X | | | | | X | | | | | X | | | | | | X | | X | X | | | | |
| 76 | 5 | | X | X | | | | | X | | | | | | X | | | | | X | | X | X | | | | |
| 77 | 5 | | X | X | | | | | X | | | | | | | X | | | | X | | X | X | | | | Windshield top left, top center, top right, bottom right, bottom left |
| 78 | 5 | | X | X | | | | | X | | | | | | | X | | | | X | | X | X | | | | Rear window top left, top center, top right, bottom right, bottom left |
| 79 | 5 | | X | X | | | | | X | | | | | | | | | X | | X | | X | X | | | | |
| 80 | 5 | | X | X | | | | | X | | | X | | | | | | | X | X | | X | X | | | | |
| 81 | 5 | | X | X | | | X | | | | | | | | | | | X | | X | | X | X | | | | Passive use, Driver pocket, front seat, glovebox, two rear seat |
| 82 | 5 | | X | X | | | | | X | | | | | | | | | X | | X | | X | X | | | | Passive use, Driver pocket, front seat, glovebox, two rear seat |
| 83 | 5 | | X | X | | | | | X | | BEST | BEST | | | | | | | X | | X | X | X | | | | One Sedan and one Sedan with metallic tinted windows, closed |
| 84 | 5 | | X | X | | | | | X | | BEST | BEST | | | | | | | X | | X | X | | | | | One Sedan and one Sedan with metallic tinted windows, ajar |
| 85 | 5 | | X | | X | | | | X | | BEST | BEST | | | | | | | X | | X | X | | | | | One Sedan and one Sedan with metallic tinted windows, closed |
| 86 | 5 | | X | | X | | | | X | | BEST | BEST | | | | | | | X | | X | X | | | | | One Sedan and one Sedan with metallic tinted windows, ajar |
| 87 | 5 | | X | X | | | X | | | | X | | | | | | | | X | | X | X | X | | | | |
| 88 | 5 | | X | | X | | X | | | | | X | | | | | | | X | | X | X | | | | | |
| 89 | 5 | | X | | X | | | X | | | X | | | | | | | | X | | X | X | | | | | |
| 90 | 5 | | X | | X | | | X | | | | X | | | | | | | X | | X | X | | | | | |
| 91 | 5 | | X | | X | | | | X | | X | | | | | | | | X | | X | X | | | | | |
| 92 | 5 | | X | | X | | | | X | | | X | | | | | | | X | | X | X | | | | | |
| 93 | 5 | | X | | X | | | | X | | | | X | | | | | | X | | X | X | | | | | |
| 94 | 5 | | X | | X | | | | X | | | | | X | | | | | X | | X | X | | | | | |
| 95 | 5 | | X | | X | | | | X | | | | | | X | | | | X | | X | X | | | | | |
| 96 | 5 | | X | | X | | | | X | | | | | | | X | | | X | | X | X | | | | | Windshield top left, top center, top right, bottom right, bottom left |
| 97 | 5 | | X | | X | | | | X | | | | | | | X | | | X | | X | X | | | | | Rear window top left, top center, top right, bottom right, bottom left |
| 98 | 5 | | X | | X | | | | X | | X | | | | | | | X | | X | | X | X | | | | |
| 99 | 5 | | X | | X | | | | X | | | X | | | | | | | X | X | | X | X | | | | |
| 100 | 5 | | X | | X | | X | | | | | | | | | | | X | | X | | X | X | | | | Passive use, Driver pocket, front seat, glovebox, two rear seat |
| 101 | 5 | | X | | X | | | | X | | | | | | | | | X | | X | | X | X | | | | Passive use, Driver pocket, front seat, glovebox, two rear seat |

Note: Cells marked BEST in the 'Orientations' columns mean a selection was made to choose the highest performance approach for these test runs. In all cases the orientation used was Side.

Figure FC-1 Test Matrix (Continued)



Appendix D: Test Director and Data Collection (TDDC) Software Functional Description

Test Director and Data Collection (TDDC) Software is a software tool for browsing and updating data in the RFID Feasibility Study database. The tool provides the capabilities described in the following sections.

1. Enroll Tags

The RFID tags used in the tests are entered into the database using this function. RFID Tag Enrollment station is up and operational before invoking this function. To enroll a tag following steps are performed.

1. Launch the TDDC application software (if it is not already running)
2. Select the Enroll Tag tab in the application window (Figure FD-1)
3. Select the type (Card/Label/...) of the RFID tag to be enrolled
4. Place the RFID tag on the enrollment station and click Get RFI button
5. Click Update button when the text appears in the RFID textbox. This will insert the RFID tag ID into the database. The enrolled tag also appears in the Enrolled Tags table displayed in the window.

| TagID | Type | EnrollmentID |
|------------------|------|--------------|
| 00C62DBA41326000 | Card | 1 |
| 00E60DBA41326000 | Card | 2 |
| 00E68DBA41326001 | Card | 3 |
| 00E6CDBA41326002 | Card | 4 |
| 0105CDBA41326000 | Card | 5 |
| 0125CDBA41326001 | Card | 6 |
| 01260DBA41326003 | Card | 7 |
| 01274DBA41326001 | Card | 8 |
| 0145EDBA41326002 | Card | 9 |
| 0165EDBA41326003 | Card | 10 |
| 01660DBA41326000 | Card | 11 |
| 0182CDBA41326000 | Card | 12 |
| 01862DBA41326000 | Card | 13 |

Figure FD-1 TDDC Tag Enrollment screen



2. Browse/Edit Test Configuration Data

To browse or edit the test configuration data, select the Test Configurations tab in the TDDC application main window (Figure FD-2). The test configuration data is displayed as a table in the window. To change the test configuration data, select the appropriate row, make the required change/s and, click the Update button.

| | TestType | Power | TagType | Speed | Orientati | Location | Handling | NumPas | VehicleT | VehicleT |
|---|----------|-------|---------|-------|-----------|----------|----------|--------|----------|----------|
| ▶ | 1 | 90 | 1 | 20 | Front | (null) | (null) | 2 | Sedan | (null) |
| | 2 | 90 | 1 | 20 | Side | (null) | (null) | 2 | Sedan | (null) |
| | 3 | 90 | 1 | 30 | Front | (null) | (null) | 2 | Sedan | (null) |
| | 4 | 90 | 1 | 30 | Side | (null) | (null) | 2 | Sedan | (null) |
| | 5 | 90 | 1 | 40 | Front | (null) | (null) | 2 | Sedan | (null) |
| | 6 | 90 | 1 | 40 | Side | (null) | (null) | 2 | Sedan | (null) |
| | 7 | 90 | 1 | 30 | Front | (null) | (null) | 2 | Truck | (null) |
| | 8 | 90 | 1 | 30 | Side | (null) | (null) | 2 | Truck | (null) |
| | 9 | 90 | 1 | 30 | Front | (null) | (null) | 2 | Sedan | Truck |
| | 10 | 90 | 1 | 30 | Side | (null) | (null) | 2 | Sedan | Truck |
| | 11 | 90 | 1 | 40 | (null) | WindShi | (null) | 2 | Sedan | Sedan |
| | 12 | 90 | 1 | 20 | Front | (null) | (null) | 5 | Sedan | (null) |
| | 13 | 90 | 1 | 20 | Side | (null) | (null) | 5 | Sedan | (null) |
| | 14 | 90 | 1 | 40 | Front | (null) | (null) | 5 | Sedan | (null) |

Figure FD-2 TDDC Test Configuration Data screen



3. Perform Test and Collect Test Data

TDDC application software is used for monitoring and performing the tests. At the successful completion of a test run, the software automatically collects the data from the vendor hardware and saves it in the test database for later analysis. Following steps are performed to initiate and run the tests.

1. Select the Test Runs tab in the TDDC application main window (Figure FD-3). The window display the list of test runs defined in the database.
2. Select the test run to start in the Test Runs table.
3. Select the Weather Conditions choice button reflecting the weather at the time of the test.
4. Enter any comments in the Comments text box regarding the test.
5. Click the Start Test Run button. This will pop-up a dialog window (Figure FD-4 in the case of Sedan/Truck and Figure FD-7 in the case of Bus) displaying the details of the test configuration.
6. Make any necessary changes to the test configuration data.
7. Click Arm button to initiate the test. This will launch the dialog window shown in Figure FD-5 and initiate collection of tag data by the RFID readers.
8. Click Unarm button to end the tag data collection by the readers (Click the Abort button to abort the test). This will launch the dialog window shown in Figure FD-6. The data collected by the readers is obtained by the TDDC application and saved in the database.
9. Click OK button to complete the test run.

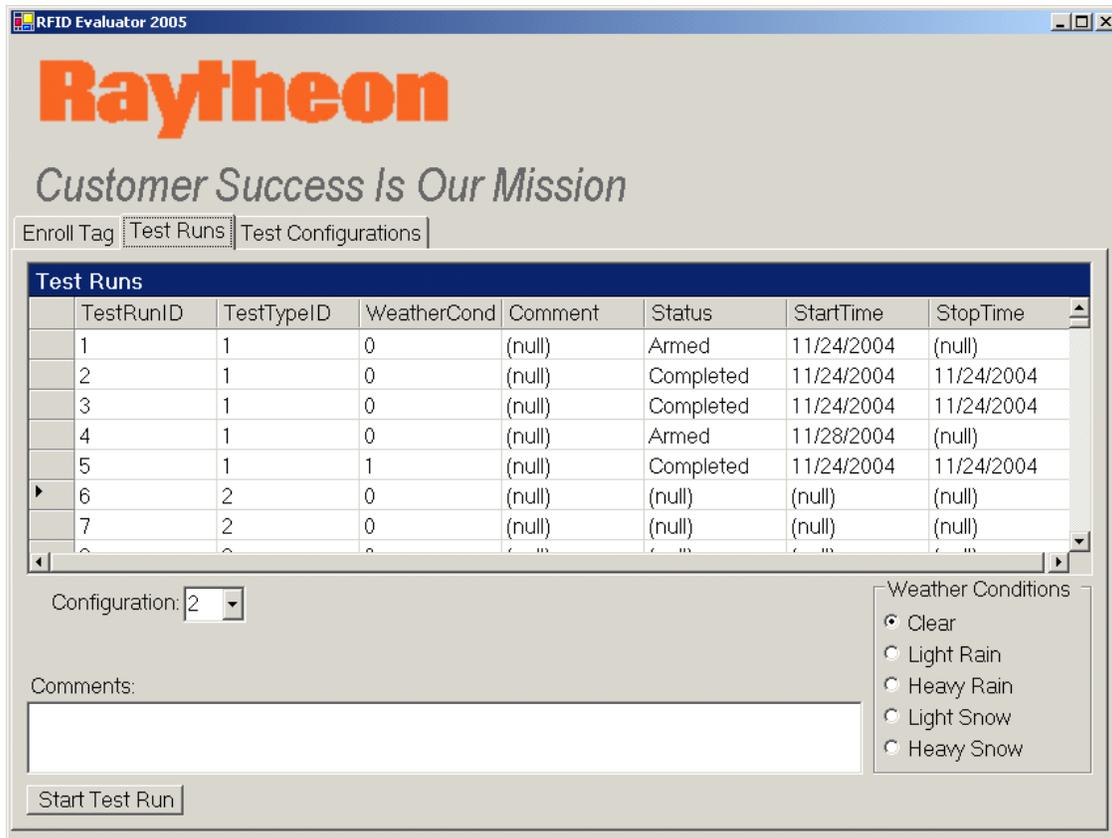


Figure FD-3 TDDC Test Run screen



Test Run: 6 Test Type: 2

Standard Vehicles | Bus

Vehicle 1

Vehicle ID: Blue Sedan

1: 1 2: 2

Actual Speed (in mph): 20

Orientation: Side Handling: Normal

Location: Hand Held

Arm Cancel

Figure FD-4 TDDC Test Run Configuration screen (Before the test start)



Test Run: 6 Test Type: 2

Standard Vehicles | Bus

Vehicle 1

Vehicle ID: Blue Sedan

1: 1 2: 2

Actual Speed (in mph): 20

Orientation: Side Handling: Normal

Location: Hand Held Start Time: 12/1/2004 4:43:00 PM

Unarm Abort

Figure FD-5 TDDC Test Run Configuration screen (Test in progress)



Test Run: 6 Test Type: 2

Standard Vehicles | Bus

Vehicle 1

Vehicle ID: Blue Sedan

1: 1 2: 2

Actual Speed (in mph): 20

Orientation: Side Handling: Normal

Location: Hand Held Stop Time: 2004-12-01 16:43:38Z

Arm OK

Figure FD-6 TDDC Test Run Configuration screen (Test complete)



Test Run: 200 Test Type: 40

Standard Vehicles Bus

Bus

Vehicle ID: BusXYZ

Actual Speed (in mph): 30

| Tags Available | Tags On Bus |
|----------------|-------------|
| 026 | 001 |
| 027 | 002 |
| 028 | 003 |
| 029 | 004 |
| 030 | 005 |
| 031 | 006 |
| 032 | 007 |
| 033 | 008 |
| 034 | 009 |
| 035 | 010 |
| 036 | 011 |
| 037 | 012 |
| 038 | 013 |
| 039 | 014 |
| 040 | 015 |
| 041 | 016 |
| 042 | 017 |

Orientation: Side Handling: Normal

Location: Hand Held

Arm Cancel

Figure FD-7 TDDC Test Run Configuration screen (for the case of Bus)