



Rear Cross Traffic Alert Subsystem Test Procedure

1 Scope

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. To define the test procedure that will determine if a vehicle meets the subsystem and vehicle performance requirements for Rear Cross Traffic Alert (RCTA).

1.2 Foreword. Not applicable.

1.3 Applicability. This procedure applies to passenger vehicles that are equipped with RCTA system and intend to comply with the applicable General Motors requirements.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

None

2.3 Additional References.

OxTS User Manual

Rear Cross Traffic Alert CG2976

Rear Cross Traffic Alert Subsystem Technical Specification

Side Blind Zone Alert - Left Diagnostic Specification

Side Blind Zone Alert - Right Diagnostic Specification

3 Resources

3.1 Facilities.

3.1.1 Some portions of this test may be run on the electrical test bench or at a vehicle level. Contact the electrical validation engineer (VE) or Bench Lead (BL) in the desired region to determine the location of the appropriate electrical test bench.

3.1.2 Parking lot with 45°, 60°, and 90° angles and parking spaces with 125° curve road.

3.1.3 Public parking lots that contain the parking space layout as described in the Subsystem Technical Specification (SSTS).

3.2 Equipment.

3.2.1 Global Positioning System (GPS) currently in use by Milford Proving Ground (MPG) Active Safety Development and Validation (Dev/Val) Group is the RT3000 series with Hunter solution (OxTS). Other regions' information will be added as testing is developed.

3.2.2 GPS base station, either permanently mounted (e.g., at MPG Building 16) or a portable base station at the test site.

GM Confidential

© Copyright 2012 General Motors Company All Rights Reserved

July 2012

Page 1 of 12

3.2.3 Data acquisition system includes laptop computer running Vehicle Spy with NeoVI (from Intrepid Control Systems).

3.2.4 Mid size vehicle and motorcycle to be used as Target Vehicles (TV).

3.3 Test Vehicle/Test Piece. The test vehicle should be equipped with the RCTA system and should be selected as being representative of the group of vehicles for which this requirement is being demonstrated. For validation, all components used for this test must have the latest production intent released hardware, software and calibrations.

3.4 Test Time.

Calendar time: 5 days

Test hours: 32 hours

Coordination hours: 8 hours

3.5 Test Required Information.

3.5.1 Cold tire inflation pressure from placard or optional tire inflation pressure label.

3.5.2 Setup information for GPS equipment and data acquisition instrumentation being used.

3.5.3 Correct GM local area network (GMLAN) database for the test vehicle that contain the needed signals from Appendix A.

3.5.4 A copy of CG2976.

3.6 Personnel/Skills.

3.6.1 The test engineer or technician need appropriate driving privileges for their test site. If test is done at MPG, the test engineer or technician must have driving privileges on ground. Contact MPG Traffic Safety to schedule test time on the Vehicle Dynamics Test Area (VDTA), if needed.

3.6.2 Familiarity with the use of Vehicle Spy and RT3000 equipment is required. A second person to monitor the laptop and collect/save data will also be needed.

3.6.3 Personnel to drive target vehicle(s). Certain parts of the procedure require 2 target vehicles.

4 Procedure

4.1 Preparation.

4.1.1 Obtain Test Readiness Team (TRT) approval on vehicle configuration levels and complete the Test Information Data Sheet. Approvals can be a signed documentation or hard copy of email approvals from each TRT Design Release Engineer (DRE) for their component.

4.1.2 Install the GPS test equipment and the data acquisition equipment (laptop, Vehicle Spy, etc.) into the Host Vehicle (HV).

4.1.3 Perform the vehicle measurements required by the GPS equipment setup program (RT-Config and RT-Range). See the RT3000 and Hunter setup software in Appendix A. The most important measurement is the distance between the dual GPS antennas. This measurement should be accurate to within 5 mm. Other measurements are automatically corrected by the RT3000 during use and initially need to be accurate to 0.1 m. The accuracy is selectable in the measurement screen.

4.1.4 Verify that the GPS base station is set up and communicating (using RT-Range software) or set up a separate base station at the test site.

4.1.5 Load the setup files for the Vehicle Spy monitoring program (VS3 and databases). Power the RT3000 equipment. Verify that controller area network (CAN) data is being collected and GPS data is correctly updating. VS3 files can be provided by the Active Safety Development and Validation group at MPG. Verify the correct GMLAN database and RCTA GMLAN signals are being used for the vehicle being tested. The VS3 file will use the RCTA alert signal to trigger the capture file. Set up the proper filenames to store the captured data.

4.1.6 Obtain and set up the summary file (currently a Microsoft Excel file with macro) to automatically summarize the data from each test run. This file can be provided by the Active Safety Development and Validation group at MPG.

4.1.7 Determine which sections of the test procedure will be run on the bench and the vehicle.

GM Confidential

© Copyright 2012 General Motors Company All Rights Reserved

July 2012

Page 2 of 12

4.1.8 If new Side Blind Zone Alert (SBZA) sensors are used, align each sensor per the production or service procedure.

4.2 Conditions.

4.2.1 Environmental Conditions. Testing should be performed in good weather conditions.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 RCTA Interface (Test Bench or Vehicle).

4.3.1.1 Follow the procedure and answer the questions in the RCTA Interface tab of CG2976.

4.3.1.2 Complete the data sheets of CG2976 for inclusion in the test report.

4.3.2 RCTA Functional (Vehicle).

4.3.2.1 Follow the procedure and answer the questions in the RCTA Functional tab of CG2976.

4.3.2.2 Complete the data sheets of CG2976 for inclusion in the test report.

4.3.3 RCTA Diagnostics (Test Bench or Vehicle).

4.3.3.1 Follow the procedure and answer the questions in the RCTA Diagnostics tab of CG2976.

4.3.3.2 Complete the data sheets of CG2976 for inclusion in the test report.

4.3.4 RCTA Performance (Vehicle).

4.3.4.1 Follow the procedure and answer the questions in the RCTA Performance tab of CG2976.

4.3.4.2 Complete the data sheets in Appendix B for inclusion in the test report.

4.3.4.3 Complete the data sheets of CG2976 for inclusion in the test report.

5 Data

5.1 Calculations.

5.2 Interpretation of Results.

5.2.1 Pass/Fail Criteria. The pass or fail criteria are defined as:

5.2.1.1 The RCTA system shall issue an alert when Time to Collision (TTC) is $\leq$ Cal_RCTA_Alert_Threshold.

5.2.1.2 The overall system False Alert is $\leq$ 5% of total test across all scenarios.

5.2.1.3 Missed Alert is $\leq$ 0.5% of total test across all scenarios.

5.2.1.4 All questions should be answered "Meets Requirements".

5.3 Test Documentation. See CG2976 for data sheets.

6 Safety

This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

7 Notes

7.1 Glossary.

DBC File: A file type primarily associated with CANdb, by Vector Informatik GmbH.

Figure Eight Maneuver: A driving maneuver in which the vehicle is driven in a complete circle in one direction, followed immediately by a complete circle in the opposite direction.

Intrepid Control Systems: Source of Vehicle Spy and NeoVI Fire vehicle diagnostic and testing products.

NeoVI: A vehicle diagnostic and testing hardware package, used with Vehicle Spy software.

OxTS: Oxford Technical Solutions, a manufacturer of GPS-aided Inertial Navigation systems.

GM Confidential

© Copyright 2012 General Motors Company All Rights Reserved

July 2012

Page 3 of 12

Rear Cross Traffic Alert (RCTA) System: Designed to alert the driver, with visual display and either an audible sound or a haptic warning, to the presence of object(s) of interest that may cause a collision with the Host Vehicle.

RT3000: An Inertial + GPS Navigation System product from Oxford Technical Solutions.

Vehicle Spy: A vehicle diagnostic and testing software package, used with NeoVI hardware.

7.2 Acronyms, Abbreviations, and Symbols.

BL	Bench Lead
CAN	Controller Area Network
Dev/Val	Development and Validation
DRE	Design Release Engineer
GMLAN	GM Local Area Network
GPS	Global Positioning System
HV	Host Vehicle
IP	Internet Protocol
IVER	Integration Vehicle Engineering Release
LF	Left Front
LR	Left Rear
MPG	Milford Proving Ground
MVB_NS	Manufacturing Validation Build, Non-Salable
MVB_S	Manufacturing Validation Build, Salable
OxTS	Oxford Technical Solutions
PPV	Product/Process Validation (Vehicle)
RCTA	Rear Cross Traffic Alert
RF	Right Front
RR	Right Rear
SBZA	Side Blind Zone Alert
SSTS	Subsystem Technical Specification
TRT	Test Readiness Team
TTC	Time To Collision
TV	Target Vehicle
VDTA	Vehicle Dynamics Test Area
VE	Validation Engineer
VS3	Vehicle Spy 3
WLAN	Wireless Local Area Network

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW16658

9 Release and Revisions

This standard was originated in August 2011. It was first approved by Active Safety Development and Validation in July 2012. It was first published in July 2012.

Issue	Publication Date	Description (Organization)
1	JUL 2012	Initial publication.

GM Confidential

© Copyright 2012 General Motors Company All Rights Reserved

July 2012

Page 4 of 12