GM	WORLDWIDE ENGINEERING STANDARDS	General Specification	GMW17393

Data String Length Testing Standards for Infotainment Systems

1 Introduction

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 verify each infotainment component message handling based on string length, formatting, and truncation. Strings of variable length shall be tested at and beyond their limits.

1.2 Applicability. Ethernet, Media Oriented Systems Transport (MOST), Controller Area Network (CAN), Input/Output (IO), Local Interconnect Network (LIN), Bluetooth (BT), and FlexRay messages, specifically user-creatable strings of variable length. Examples include Audio, Video, Pictures, Phonebook Information, Contacts, File structures such as those on a Universal Serial Bus (USB) device or Secure Digital (SD) card, Compact Disk (CD), or wirelessly connected device.

1.3 Remarks. This test specification includes provisions for proper handling of user created variable length data strings traced to a Human Machine Interface (HMI) requirement for phone length not tested by suppliers. The Instrument Panel Cluster (IPC) was resetting continuously while a phone was paired to HMI via BT. Resetting stopped occurring when phone was disconnected. It was determined the phone name sent from the HMI was longer than the character length requirement should allow. The cluster was not able to handle the unexpectedly long phone name and began to reset.

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.

- K2L Optolyzer for MOST is available at Uniform Resource Locator (URL) http://www.k2l.de/
- Vehicle Spy 3 for Ethernet/CAN/FlexRay is available at URL http://www.intrepidcs.com/

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities. An electrical test laboratory with a subsystem or system test bench.

3.1.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.1.2 Equipment. Appropriate message monitoring programs, e.g., K2L Optolyzer for MOST, Vehicle Spy 3 for Ethernet/CAN/FlexRay, etc. shall be used to verify contents of each message the module consumes and produces. Additionally, if the module has a video screen, i.e., HMI, IPC, Rear Seat Entertainment (RSE), a video camera or photo resistor shall detect if the screen turns off/goes black during these tests.

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Note: These programs shall identify if module is experiencing any abnormal behaviors such as resets or lockups.

3.1.3 Test Vehicle/Test Piece. For validation tests, all infotainment components, hardware, software and physical connectivity, shall be production intent.

3.1.4 Test Time. Test time is dependent on infotainment system complexity.

3.1.5 Test Required Information. Not applicable.

3.1.6 Personnel/Skills. Knowledge of serial data tools and vehicle infotainment systems.

3.2 Preparation. A specialized test procedure for a given module shall be created by each module supplier. This procedure shall satisfy the requirements outlined in Section 4 Requirements and Procedure for one example of each user-created string type for each applicable module under Normal Condition (3.4.1), Truncated Condition (3.4.2), Overflow Condition (3.4.3), and Truncated and Overflow Condition (3.4.4).

3.3 Conditions.

3.3.1 Environmental Conditions. This test procedure is a functional test that is not intended to test the effect of any environmental conditions. It is intended to be performed on an electrical test bench in an electrical test laboratory environment with no additional environmental requirements.

3.3.2 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.

3.4 Instructions.

3.4.1 Normal Condition:

3.4.1.1 For Module Receiving String:

a. A message with maximum length is sent to the module.

b. A message with zero length is sent to the module.

3.4.1.2 For Module Sending String:

a. The module sends a message with maximum length to another module or simulated network.

b. The module sends a zero length message to another module or simulated network.

3.4.2 Truncated Condition:

3.4.2.1 For Module Receiving String: A set of characters is sent to the module such that one of the characters is truncated in the middle of its byte sequence.

Example: With 4 bytes per character, the module expects to receive a 3 byte message in the following format:

Byte 1:	Byte 2:	Byte 3:
AAAA AAAA	BBBB BBBB	CCCC CCCC

For a test case, the following message is sent to the module:

Byte 1:	Byte 2:	Byte 3:
AAAA AAAA	BBBB BBBB	CCCC CC

3.4.2.2 For Module Sending String: The module attempts to send a message similar to the 3.4.2.1 test case to another module or simulated network. Strings of this nature shall be sent such that they are not truncated in the middle of a character's byte sequence. Strings must either not be sent or padded to ensure proper format is kept.

3.4.3 Overflow Condition:

3.4.3.1 For Module Receiving String: A set of characters is sent to the module such that the amount of characters is greater than the maximum designated length.

Example: With 4 bytes per character, the module expects to receive a 3 byte message in the following format:

Byte 1:	Byte 2:	Byte 3:
AAAA AAAA	BBBB BBBB	CCCC CCCC

For a test case, the following message is sent to the module:

Byte 1:	Byte 2:	Byte 3:	Byte 4:
AAAA AAAA	BBBB BBBB	CCCC CCCC	DDDD DDDD

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