**NATIONAL TRANSPORTATION SAFETY BOARD**
**OFFICE OF HIGHWAY SAFETY**
**WASHINGTON, D.C.**

**RECORDER SPECIALIST'S**
**FACTUAL REPORT**

## A.    CRASH INFORMATION

Location:               Northbound US Highway 83 (US-83) near milepost 553.4 in Uvalde
                        County, 6.5 miles north of Concan, Texas

Vehicle 1:              2007 Dodge Ram quad-cab 3500 pickup truck

Operator 1:             Private owner

Vehicle 2:              2004 Ford E350 cutaway chassis with a 13-passenger Turtle Top Vanterra
                        medium-size bus body

Operator 2:             First Baptist Church of New Braunfels

Date:                   Wednesday, March 29, 2017

Time:                   Approximately 12:20 p.m. CST

NTSB #:                 **HWY17MH011**

## B.    RECORDERS GROUP

A group was not convened.

## C.    CRASH SUMMARY

For a summary of the crash, refer to the *Crash Summary Report* in the docket for this investigation.

## D.    DETAILS OF THE RECORDERS INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following electronic devices:

Device 1:                           Airbag Control Module
Device 1 Serial Number:             62220930170773
Vehicle:                            Vehicle #2

Device 2:                           Airbag Control Module
Device 2 Serial Number:             TQCME2816C0744

| | |
|---|---|
| Vehicle: | Vehicle #1 |
| | |
| Device 3: | ZTE Z223 Cell Phone |
| Device 3 Serial Number: | 325360253989 |
| Vehicle: | Vehicle #1 |
| | |
| Device 4: | Apple iPhone 4S |
| Device 4 Serial Number: | n/a |
| Vehicle: | Vehicle #1 |

## 1. Airbag Control Module Device Description

The Airbag Control Module (ACM) is part of an automobile's supplemental restraint system. Depending on the vehicle, the module may be capable of recording data when triggered by an airbag event known as a deployment or non-deployment. A non-deployment event involves a change in velocity that was significant enough to initialize the ACM, but the airbag does not deploy.

Typically, several seconds of pre-collision and post-collision data are recorded when triggered. Parameters recorded vary by manufacturer and model year, but may include vehicle speed, engine speed, brake application, throttle position, seatbelt usage, and airbag performance.

### 1.1. Airbag Control Module (Vehicle #2) Data Recovery

The electrical system of Vehicle #2 was compromised so the ACM could not be imaged normally. The ACM was removed from the vehicle and brought to the manufacturer for imaging. Figures 1 and 2 show the device as received.

Figure 1. Front of Airbag Control Module (Vehicle #2) as received.



Figure 2. Back of Airbag Control Module (Vehicle #2) as received.

### 1.1.  Airbag Control Module (Vehicle #2) Data Description

The data extracted includes information about the x-sensor, the y-sensor, the EFS-sensor, the stored codes, and the algorithm decisions. The x-sensor records the longitudinal acceleration at the location of the module. There was approximately a 33.2 mile per hour change in longitudinal velocity for the recorded event. The y-sensor records latitudinal change in velocity at the location of the module. There was approximately a 12.1 mile per hour change in velocity for the recorded event. The EFS-sensor is the front crash sensor that records change in velocity at the front crash sensor location. There was approximately a 13.5 mile per hour change in velocity for the recorded event at the front crash sensor. The different changes in velocity occurred over different lengths of time.  For more detail, see Recorders Attachment, Postcrash Data from the 2004 Ford E350 Airbag Control Module.

### 2.  Airbag Control Module (Vehicle #1) Data Recovery

The ACM was imaged by the Texas Department of Public Safety. All post processing of the data was performed by the Crash Data Retrieval (CDR) software. The software organizes the imaged data in a *.pdf report that contains the following sections: user information including date and time the device was imaged, user comments, data limitations, data source, tabular data and plot(s) from event(s), and raw hexadecimal data used in the report. The software does not correlate time to any standard such as eastern standard time (EST), and is recorded as seconds elapsed based on the start of the event referenced to an ignition cycle. Figures 3 and 4 show the device as received.

Figure 3. Front of Airbag Control Module (Vehicle #1) as received.

Figure 4. Back of Airbag Control Module (Vehicle #1) as received.



## 2.1. Airbag Control Module (Vehicle #1) Data Description

No accident data was available from the ACM in vehicle #1 due to sudden power loss. For more detail, see Recorders Attachment, Postcrash Data from the 2007 Dodge Ram Airbag Control Module.

## 3. ZTE Z223 Cell Phone (Vehicle #1) Device Description

The ZTE Z223 Cell Phone is capable of voice calling, text messaging, email, photo/video recording, audio (music) playback, and other specialized functions depending on configuration. Data is stored in non-volatile memory[1] and may include call logs, text messaging logs, image, video, and position location information. The amount and type of data stored varies based on the software version and configuration of the specific device.

## 3.1. ZTE Z223 Cell Phone (Vehicle #1) Data Recovery

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed the unit had not sustained any damage. Information was attempted to be extracted normally using the forensic software, however there was communication errors. The phone was manually analyzed for accident pertinent data. Figures 5 and 6 show the device as received.

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[1] Non-volatile memory is semi-conductor memory that does not require power to retain data.

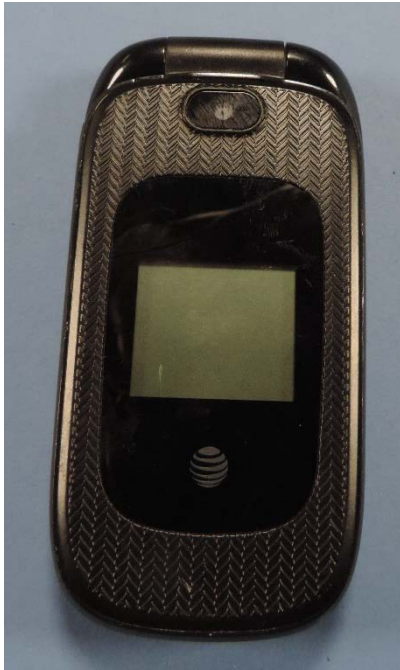Figure 5. Front of ZTE Z223 Cell Phone (Vehicle #1) as received.

Figure 6. Back of ZTE Z223 Cell Phone (Vehicle #1) as received.





### 3.2. ZTE Z223 Cell Phone (Vehicle #1) Data Description

No accident pertinent data was found on the phone.

## 4. Apple iPhone 4S (Vehicle #1) Device Description

The Apple iPhone is a touch-screen smart-phone capable of voice calling, text messaging, email, photo/video recording, audio (music) playback, and numerous other specialized functions depending on configuration. Specialized functions are supported by additional user-installed program applications (Apps). Application data is stored in non-volatile memory and may include call logs, text messaging logs, image, video, and position location information. In addition, the specialized application data may be stored in a proprietary file structure using numerous file formats. The amount and type of data stored varies based on the software version and configuration of the specific device.

### 4.1. Apple iPhone 4S (Vehicle #1) Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained considerable impact damage. The interior memory board was removed from the device and installed in a surrogate device. Figure 7 is a picture of the iPhone as received.

Figure 1. iPhone 4s (Vehicle #1) as received.

## 4.2. Apple iPhone 4S (Vehicle #1) Data Description

The extensive impact damage to the iPhone prevented any data retrieval from the device.

## E.    DOCKET MATERIAL

The following attachments are included in the docket for this investigation:

*LIST OF ATTACHMENTS*

Recorders Attachment -        Postcrash Data from the 2007 Dodge Ram Airbag Control Module

Recorders Attachment -        Postcrash Data from the 2004 Ford E350 Airbag Control Module

END OF REPORT

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