National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594

HWY23MH017

PERSONAL ELECTRONIC DEVICE

Specialist's Factual Report

December 12, 2023

TABLE OF CONTENTS

A. CRASH

Location: Teutopolis, Illinois
Date: September 29, 2023
Time: 2041 central daylight time (CDT)

B. PERSONAL ELECTRONIC DEVICE SPECIALIST

Specialist   W. Deven Chen
                              Electrical Engineer – Recorder Specialist
                              National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

A recorder group was not convened. The NTSB Vehicle Recorder Division received the following personal electronic device (PED) belonging to the driver of the truck tractor owned by Prairieland Transport LTD:

Manufacturer/Model: Samsung Galaxy S21 Smartphone

1.0 Recorder Description

PEDs are a category of devices comprised primarily of portable computing devices and mobile phones. Portable computing devices are typically capable of internet access, email, messaging services, and can run user-installed applications to perform specific tasks. Depending on the model, mobile phones can perform many of the same tasks as portable computing devices, plus have voice call and text messaging capabilities. PED user and system data is typically stored on non-volatile memory (NVM) and can be accessed through manufacturer-provided interfaces. [1]

1.1 Recorder Data Recovery

The Samsung Galaxy S21 was received by the Vehicle Recorder Division smartphone with its SIM card tray removed and was connected to a portable power bank, shown in figure 1. The device was in good condition other than some cracks shown on its screen. The device was unlocked with a provided passcode. The device was then connected to a PC and read using forensic evidence recovery software for PEDs.

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[1] Non-volatile memory is semiconductor memory that does not require external power for data retention.

Figure 1. Samsung Galaxy S21 as Received.

1.2 Recorder Data Examination

The data were examined for indications of usage between September 26, 2023, to September 29, 2023. The accident occurred around 20:41 CDT on September 29, 2023. All the categories of data were reviewed, and the following categories contained data pertinent to this investigation: "Application Usage Log", "Call Log", "Chats", "Email", and "Web Search".

1.2.1 Application Usage Log

The application usage log contained user action logs of applications installed on the device, including the times when an application was brought to focus[2], sent to background[3], or closed[4]. The data indicated that the user brought an application to focus on 20:33:10 CDT and closed this application at 20:33:22 CDT, on September 29, 2023, and that there was no other user action afterwards and prior to the time of the accident at 20:41 CDT, on September 29, 2023.

1.2.2 Call Log

Table 1 is a summary of the "Call Log" activity. The times in the table indicate the time when the phone calls were connected.

Table 1. Summary of the phone call activity. The table shows the most recent events near the top.

#	Date/Time (CDT)	Duration (hh:mm:ss)	Direction	Status
1	9/29/2023 18:57:55	01:12:17	Incoming	Answered
2	9/29/2023 17:04:45	00:02:46	Incoming	Answered
3	9/29/2023 15:13:26	00:09:50	Outgoing	Answered
4	9/29/2023 13:10:20	00:06:27	Outgoing	Answered
5	9/29/2023 10:08:12	00:09:32	Outgoing	Answered
6	9/29/2023 9:57:41	00:01:04	Outgoing	Answered
7	9/29/2023 9:27:38	00:08:57	Incoming	Answered
8	9/29/2023 9:14:46	00:01:35	Outgoing	Answered
9	9/29/2023 9:12:13	00:01:48	Incoming	Answered
10	9/29/2023 8:56:57	00:15:34	Incoming	Answered
11	9/29/2023 8:08:08	00:02:09	Incoming	Answered
12	9/29/2023 8:03:39	00:04:13	Incoming	Answered
13	9/29/2023 7:48:47	00:14:35	Outgoing	Answered
14	9/29/2023 7:47:31	00:15:51	Incoming	Answered
15	9/29/2023 7:38:56	00:04:16	Incoming	Answered
16	9/29/2023 7:16:42	00:01:10	Outgoing	Answered
17	9/29/2023 7:12:11	00:03:10	Incoming	Answered
18	9/29/2023 7:10:41	00:00:04	Outgoing	Answered
19	9/29/2023 7:03:48	00:00:03	Outgoing	Answered
20	9/28/2023 20:47:00	00:02:51	Outgoing	Answered
21	9/28/2023 17:39:02	00:01:15	Outgoing	Answered
22	9/27/2023 15:13:09	00:05:16	Outgoing	Answered
23	9/27/2023 14:14:58	00:00:34	Outgoing	Answered

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[2] Bring to focus – open an application or select an application in the background to activate and actively display this application on the screen.
[3] Send to background – un-focus an application by bringing other application to focus, or returning to home page, or turning off the screen.
[4] Close – close out an application from the screen and the background or turn off the screen.

#	Date/Time (CDT)	Duration (hh:mm:ss)	Direction	Status
24	9/26/2023 21:23:07	00:50:52	Incoming	Answered
25	9/26/2023 21:05:03	00:05:23	Outgoing	Answered
26	9/26/2023 17:14:44	00:06:48	Incoming	Answered
27	9/26/2023 11:33:28	00:20:37	Outgoing	Answered
28	9/26/2023 11:31:40	00:00:00	Incoming	Missed
29	9/26/2023 10:13:01	00:00:24	Outgoing	Answered

1.2.3 Chats

Table 2 is a summary of the text message activity. Native Messages are text messages through the mobile service provider. WhatsApp and Instagram are social media platforms operated through mobile data. The times in the table were the times when the text messages were received/sent. It was unknown when the received text messages were read.

Table 2. Summary of the text message activity. The table shows the most recent events near the top.

#	Date/Time (CDT)	Direction	Status	Source
1	9/29/2023 20:59:01	Incoming	Unread	WhatsApp
2	9/29/2023 20:13:22	Incoming	Unread	WhatsApp
3	9/29/2023 20:12:42	Incoming	Unread	WhatsApp
4	9/29/2023 19:55:50	Incoming	Unread	WhatsApp
5	9/29/2023 19:50:10	Incoming	Unread	WhatsApp
6	9/29/2023 19:28:55	Incoming	Unread	WhatsApp
7	9/29/2023 19:17:44	Incoming	Unread	WhatsApp
8	9/29/2023 19:17:18	Incoming	Unread	WhatsApp
9	9/29/2023 19:15:14	Incoming	Unread	WhatsApp
10	9/29/2023 18:55:35	Incoming	Unread	WhatsApp
11	9/29/2023 18:48:29	Incoming	Unread	WhatsApp
12	9/29/2023 18:46:53	Incoming	Unread	WhatsApp
13	9/29/2023 15:41:38	Incoming	Unknown	Instagram
14	9/29/2023 15:38:17	Incoming	Unknown	Instagram
15	9/29/2023 15:33:37	Incoming	Unread	WhatsApp
16	9/29/2023 15:14:16	Incoming	Unread	WhatsApp
17	9/29/2023 14:56:20	Incoming	Unread	WhatsApp
18	9/29/2023 7:53:23	Incoming	Unread	Native Messages
19	9/29/2023 7:36:52	Incoming	Unread	Native Messages
20	9/29/2023 7:32:13	Outgoing		Native Messages
21	9/29/2023 7:32:04	Outgoing		Native Messages
22	9/29/2023 6:55:06	Outgoing		Native Messages
23	9/29/2023 6:39:02	Outgoing		Native Messages
24	9/29/2023 6:22:17	Incoming	Read	Native Messages
25	9/28/2023 22:23:00	Incoming	Unknown	Instagram
26	9/28/2023 21:50:58	Incoming	Unknown	Instagram

#	Date/Time (CDT)	Direction	Status	Source
27	9/28/2023 21:50:58	Incoming	Unknown	Instagram
28	9/28/2023 21:38:34	Incoming	Unknown	Instagram
29	9/28/2023 19:41:21	Incoming	Unknown	Instagram
30	9/28/2023 18:57:02	Incoming	Unread	WhatsApp
31	9/28/2023 18:02:59	Incoming	Unread	WhatsApp
32	9/28/2023 18:02:15	Incoming	Unread	WhatsApp
33	9/28/2023 17:59:39	Incoming	Unread	WhatsApp
34	9/28/2023 17:53:17	Incoming	Unread	WhatsApp
35	9/28/2023 17:48:56	Incoming	Unread	Native Messages
36	9/28/2023 17:47:46	Incoming	Unread	WhatsApp
37	9/28/2023 17:42:42	Incoming	Unread	WhatsApp
38	9/28/2023 17:40:56	Incoming	Unread	Native Messages
39	9/28/2023 16:54:53	Incoming	Read	Native Messages
40	9/28/2023 16:54:39	Outgoing		Native Messages
41	9/28/2023 16:54:18	Incoming	Read	Native Messages
42	9/28/2023 16:53:26	Outgoing		Native Messages
43	9/28/2023 16:03:05	Incoming	Unknown	WhatsApp
44	9/28/2023 15:51:33	Incoming	Unknown	WhatsApp
45	9/28/2023 11:34:43	Incoming	Unknown	WhatsApp
46	9/28/2023 10:38:01	Incoming	Unknown	WhatsApp
47	9/28/2023 10:08:01	Incoming	Unknown	WhatsApp
48	9/28/2023 10:07:58	Incoming	Unknown	WhatsApp
49	9/28/2023 9:33:32	Incoming	Unknown	WhatsApp
50	9/28/2023 8:39:56	Incoming	Read	Native Messages
51	9/28/2023 8:39:23	Incoming	Read	Native Messages
52	9/28/2023 8:38:52	Outgoing		Native Messages
53	9/28/2023 8:37:27	Incoming	Read	Native Messages
54	9/28/2023 8:29:35	Incoming	Unknown	WhatsApp
55	9/28/2023 8:29:14	Incoming	Unknown	WhatsApp
56	9/28/2023 8:25:29	Incoming	Unknown	WhatsApp
57	9/28/2023 8:12:20	Incoming	Unknown	WhatsApp
58	9/28/2023 7:37:51	Incoming	Unknown	WhatsApp
59	9/28/2023 7:35:32	Incoming	Read	WhatsApp
60	9/28/2023 7:03:19	Incoming	Unknown	WhatsApp
61	9/28/2023 6:08:22	Incoming	Unknown	WhatsApp
62	9/27/2023 22:02:34	Incoming	Unknown	Snapchat
63	9/27/2023 18:52:47	Incoming	Read	Native Messages
64	9/27/2023 18:38:39	Outgoing		Native Messages
65	9/27/2023 18:30:55	Incoming	Read	Native Messages
66	9/27/2023 14:53:55	Incoming	Read	Native Messages
67	9/27/2023 14:30:16	Outgoing		Native Messages
68	9/27/2023 13:19:44	Incoming	Read	Native Messages

#	Date/Time (CDT)	Direction	Status	Source
69	9/27/2023 11:31:42	Incoming	Unknown	WhatsApp
70	9/27/2023 11:31:07	Outgoing		WhatsApp
71	9/27/2023 11:31:04	Incoming	Unread	WhatsApp
72	9/27/2023 11:30:33	Incoming	Unknown	WhatsApp
73	9/26/2023 19:24:01	Incoming	Unknown	WhatsApp
74	9/26/2023 19:22:25	Incoming	Unknown	WhatsApp
75	9/26/2023 18:51:58	Outgoing		WhatsApp
76	9/26/2023 18:41:49	Incoming	Unknown	WhatsApp
77	9/26/2023 18:10:11	Outgoing		Native Messages
78	9/26/2023 18:10:01	Incoming	Read	Native Messages
79	9/26/2023 18:08:42	Outgoing		Native Messages
80	9/26/2023 18:04:43	Incoming	Unknown	WhatsApp
81	9/26/2023 17:26:17	Incoming	Read	Native Messages
82	9/26/2023 17:26:14	Incoming	Read	Native Messages
83	9/26/2023 17:26:01	Outgoing		Native Messages
84	9/26/2023 17:24:33	Incoming	Read	Native Messages
85	9/26/2023 17:24:22	Incoming	Read	Native Messages
86	9/26/2023 17:24:04	Outgoing		Native Messages
87	9/26/2023 17:23:35	Incoming	Read	Native Messages
88	9/26/2023 16:00:19	Incoming	Read	Native Messages
89	9/26/2023 15:59:51	Outgoing		Native Messages
90	9/26/2023 15:58:52	Incoming	Read	Native Messages
91	9/26/2023 15:58:22	Outgoing		Native Messages
92	9/26/2023 15:57:43	Incoming	Read	Native Messages
93	9/26/2023 13:48:23	Incoming	Read	Native Messages
94	9/26/2023 13:48:01	Incoming	Read	Native Messages
95	9/26/2023 13:47:46	Outgoing		Native Messages
96	9/26/2023 13:47:18	Incoming	Read	Native Messages
97	9/26/2023 13:47:10	Outgoing		Native Messages
98	9/26/2023 13:31:52	Incoming	Read	Native Messages
99	9/26/2023 12:05:03	Incoming	Read	Native Messages
100	9/26/2023 12:05:01	Incoming	Read	Native Messages
101	9/26/2023 12:04:45	Outgoing		Native Messages
102	9/26/2023 12:03:47	Incoming	Read	Native Messages
103	9/26/2023 12:03:35	Incoming	Read	Native Messages
104	9/26/2023 12:03:34	Incoming	Read	Native Messages
105	9/26/2023 12:03:18	Outgoing		Native Messages
106	9/26/2023 12:03:06	Incoming	Read	Native Messages
107	9/26/2023 8:32:20	Incoming	Unknown	WhatsApp
108	9/26/2023 8:29:00	Incoming	Unknown	WhatsApp
109	9/26/2023 8:18:10	Incoming	Unknown	WhatsApp
110	9/26/2023 8:03:07	Incoming	Unknown	WhatsApp

#	Date/Time (CDT)	Direction	Status	Source
111	9/26/2023 7:59:01	Incoming	Unknown	WhatsApp
112	9/26/2023 7:59:00	Incoming	Unknown	WhatsApp
113	9/26/2023 7:59:00	Incoming	Unknown	WhatsApp
114	9/26/2023 7:40:14	Incoming	Unknown	WhatsApp
115	9/26/2023 7:03:03	Incoming	Unknown	WhatsApp
116	9/26/2023 5:56:07	Incoming	Unknown	WhatsApp

1.2.4 Email

Table 3 is a summary of the email activity. The times in the table were the times when the emails were received/sent.

Table 3. Summary of the email activity. The table shows the most recent events near the top.

#	Date/Time (CDT)	Direction
1	9/29/2023 13:59:43	Incoming
2	9/29/2023 13:58:42	Outgoing
3	9/29/2023 11:50:47	Incoming
4	9/29/2023 11:34:36	Incoming
5	9/29/2023 11:07:11	Incoming
6	9/29/2023 9:55:47	Incoming
7	9/29/2023 9:54:36	Incoming
8	9/29/2023 8:05:05	Incoming
9	9/29/2023 7:45:26	Outgoing
10	9/29/2023 7:35:45	Incoming
11	9/29/2023 6:45:09	Incoming
12	9/29/2023 6:21:06	Outgoing
13	9/29/2023 3:22:37	Incoming
14	9/28/2023 21:46:35	Incoming
15	9/28/2023 20:01:30	Incoming
16	9/28/2023 17:15:22	Incoming
17	9/28/2023 12:15:01	Incoming
18	9/28/2023 11:36:13	Incoming
19	9/28/2023 11:13:30	Incoming
20	9/28/2023 11:03:42	Incoming
21	9/28/2023 9:51:25	Incoming
22	9/28/2023 7:49:21	Incoming
23	9/28/2023 7:45:29	Incoming
24	9/27/2023 13:04:39	Incoming
25	9/27/2023 11:34:17	Incoming
26	9/27/2023 11:30:45	Incoming
27	9/27/2023 9:41:47	Incoming
28	9/26/2023 16:03:41	Incoming

#	Date/Time (CDT)	Direction
29	9/26/2023 14:00:33	Incoming
30	9/26/2023 11:39:15	Incoming
31	9/26/2023 9:16:59	Incoming
32	9/26/2023 9:01:35	Incoming
33	9/26/2023 8:08:28	Incoming

1.2.5 Web Search

Table 4 is a summary of the web search activity. The times in the table were the times when the web searched started.

Table 4. Summary of the web search activity. The table shows the most recent events near the top.

#	Date/Time (CDT)	Source
1	9/28/2023 13:11:55	Chrome
2	9/28/2023 13:11:32	Chrome
3	9/28/2023 13:11:23	Chrome
4	9/28/2023 13:11:22	Chrome
5	9/28/2023 13:11:21	Chrome
6	9/28/2023 13:11:02	Chrome
7	9/28/2023 13:10:59	Chrome
8	9/28/2023 13:10:53	Chrome
9	9/28/2023 13:10:52	Chrome
10	9/28/2023 13:10:50	Chrome
11	9/27/2023 22:01:27	Chrome
12	9/26/2023 15:39:32	Chrome
13	9/26/2023 10:29:30	Chrome