
ELD Documentation Documentation

Release

Treeline

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4. FUNCTIONAL REQUIREMENTS

1.1 4.1 ELD User Accounts

1.1.1 4.1.1 Account Types

An ELD must support a user account structure that separates drivers and motor carrier's support personnel (i.e. non-drivers).

1.1.2 4.1.2 Account Creation

1. Each user of the ELD must have a valid active account on the ELD with a unique identifier assigned by the motor carrier.
2. Each driver account must require the entry of the driver's license number and the State or jurisdiction that issued the driver's license into the ELD during the account creation process. The driver account must securely store this information on the ELD.
3. An ELD must not allow creation of more than one driver account associated with a driver's license for a given motor carrier.
4. A driver account must not have administrative rights to create new accounts on the ELD.
5. A support personnel account must not allow recording of ELD data for its account holder.
6. An ELD must reserve a unique driver account for recording events during nonauthenticated operation of a CMV. This appendix will refer to this account as the "unidentified driver account."

1.1.3 4.1.3 Account Security

1. An ELD must provide secure access to data recorded and stored on the system by requiring user authentication during system login.

2. Driver accounts must only have access to data associated with that driver, protecting the authenticity and confidentiality of the collected information.

1.1.4 4.1.4 Account Management

1. An ELD must be capable of separately recording and retaining ELD data for each individual driver using the ELD.
2. An ELD must provide for and require **concurrent authentication for team drivers**
3. If more than one ELD unit is used to record a driver's electronic records within a motor carrier's operation, the ELD in the vehicle the driver is operating most recently must be able to produce a complete ELD report for that driver, on demand, for the current 24-hour period and the previous 7 consecutive days.

1.1.5 4.1.5 Non-Authenticated Operation

1. An ELD must associate all non-authenticated operation of a CMV with a **single ELD account labeled unidentified driver**.
 2. If a driver does not log onto the ELD, as soon as the vehicle is in motion, the ELD must:
 - Provide a **visual or visual and audible warning** reminding the driver to stop and log in to the ELD;
 - Record accumulated driving and on-duty, not-driving, time in accordance with the ELD defaults described in section *4.4.1 Conditions for Automatic Setting of Duty Status* of this appendix under the unidentified driver profile; and
 - Not allow entry of any information into the ELD other than a response to the login prompt.
-

1.2 4.2 ELD-Vehicle Interface

1. An ELD must be integrally synchronized with the engine of the CMV. Engine synchronization for purposes of ELD compliance means the monitoring of the vehicle's engine operation to automatically capture the engine's power status, vehicle's motion status, miles driven value, and engine hours value when the CMV's engine is powered.
 2. An ELD used while operating a CMV that is a model year 2000 or later model year, as indicated by the vehicle identification number (VIN), that has an engine electronic control module (ECM) must establish a link to the engine ECM when the CMV's engine is powered and receive automatically the engine's power status, vehicle's motion status, miles driven value, and engine hours value through the serial or Control Area Network communication protocols supported by the vehicle's engine ECM. If the vehicle does not have an ECM, an ELD may use alternative sources to obtain or estimate these vehicle parameters with the listed accuracy requirements under section *4.3.1 ELD Sensing* of this appendix.
-

1.3 4.3 ELD Inputs

1.3.1 4.3.1 ELD Sensing

4.3.1.1 Engine Power Status

An ELD must be powered and become fully functional within 1 minute of the vehicle's engine receiving power and must remain powered for as long as the vehicle's engine stays powered.

4.3.1.2 Vehicle Motion Status

1. An ELD must automatically determine whether a CMV is in motion or stopped by comparing the vehicle speed information with respect to a set speed threshold as follows:
 - Once the **vehicle speed exceeds the set speed threshold, it must be considered in motion.**
 - Once in motion, the vehicle must be considered in motion until its **speed falls to 0 miles per hour and stays at 0 miles per hour for 3 consecutive seconds. Then, the vehicle will be considered stopped.**
 - An ELD's set speed threshold for determination of the in-motion state for the purpose of this section must **not be configurable to greater than 5 miles per hour.**
2. If an ELD is required to have a link to the vehicle's engine ECM, vehicle speed information must be acquired from the engine ECM. Otherwise, vehicle speed information must be acquired using an independent source apart from the positioning services described under section *4.3.1.6 CMV Position* of this appendix and must be accurate within ± 3 miles per hour of the CMV's true ground speed for purposes of determining the in motion state for the CMV.

4.3.1.3 Vehicle Miles

1. An ELD must monitor vehicle miles as accumulated by a CMV over the course of an ignition power on cycle (accumulated vehicle miles) and over the course of CMV's operation (total vehicle miles). Vehicle miles information must use or must be converted to units of **whole miles**.
2. If the ELD is required to have a link to the vehicle's engine ECM as specified in section *4.2 ELD-Vehicle Interface* of this appendix:
 - The ELD must monitor the engine ECM's odometer message broadcast and use it to log total vehicle miles information; and
 - The ELD must use the odometer message to determine accumulated vehicle miles since engine's last power on instance.
3. If the ELD is not required to have a link to the vehicle's engine ECM as specified in section *4.2 ELD-Vehicle Interface* of this appendix, the accumulated vehicle miles indication must be obtained or estimated from a source that is accurate to within $\pm 10\%$ of miles accumulated by the CMV over a 24-hour period as indicated on the vehicle's odometer display.

4.3.1.4 Engine Hours

1. An ELD must monitor engine hours of the CMV over the course of an ignition power on cycle (elapsed engine hours) and over the course of the total engine hours of the CMV's operation. Engine hours must use or must be converted to **hours in intervals of a tenth of an hour.**

2. If an ELD is required to have a link to the vehicle's engine ECM, the ELD must monitor the engine ECM's total engine hours message broadcast and use it to log total engine hours information. Otherwise, engine hours must be obtained or estimated from a source that monitors the ignition power of the CMV and must be accurate within ± 0.1 hour of the engine's total operation within a given ignition power on cycle.

4.3.1.5 Date and Time

1. The ELD must obtain and record the date and time information automatically without allowing any external input or interference from a motor carrier, driver, or any other person.
2. The ELD time must be synchronized to Coordinated Universal Time (UTC) and the absolute deviation from UTC must not exceed 10 minutes at any point in time.

4.3.1.6 CMV Position

1. An ELD must determine automatically the position of the CMV in standard latitude/longitude coordinates with the accuracy and availability requirements of this section.
2. The ELD must obtain and record this information **without allowing any external input or interference from a motor carrier, driver, or any other person**.
3. CMV position measurement must be accurate to ± 0.5 mile of absolute position of the CMV when an ELD measures a valid latitude/longitude coordinate value.
4. Position information must be obtained in or converted to standard signed latitude and longitude values and must be expressed as decimal degrees to hundreds of a degree precision (i.e., a decimal point and two decimal places).
5. Measurement accuracy combined with the reporting precision requirement implies that position reporting accuracy will be on the order of ± 1 mile of absolute position of the CMV during the course of a CMV's commercial operation.
6. During periods of a **driver's indication of personal use of the CMV, the measurement reporting precision requirement is reduced to tenths of a degree** (i.e., a decimal point and single decimal place) as further specified in section *4.7.3 Privacy Preserving Provision for Use During Personal Uses of a CMV* of this appendix.
7. An ELD must be able to acquire a valid position measurement **at least once every 5 miles of driving**; however, the ELD records CMV location information only during ELD events as specified in section *4.5.1 Events and Data to Record* of this appendix.

4.3.1.7 CMV VIN

The vehicle identification number (VIN) for the power unit of a CMV must automatically be obtained from the engine ECM and recorded if it is on the vehicle data bus.

1.3.2 4.3.2 Driver's Manual Entries

1. An ELD must prompt the driver to input information into the ELD only when the CMV is stationary and driver's duty status is not on-duty driving, except for the condition specified in section *4.4.1.2 Automatic Setting of Duty Status to On-Duty Not Driving* of this appendix.
2. If the driver's duty status is driving, an ELD must only allow the driver who is operating the CMV to change the driver's duty status to another duty status.
3. A stopped vehicle must maintain zero (0) miles per hour speed to be considered stationary for purposes of information entry into an ELD.

- An ELD must allow an authenticated co-driver who is not driving, but who has logged into the ELD prior to the vehicle being in motion, to make entries over his or her own records when the vehicle is in motion. The **ELD must not allow co-drivers to switch driving roles when the vehicle is in motion.**

4.3.2.1 Driver’s Entry of Required Event Data Fields

- An ELD must provide a means for a driver to enter information pertaining to the driver’s ELD records manually, e.g., CMV power unit number, as specified in section *7.4 CMV Power Unit Number* of this appendix; trailer number(s), as specified in section *7.42 Trailer Number(s)* ; and shipping document number, as specified in section *7.39 Shipping Document Number*.
- If the motor carrier populates these fields automatically, the ELD must provide means for the driver to review such information and make corrections as necessary.

4.3.2.2 Driver’s Status Inputs

4.3.2.2.1 Driver’s Indication of Duty Status

- An ELD must provide a means for the authenticated driver to select a driver’s duty status.
- The ELD must use the ELD duty status categories listed in ‘**Table 1**’ of this appendix.

Table 1 Duty Status Categories

Duty Status	Abbreviation	Data Coding
Off Duty	OFF	1
Sleeper Berth	SB	2
Driving	D	3
On-duty Not Driving	ON	4

4.3.2.2.2 Driver’s Indication of Situations Impacting Driving Time Recording

- An ELD must provide the means for a driver to indicate the beginning and end of a period when the driver may use the CMV for **authorized personal use or for performing yard moves**. The ELD must acquire this status in a standard format from the category list in *Table 2* of this appendix. This list must be supported independent of the duty status categories described in section *4.3.2.2.1 Driver’s Indication of Duty Status* of this appendix.

Table 2 Categories for Driver’s Indication of Situations Impacting Driving Time Recording

Category	Abbreviation	Data Coding
Authorized Personal Use of CMV	PC	1
Yard Moves	YM	2
Default: None	–	0

- An ELD must allow a driver to select only categories that a **motor carrier enables by configuration** for that driver, as described in section *4.3.3.1.1 Configuration of Available Categories Impacting Driving* of this appendix.

3. An ELD must only allow **one category to be selected at any given time** and use the latest selection by the driver.
4. The ELD **must prompt the driver to enter an annotation upon selection of a category** from *Table 2* of this appendix and record the driver's entry.
5. A driver's indication of special driving situation must **reset to none if the ELD or CMV's engine goes through a power off cycle (ELD or CMV's engine turns off and then on) except if the driver has indicated authorized personal use of CMV. If the driver has indicated authorized personal use of the CMV, the ELD must require confirmation of continuation of the authorized personal use of CMV condition by530 the driver. If not confirmed by the driver and the vehicle is in motion, the ELD must default to none.**

4.3.2.3 Driver's Certification of Records

1. An ELD must include a function whereby a driver can certify the driver's records at the end of a 24-hour period.
 - This function, when selected, must display a statement that reads "I hereby certify that my data entries and my record of duty status for this 24-hour period are true and correct."
 - An ELD must prompt the driver to select "Agree" or "Not ready." An ELD must record the driver's affirmative selection of "Agree" as an event.
2. An ELD must only allow the authenticated driver to certify records associated with that driver.
3. If any edits are necessary after the driver certifies the records for a given 24- hour period, the ELD must require and prompt the driver to re-certify the updated records.
4. If there are any past records on the ELD (excluding the current 24-hour period) that require certification or re-certification by the driver, the ELD must indicate the required driver action on the ELD's display and prompt the driver to take the necessary action during the login and logout processes.

4.3.2.4 Driver's Data Transfer Initiation Input

1. An ELD must provide a standardized single-step driver interface for compilation of driver's ELD records and initiation of the data transfer to authorized safety officials when requested during a roadside inspection.
2. The ELD must input the data transfer request from the driver, require confirmation, present and request selection of the supported data transfer options by the ELD, and prompt for entry of the output file comment as specified in section *4.3.2.5 Driver's Entry of an Output File Comment* of this appendix. Upon confirmation, the ELD must generate the compliant output file and perform the data transfer.
3. The supported single-step data transfer initiation mechanism (such as a switch or an icon on a touch-screen display) must be clearly marked and visible to the driver when the vehicle is stopped.

4.3.2.5 Driver's Entry of an Output File Comment

An ELD must accommodate the entry of an output file comment up to 60 long. If an authorized safety official provides a key phrase code during an inspection to be included in the output file comment, must be entered and embedded in the electronic ELD records in the dataset as specified in section *4.8.2.1.1 Header Segment* this appendix. The default value for the output file comment must be blank. This output file comment must be used only for the creation of related data files for the intended time, place, and ELD user.

4.3.2.6 Driver's Annotation of Records

1. An ELD must allow a driver to add annotations in text format to recorded, entered, or edited ELD events.

2. The ELD must require annotations to be **4 characters or longer**, including embedded spaces if driver annotation is required and driver is prompted by the ELD.

4.3.2.7 Driver’s Entry of Location Information

1. An ELD must allow manual entry of a CMV’s location by the driver in text format in support of the driver edit requirements described in section *4.3.2.8 Driver’s Record Entry/Edit* of this appendix.
2. The driver’s manual location entry must be available as an option to a driver only when prompted by the ELD under allowed conditions as described in section *4.6.1.4 Positioning Compliance Monitoring* of this appendix.
3. A manual location entry must show “M” in the latitude/longitude coordinates fields in ELD records.

4.3.2.8 Driver’s Record Entry/Edit

1. An ELD must provide a mechanism for a driver to review, edit, and annotate the driver’s ELD records when a notation of errors or omissions is necessary or enter the driver’s missing ELD records subject to the requirements specified in this section.
2. An ELD must not permit alteration or erasure of the original information collected concerning the driver’s ELD records or alteration of the source data streams used to provide that information.

4.3.2.8.1 Mechanism for Driver Edits and Annotations

1. If a driver edits or annotates an ELD record or enters missing information, the act must not overwrite the original record.
2. The ELD must use the process outlined in section *4.4.4.2 Event Record Status, Event Record Origin, Event Type Setting* of this appendix to configure required event attributes to track the edit history of records.
3. Driver edits must be accompanied by an annotation. The ELD must prompt the driver to annotate edits.

4.3.2.8.2 Driver Edit Limitations

1. An ELD must not allow or require the editing or manual entry of records with the following event types, as described in section *7.25 Event Type* of this appendix:

Event Type	Description
2	An intermediate log,
5	A driver’s login/logout activity,
6	CMV’s engine power up / shut down, or
7	ELD malfunctions and data diagnostic events

2. An ELD must not allow automatically recorded driving time to be shortened or the ELD username associated with an ELD record to be edited or reassigned, except under the following circumstances:
 - Assignment of Unidentified Driver records. ELD events recorded under the “Unidentified Driver” profile may be edited and assigned to the driver associated with the record; and
 - Correction of errors with team drivers. In the case of team drivers, the driver account associated with the driving time records may be edited and reassigned between the team drivers if there was a mistake resulting in a mismatch between the actual driver and the driver recorded by the ELD and if both team drivers were respectively indicated in each other’s records as a co-driver. The ELD must require each co-driver to confirm the change for the corrective action to take effect.

1.3.3 4.3.3 Motor Carrier's Manual Entries

An ELD must restrict availability of motor carrier entries outlined in this section only to authenticated “support personnel” account holders.

4.3.3.1 ELD Configuration

If an ELD or a technology that includes an ELD function offers configuration options to the motor carrier or the driver that are not otherwise addressed or prohibited in this appendix, the configuration options must not affect the ELD's compliance with the requirements of this rule for each configuration setting of the ELD.

4.3.3.1.1 Configuration of Available Categories Impacting Driving

Time Recording 1. An ELD must allow a motor carrier to unilaterally configure the availability of each of the three categories listed on *Table 2* of this appendix that the motor carrier chooses to authorize for each of its drivers. By default, none of these categories must be available to a new driver account without the motor carrier proactively configuring their availability. 2. A motor carrier may change the configuration for the availability of each category for each of its drivers. Changes to the configuration setting must be recorded on the ELD and communicated to the applicable authenticated driver during the ELD login process.

4.3.3.1.2 Configuration of Using ELDs

1. An ELD must provide the motor carrier the ability to configure a driver account exempt from use of an ELD.
2. The ELD must default the setting of this configuration option for each new driver account created on an ELD to “no exemption.”
3. An exemption must be proactively configured for an applicable driver account by the motor carrier. The ELD must prompt the motor carrier to annotate the record and provide an explanation for the configuration of exemption.
4. If a motor carrier configures a driver account as exempt
 - The ELD must present the configured indication that is in effect for that driver during the ELD login and logout processes.
 - The ELD must continue to record ELD driving time but suspend detection of missing data elements data diagnostic event for the driver described in section *4.6.1.5 Data Recording Compliance Monitoring* of this appendix and data transfer compliance monitoring function described in section *4.6.1.7 Data Transfer Compliance Monitoring* when such driver is authenticated on the ELD.

4.3.3.1.3 Motor Carrier's Post-Review Electronic Edit Requests

1. An ELD may allow the motor carrier (via a monitoring algorithm or support personnel) to screen, review, and request corrective edits to the driver's certified (as described in section *4.3.2.3 Driver's Certification of Records* of this appendix) and submitted records through the ELD system electronically. If this function is implemented by the ELD, the ELD must also support functions for the driver to see and review the requested edits.
2. Edits requested by anyone or any system other than the driver must require the driver's electronic confirmation or rejection.

1.4 4.4 ELD Processing and Calculations

1.4.1 4.4.1 Conditions for Automatic Setting of Duty Status

4.4.1.1 Automatic Setting of Duty Status to Driving

An ELD must automatically record driving time when the vehicle is in motion by setting duty status to driving for the driver unless, before the vehicle is in motion, the driver:

1. Sets the duty status to **off-duty and indicates personal use of CMV**, in which case duty status must remain off-duty until **driver's indication of the driving condition ends**; or
2. Sets the duty status to **on-duty not driving and indicates yard moves**, in which case duty status must remain on-duty not driving until **driver's indication of the driving condition ends**.

4.4.1.2 Automatic Setting of Duty Status to On-Duty Not Driving

When the duty status is set to driving, and the CMV has not been in-motion for 5 consecutive minutes, the ELD must prompt the driver to confirm continued driving status or enter the proper duty status. If the driver does not respond to the ELD prompt within 1-minute after receiving the prompt, the ELD must automatically switch the duty status to on-duty not driving. The time thresholds for purposes of this section must not be configurable.

4.4.1.3 Other Automatic Duty-Status Setting Actions Prohibited

An ELD must not feature any other automatic records of duty setting mechanism than those described in sections 4.4.1.1 and 4.4.1.2 *Automatic Setting of Duty Status to On-Duty Not Driving* of this appendix. Duty status changes that are not initiated by the driver, including duty status alteration recommendations by motor carrier support personnel or a software algorithm, are subject to motor carrier edit requirements in section 4.3.3.1.3 *Motor Carrier's Post-Review Electronic Edit Requests*.

1.4.2 4.4.2 Geo-Location Conversions

1. For each change in duty status, the ELD must convert automatically captured vehicle position in latitude/longitude coordinates into geo-location information, indicating approximate distance and direction to an identifiable location corresponding to the name of a nearby city, town, or village, with a State abbreviation.
2. Geo-location information must be derived from a database that contains all cities, towns, and villages with a population of 5,000 or greater and listed in ANSI INCITS 446-2008 (R2013) (incorporated by reference, see § 395.38).
3. An ELD's viewable outputs (such as printouts or display) must feature geolocation information as place names in text format.

1.4.3 4.4.3 Date and Time Conversions

1. An ELD must have the capability to convert and track date and time captured in UTC standard to the time standard in effect at driver's home terminal, taking the daylight savings time changes into account by using the parameter "Time Zone Offset from UTC" as specified in section 7.41 *Time Zone Offset from UTC* of this appendix.

2. An ELD must record the driver's record of duty status using the time standard in effect at the driver's home terminal for a 24-hour period beginning with the time specified by the motor carrier for that driver's home terminal.
3. The data element "Time Zone Offset from UTC" must be included in the "Driver's Certification of Own Records" events as specified in section *4.5.1.4 Event: Driver's Certification of Own Records* of this appendix.

1.4.4 4.4.4 Setting of Event Parameters in Records, Edits, and Entries

This section describes the security measures for configuring and tracking event attributes for ELD records, edits, and entries in a standardized manner.

4.4.4.1 Event Sequence Identifier (ID) number

1. Each ELD event must feature an event sequence ID number. * The event sequence ID number for each ELD event must use continuous numbering across all users of that ELD and across engine and ELD power on and off cycles. * An ELD must use the next available event sequence ID number (incremented by one) each time a new event log is recorded. * The event sequence ID number must track at least the last 65,536 unique events recorded on the ELD. 2. The continuous event sequence ID numbering structure used by the ELD must be mapped into a continuous hexadecimal number between 0000 (Decimal 0) and FFFF (Decimal 65535).

4.4.4.2 Event Record Status, Event Record Origin, Event Type Setting

1. An ELD must retain the original records even when allowed edits and entries are made over a driver's ELD records.
2. An ELD must keep track of all event record history, and the process used by the ELD must produce the event record status, event record origin, and event type for the ELD records in the standard categories specified in sections *7.23 Event Record Status*, *7.22 Event Record Origin*, and *7.25 Event Type* of this appendix, respectively for each record as a standard security measure. For example, an ELD may use the process outlined in sections *4.4.4.2.1 Records Automatically Logged by ELD* *4.4.4.2.6 Driver's Actions Over Motor Carrier Edit Suggestions* to meet the requirements of this section.

4.4.4.2.1 Records Automatically Logged by ELD

At the instance an ELD creates a record automatically, the ELD must:

1. Set the "Event Record Status" to "1" (active); and
2. Set the "Event Record Origin" to "1" (automatically recorded by ELD).

4.4.4.2.2 Driver Edits

At the instance of a driver editing existing record(s), the ELD must:

1. Identify the ELD record(s) being modified for which the "Event Record Status" is currently set to "1" (active);
2. Acquire driver input for the intended edit and construct the ELD record(s) that will replace the record(s) identified in paragraph **:ref:'4.4.4.2.2' (1)** of this appendix;
3. Set the "Event Record Status" of the ELD record(s) identified in paragraph **:ref:'4.4.4.2.2' (1)** of this appendix, which is being modified, to "2" (inactive-changed);

4. Set the “Event Record Status” of the ELD record(s) constructed in paragraph :ref:‘4.4.4.2.2’ (2) of this appendix to “1” (active); and
5. Set the “Event Record Origin” of the ELD record(s) constructed in paragraph :ref:‘4.4.4.2.2’ (2) of this appendix to “2” (edited or entered by the driver).

4.4.4.2.3 Driver Entries

When a driver enters missing record(s), the ELD must:

1. Acquire driver input for the missing entries being implemented and construct the new ELD record(s) that will represent the driver entries;
2. Set the “event record status” of the ELD record(s) constructed in paragraph :ref:‘4.4.4.2.3’ (1) of this appendix to “1” (active); and
3. Set the “event record origin” of the ELD record(s) constructed in paragraph :ref:‘4.4.4.2.3’ (1) of this appendix to “2” (edited or entered by the driver).

4.4.4.2.4 Driver’s Assumption of Unidentified Driver Logs

When a driver reviews and assumes ELD record(s) logged under the unidentified driver profile, the ELD must:

1. Identify the ELD record(s) logged under the unidentified driver profile that will be reassigned to the driver;
2. Use elements of the unidentified driver log(s) from paragraph :ref:‘4.4.4.2.4’ (1) of this appendix and acquire driver input to populate missing elements of the log originally recorded under the unidentified driver profile, and construct the new event record(s) for the driver;
3. Set the event record status of the ELD record(s) identified in paragraph :ref:‘4.4.4.2.4’ (1) of this appendix, which is being modified, to “2” (inactive–changed);
4. Set the event record status of the ELD record(s) constructed in paragraph :ref:‘4.4.4.2.4’ (2) of this appendix to “1” (active); and
5. Set the event record origin of the ELD record(s) constructed in paragraph :ref:‘4.4.4.2.4’ (2) of this appendix to “4” (assumed from unidentified driver profile).

4.4.4.2.5 Motor Carrier Edit Suggestions

If a motor carrier requests an edit on a driver’s records electronically, the ELD must:

1. Identify the ELD record(s) the motor carrier requests to be modified for which the “event record status” is currently set to “1” (active);
2. Acquire motor carrier input for the intended edit and construct the ELD record(s) that will replace the record identified in paragraph :ref:‘4.4.4.2.5’ (1) of this appendix—if approved by the driver;
3. Set the event record status of the ELD record(s) in paragraph :ref:‘4.4.4.2.5’ (2) of this appendix to “3” (inactive–change requested); and
4. Set the event record origin of the ELD record constructed in paragraph :ref:‘4.4.4.2.5’ (2) of this appendix to “3” (edit requested by an authenticated user other than the driver).

4.4.4.2.6 Driver's Actions Over Motor Carrier Edit Suggestions

1. If edits are requested by the motor carrier, the ELD must allow the driver to review the requested edits and indicate on the ELD whether the driver confirms or rejects the requested edit(s).
2. If the driver approves the motor carrier's edit suggestion the ELD must:
 - Set the event record status of the ELD record(s) identified under paragraph :ref:'4.4.4.2.5' (1) of this appendix being modified, to "2" (inactive–changed); and
 - Set the "event record status" of the ELD record(s) constructed in paragraph :ref:'4.4.4.2.5' (2) of this appendix to "1" (active).
3. If the driver disapproves the motor carrier's edit(s) suggestion, the ELD must set the "event record status" of the ELD record(s) identified in paragraph :ref:'4.4.4.2.5' (2) of this appendix to "4" (inactive–change rejected).

1.4.5 4.4.5 Data Integrity Check Functions

1. An ELD must support standard security measures that require the calculation and recording of standard data check values for each ELD event recorded, for each line of the output file, and for the entire data file to be generated for transmission to an authorized safety official or the motor carrier.
2. For purposes of implementing data check calculations, the alphanumeric-tonumeric mapping provided in *Table 3* of this appendix must be used.
3. Each ELD event record type specified in sections *4.5.1.1 Event: Change in Driver's Duty Status* and *4.5.1.3 Event: Change in Driver's Indication of Allowed Conditions that Impact Driving Time Recording* of this appendix must include an event data check value, which must be calculated as specified in section *4.4.5.1 Event Data Check*. An event data check value must be calculated at the time of the following instances and must accompany that event record thereafter:
 - When an event record is automatically created by the ELD;
 - When an authorized edit is performed by the driver on the ELD;
 - When an electronic edit proposal is created by the motor carrier through the ELD system.
 - Each line of the ELD output file must include a line data check value, which must be calculated as specified in section *4.4.5.2 Line Data Check* of this appendix.
 - Each ELD report must also include a file data check value, which must be calculated as specified in section *4.4.5.3 File Data Check* of this appendix.

4.4.5.1 Event Data Check

The event data check value must be calculated as follows.

4.4.5.1.1 Event Checksum Calculation

1. A checksum calculation includes the summation of numeric values or mappings of a specified group of alphanumeric data elements. The ELD must calculate an event checksum value associated with each ELD event at the instance of the event record being created.
2. The event record elements that must be included in the checksum calculation are the following: * <Event Type>, * <Event Code>, * <Event Date>, * <Event Time>, * <Vehicle Miles>, * <Engine Hours>, * <Event Latitude>, * <Event Longitude>, * <CMV number>, and * <ELD username>.
3. The ELD must sum the numeric values of all individual characters making up the listed data elements using the character to decimal value coding specified in **'Table**

3 <#Table-3> of this appendix, and use the 8-bit lower byte of the hexadecimal representation of the summed total as the event checksum value for that event.

4.4.5.1.2 Event Data Check Calculation

The event data check value must be the hexadecimal representation of the output 8-bit byte, after the below bitwise operations are performed on the binary representation of the event checksum value, as set forth below:

1. Three consecutive circular shift left (rotate no carry -left) operations; and
2. A bitwise exclusive OR (XOR) operation with the hexadecimal value C3 (decimal 195; binary 11000011).

4.4.5.2 Line Data Check

A line data check value must be calculated at the time of the generation of the ELD output file, to transfer data to authorized safety officials or to catalogue drivers' ELD records at a motor carrier's facility. A line data check value must be calculated as follows.

4.4.5.2.1 Line Checksum Calculation

1. The ELD must calculate a line checksum value associated with each line of ELD output file at the instance when an ELD output file is generated. 2. The data elements that must be included in the line checksum calculation vary as per the output data file specified in section *4.8.2.1 ELD Output File Standard* of this appendix. 3. The ELD must convert each character featured in a line of output using the character to decimal value coding specified on *Table 3* of this appendix and sum the converted numeric values of each character listed on a given ELD output line item (excluding the line data check value being calculated), and use the 8-bit lower byte value of the hexadecimal representation of the summed total as the line checksum value for that line of output.

4.4.5.2.2 Line Data Check Calculation.

The line data check value must be calculated by performing the following operations on the binary representation of the line checksum value as follows: 1. Three consecutive circular shift left (rotate no carry -left) operations on the line checksum value; and 2. A bitwise XOR operation with the hexadecimal value 96 (decimal 150; binary 10010110).

4.4.5.2.3 Line Data Check Value Inclusion in Output File

The calculated line data check value must be appended as the last line item of each of the individual line items of the ELD output file as specified in the output file format in section *4.8.2.1 ELD Output File Standard* of this appendix.

4.4.5.3 File Data Check

A file data check value must also be calculated at the time of the creation of an ELD output file. A file data check value must be calculated as follows.

4.4.5.3.1 File Checksum Calculation.

1. The ELD must calculate a single 16-bit file checksum value associated with an ELD output file at the instance when an ELD output file is generated.

2. The file data check value calculation must include all individual line data check values contained in that file. 3. The ELD must sum all individual line data check values contained in a data file output created, and use the lower two 8-bit byte values of the hexadecimal representation of the summed total as the “file checksum” value.

4.4.5.3.2 File Data Check Value Calculation.

1. The file data check value must be calculated by performing the following operations on the binary representation of the file checksum value:
 - Three consecutive circular shift left (aka rotate no carry -left) operations on each 8-bit bytes of the value; and
 - A bitwise XOR operation with the hexadecimal value 969C (decimal 38556; binary 1001011010011100).
2. The file data check value must be the 16-bit output obtained from the above process.

4.4.5.3.3 File Data Check Value Inclusion in Output File.

The calculated 16-bit file data check value must be converted to hexadecimal 8- bit bytes and must be appended as the last line item of the ELD output file as specified in the output file format in section *4.8.2.1.11 File Data Check Value* of this appendix.

Table 3 Character to Decimal Value Mapping for Checksum Calculations

Character	Decimal mapping {ASCII (“Character”) (decimal)– 48 (decimal)}
“1”	1
“2”	2
“3”	3
“4”	4
“5”	5
“6”	6
“7”	7
“8”	8
“9”	9
“A”	17
“B”	18
“C”	19
“D”	20
“E”	21
“F”	22
“G”	23
“H”	24
“I”	25
“J”	26
“K”	27
“L”	28
“M”	29
“N”	30
“O”	31
“P”	32

Continued on next page

Table 1.1 – continued from previous page

Character	Decimal mapping {ASCII (“Character”) (decimal)– 48 (decimal)}
“Q”	33
“R”	34
“S”	35
“T”	36
“U”	37
“V”	38
“W”	39
“X”	40
“Y”	41
“Z”	42
“a”	49
“b”	50
“c”	51
“d”	52
“e”	53
“f”	54
“g”	55
“h”	56
“i”	57
“j”	58
“k”	59
“l”	60
“m”	61
“n”	62
“o”	63
“p”	64
“q”	65
“r”	66
“s”	67
“t”	68
“u”	69
“v”	70
“w”	71
“x”	72
“y”	73
“z”	74
All other characters including blank spaces	0

1.5 4.5 ELD Recording

1.5.1 4.5.1 Events and Data to Record

An ELD must record data at the following discrete events:

4.5.1.1 Event: Change in Driver’s Duty Status

When a driver’s duty status changes, the ELD must associate the record with the driver, the record originator—if created during an edit or entry—the vehicle, the motor carrier, and the shipping document number and must include

the following data elements:

1. as described in section *7.24 Event Sequence ID Number* of this appendix;
2. as described in section *7.23 Event Record Status*;
3. as described in section *7.22 Event Record Origin*;
4. as described in section *7.25 Event Type*;
5. as described in section *7.20 Event Code*;
6. <{Event} Date> as described in section *7.8 Date*;
7. <{Event} Time> as described in section *7.40 Time*;
8. <{Accumulated} Vehicle Miles> as described in section *7.43 Vehicle Miles*;
9. <{Elapsed} Engine Hours> as described in section *7.19 Engine Hours*;
10. <{Event} Latitude> as described in section *7.31 Latitude*;
11. <{Event} Longitude> as described in section *7.33 Longitude*;
12. as described in section *7.9 Distance Since Last Valid Coordinates*;
13. as described in section *7.35 Malfunction Indicator Status*;
14. as described in section *7.7 Data Diagnostic Event Indicator Status*;
15. <{Event} Comment /Annotation> as described in section *7.6 Comment/Annotation*;
16. as described in section *7.12 Driver's Location Description*; and
17. as described in section *7.21 Event Data Check Value*.

4.5.1.2 Event: Intermediate Logs

1. When a CMV is in motion, as described in section *4.3.1.2 Vehicle Motion Status* of this appendix, and there has not been a duty status change event or another intermediate log event recorded in the previous 1-hour period, the ELD must record a new intermediate log event.
2. The ELD must associate the record to the driver, the vehicle, the motor carrier, and the shipping document number, and must include the same data elements outlined in section *4.5.1.1 Event: Change in Driver's Duty Status* of this appendix except for item (p) in section *4.5.1.1*.

4.5.1.3 Event: Change in Driver's Indication of Allowed Conditions that Impact Driving Time Recording

1. At each instance when the status of a driver's indication of personal use of CMV or yard moves changes, the ELD must record a new event.
2. The ELD must associate the record with the driver, the vehicle, the motor carrier, and the shipping document number, and must include the same data elements outlined in section *4.5.1.1 Event: Change in Driver's Duty Status* of this appendix.

4.5.1.4 Event: Driver's Certification of Own Records

1. At each instance when a driver certifies or re-certifies that the driver's records for a given 24-hour period are true and correct, the ELD must record the event.

2. The ELD must associate the record with the driver, the vehicle, the motor carrier, and the shipping document number and must include the following data elements:
 - as described in section *7.24 Event Sequence ID Number* of this appendix;
 - as described in section *7.25 Event Type*;
 - as described in section *7.20 Event Code*;
 - as described in section *7.41 Time Zone Offset from UTC*.
 - <{Event} Date> and as described in section *7.8 Date*; and
 - <{Event} Time> as described in section *7.40 Time*.

4.5.1.5 Event: Driver's Login/Logout Activity

1. At each instance when an authorized user logs in and out of the ELD, the ELD must record the event.
2. The ELD must associate the record with the driver, the vehicle, the motor carrier, and the shipping document number, and must include the following data elements:
 - as described in section *7.24 Event Sequence ID Number* of this appendix;
 - as described in section *7.25 Event Type*;
 - as described in section *7.20 Event Code*;
 - <{Event} Date> as described in section *7.8 Date*;
 - <{Event} Time> as described in section *7.40 Time*;
 - <{Total} Vehicle Miles> as described in section *7.43 Vehicle Miles*; and
 - <{Total} Engine Hours> as described in section *7.19 Engine Hours*.

4.5.1.6 Event: CMV's Engine Power Up and Shut Down Activity

1. When a CMV's engine is powered up or shut down, an ELD must record the event within 1 minute of occurrence and retain the earliest shut down and latest power-up event if the CMV has not moved since the last ignition power on cycle.
2. The ELD must associate the record with the driver or the unidentified driver profile, the vehicle, the motor carrier, and the shipping document number, and must include the following data elements:
 - as described in section *7.24 Event Sequence ID Number* of this appendix;
 - as described in section *7.25 Event Type*;
 - as described in section *7.20 Event Code*;
 - <{Event} Date> as described in section *7.8 Date*;
 - <{Event} Time> as described in section *7.40 Time*;
 - <{Total} Vehicle Miles> as described in section *7.43 Vehicle Miles*;
 - <{Total} Engine Hours> as described in section *7.19 Engine Hours*;
 - <{Event} Latitude> as described in section *7.31 Latitude*;
 - <{Event} Longitude> as described in section *7.33 Longitude*; and
 - as described in section *7.9 Distance Since Last Valid Coordinates*.

4.5.1.7 Event: ELD Malfunction and Data Diagnostics Occurrence

1. At each instance when an ELD malfunction or data diagnostic event is detected or cleared by the ELD, the ELD must record the event.
2. The ELD must associate the record with the driver, the vehicle, the motor carrier, and the shipping document number, and must include the following data elements:
 - as described in section 7.24 *Event Sequence ID Number* of this appendix;
 - as described in section 7.25 *Event Type*;
 - as described in section 7.20 *Event Code*;
 - <Malfunction/Diagnostic Code> as described in section 7.34 *Malfunction/Diagnostic Code*;
 - <{Event} Date> as described in section 7.8 *Date*;
 - <{Event} Time> as described in section 7.40 *Time*;
 - <{Total} Vehicle Miles> as described in section 7.43 *Vehicle Miles*; and
 - <{Total} Engine Hours> as described in section 7.19 *Engine Hours*.

1.6 4.6 ELD’s Self-Monitoring of Required Functions

An ELD must have the capability to monitor its compliance with the technical requirements of this section for the detectable malfunctions and data inconsistencies listed in *Table 4* of this appendix and must keep records of its malfunction and data diagnostic event detection.

1.6.1 Table 4 Standard Coding for Required Compliance Malfunction and Data Diagnostic Event Detection

Malfunction/Diagnostic Code	Malfunction Description
P	“Power compliance” malfunction
E	“Engine synchronization compliance” malfunction
T	“Timing compliance” malfunction
L	“Positioning compliance” malfunction
R	“Data recording compliance” malfunction
S	“Data transfer compliance” malfunction
O	“Other” ELD detected malfunction

Malfunction/Diagnostic Code	Data Diagnostic Event
1	“Power data diagnostic” event
2	“Engine synchronization data diagnostic” event
3	“Missing required data elements data diagnostic” event
4	“Data transfer data diagnostic” event
5	“Unidentified driving records data diagnostic” event
6	“Other” ELD identified diagnostic event

1.6.2 4.6.1 Compliance Self-Monitoring, Malfunctions and Data Diagnostic Events

4.6.1.1 Power Compliance Monitoring

1. An ELD must monitor data it receives from the engine ECM or alternative sources as allowed in sections *4.3.1.1 Engine Power Status – 4.3.1.4 Engine Hours* of this appendix, its onboard sensors, and data record history to identify instances when it may not have complied with the power requirements specified in section *4.3.1.1*, in which case, the ELD must record a power data diagnostics event for the corresponding driver(s), or under the unidentified driver profile if no drivers were authenticated at the time of detection. 2. An ELD must set a power compliance malfunction if the power data diagnostics event described in paragraph *4.6.1.1(1)* of this appendix indicates an aggregated in-motion driving time understatement of 30 minutes or more on the ELD over a 24-hour period across all driver profiles, including the unidentified driver profile.

4.6.1.2 Engine Synchronization Compliance Monitoring

1. An ELD must monitor the data it receives from the engine ECM or alternative sources as allowed in sections *4.3.1.1 – 4.3.1.4 Engine Hours* of this appendix, its onboard sensors, and data record history to identify instances and durations of its non-compliance with the ELD engine synchronization requirement specified in section *4.2 ELD-Vehicle Interface*.
2. An ELD required to establish a link to the engine ECM as described in section *4.2 ELD-Vehicle Interface* must monitor its connectivity to the engine ECM and its ability to retrieve the vehicle parameters described under section *4.3.1 ELD Sensing* of this appendix and must record an engine synchronization data diagnostics event when it no longer can acquire updated values for the ELD parameters required for records within 5 seconds of the need.
3. An ELD must set an engine synchronization compliance malfunction if connectivity to any of the required data sources specified in section *4.3.1 ELD Sensing* of this appendix is lost for more than 30 minutes during a 24-hour period aggregated across all driver profiles, including the unidentified driver profile.

4.6.1.3 Timing Compliance Monitoring

The ELD must periodically cross-check its compliance with the requirement specified in section *4.3.1.5 Date and Time* of this appendix with respect to an accurate external UTC source and must record a timing compliance malfunction when it can no longer meet the underlying compliance requirement.

4.6.1.4 Positioning Compliance Monitoring

1. An ELD must continually monitor the availability of valid position measurements meeting the listed accuracy requirements in section *4.3.1.6 CMV Position* of this appendix and must track the distance and elapsed time from the last valid measurement point.
2. ELD records requiring location information must use the last valid position measurement and include the latitude/longitude coordinates and distance traveled, in miles, since the last valid position measurement.
3. An ELD must monitor elapsed time during periods when the ELD fails to acquire a valid position measurement within 5 miles of the CMV's movement. When such elapsed time exceeds a cumulative 60 minutes over a 24 hour period, the ELD must set and record a positioning compliance malfunction.
4. If a new ELD event must be recorded at an instance when the ELD had failed to acquire a valid position measurement within the most recent elapsed 5 miles of driving, but the ELD has not yet set a positioning compliance malfunction, the ELD must record the character "X" in both the latitude and longitude fields, unless location is entered manually by the driver, in which case it must log the character "M" instead. Under the circumstances listed in this paragraph, if the ELD event is due to a change in duty status for the driver, the ELD

must prompt the driver to enter location manually in accordance with section *4.3.2.7 Driver's Entry of Location Information* of this appendix. If the driver does not enter the location information and the vehicle is in motion, the ELD must record a missing required data element data diagnostic event for the driver.

5. If a new ELD event must be recorded at an instance when the ELD has set a positioning compliance malfunction, the ELD must record the character "E" in both the latitude and longitude fields regardless of whether the driver is prompted and manually enters location information.

4.6.1.5 Data Recording Compliance Monitoring

1. An ELD must monitor its storage capacity and integrity and must detect a data recording compliance malfunction if it can no longer record or retain required events or retrieve recorded logs that are not otherwise catalogued remotely by the motor carrier.
2. An ELD must monitor the completeness of the ELD event record information in relation to the required data elements for each event type and must record a missing data elements data diagnostics event for the driver if any required field is missing at the time of recording.

4.6.1.6 Monitoring Records Logged under the Unidentified Driver Profile

1. When there are ELD records involving driving time logged on an ELD under the unidentified driver profile, the ELD must prompt the driver(s) logging in with a warning indicating the existence of new unassigned driving time.
2. The ELD must provide a mechanism for the driver to review and either acknowledge the assignment of one or more of the unidentified driver records attributable to the driver under the authenticated driver's profile as described in paragraph *4.3.2.8.2 Driver Edit Limitations* (2)(1) of this appendix or indicate that these records are not attributable to the driver.
3. If more than 30 minutes of driving in a 24-hour period show unidentified driver on the ELD, the ELD must detect and record an unidentified driving records data diagnostic event and the data diagnostic indicator must be turned on for all drivers logged in to that ELD for the current 24-hour period and the following 7 days.
4. An unidentified driving records data diagnostic event can be cleared by the ELD when driving time logged under the unidentified driver profile for the current 24-hour period and the previous 7 consecutive days drops to 15 minutes or less.

4.6.1.7 Data Transfer Compliance Monitoring

1. An ELD must implement in-service monitoring functions to verify that the data transfer mechanism(s) described in section *4.9.1 Data Transfer During Roadside Safety Inspections* of this appendix are continuing to function properly. An ELD must verify this functionality at least once every 7 days. These monitoring functions may be automatic or may involve manual steps for a driver.
2. If the monitoring mechanism fails to confirm proper in-service operation of the data transfer mechanism(s), an ELD must record a data transfer data diagnostic event and enter an unconfirmed data transfer mode.
3. After an ELD records a data transfer data diagnostic event, the ELD must increase the frequency of the monitoring function to check at least once every 24-hour period. If the ELD stays in the unconfirmed data transfer mode following the next three consecutive monitoring checks, the ELD must detect a data transfer compliance malfunction.

4.6.1.8 Other Technology-Specific Operational Health Monitoring

In addition to the required monitoring schemes described in sections *4.6.1.1 Power Compliance Monitoring* – *4.6.1.7 Data Transfer Compliance Monitoring* of this appendix, the ELD provider may implement additional, technology specific malfunction and data diagnostic detection schemes and may use the ELD’s malfunction status indicator and data diagnostic status indicator (described in sections *4.6.2.1 Visual Malfunction Indicator* and *4.6.3.1 Visual Data Diagnostics Indicator*) to communicate the ELD’s malfunction or non-compliant state to the operator(s) of the ELD.

1.6.3 4.6.2 ELD Malfunction Status Indicator

ELD malfunctions affect the integrity of the device and its compliance; therefore, active malfunctions must be indicated to all drivers who may use that ELD. An ELD must provide a recognizable visual indicator, and may provide an audible signal, to the operator as to its malfunction status.

4.6.2.1 Visual Malfunction Indicator

1. An ELD must display a single visual malfunction indicator for all drivers using the ELD on the ELD’s display or on a stand-alone indicator. The visual signal must be visible to the driver when the driver is seated in the normal driving position.
2. The ELD malfunction indicator must be clearly illuminated when there is an active malfunction on the ELD.
3. The malfunction status must be continuously communicated to the driver when the ELD is powered.

1.6.4 4.6.3 ELD Data Diagnostic Status Indicator

ELD data diagnostic status affects only the authenticated user; therefore, an ELD must only indicate the active data diagnostics status applicable to the driver logged into the ELD. An ELD must provide a recognizable visual indicator, and may provide an audible signal, to the driver as to its data diagnostics status.

4.6.3.1 Visual Data Diagnostics Indicator

1. An ELD must display a single visual data diagnostics indicator, apart from the visual malfunction indicator described in section *4.6.2.1 Visual Malfunction Indicator* of this appendix, to communicate visually the existence of active data diagnostics events for the applicable driver.
2. The visual signal must be visible to the driver when the driver is seated in the normal driving position.

1.7 4.7 Special Purpose ELD Functions

1.7.1 4.7.1 Driver’s ELD Volume Control

1. If a driver selects the sleeper-berth state for the driver’s record of duty status and no co-driver has logged into the ELD as on-duty driving, and if the ELD outputs audible signals, the ELD must either:
 - Allow the driver to mute the ELD’s volume or turn off the ELD’s audible output, or
 - Automatically mute the ELD’s volume or turn off the ELD’s audible output.
2. For purposes of this section, if an ELD operates in combination with another device or other hardware or software technology that is not separate from the ELD, the volume controls required herein apply to the combined device or technology.

1.7.2 4.7.2 Driver's Access to Own ELD Records

ELD must provide a mechanism for a driver to obtain a copy of the driver's own ELD records on demand, in either an electronic or printout format compliant with inspection standards outlined in section 4.8.2.1 *ELD Output File Standard* of this appendix.

1. The process must not require a driver to go through the motor carrier to obtain copies of the driver's own ELD records if driver's records reside on or are accessible directly by the ELD unit used by the driver.
2. If an ELD meets the requirements of this section by making data files available to the driver, it must also provide a utility function for the driver to display the data on a computer, at a minimum, as specified in § 395.8(g).

1.7.3 4.7.3 Privacy Preserving Provision for Use During Personal Uses of a CMV

1. An ELD must record the events listed in section 4.5.1 *Events and Data to Record* of this appendix under all circumstances. However, when a driver indicates that the driver is temporarily using the CMV for an authorized personal purpose, a subset of the recorded elements must either be omitted in the records or recorded at a lower precision level, as described in further detail below. The driver indicates this intent by setting the driver's duty status to off-duty, as described in section 4.3.2.2.1 *Driver's Indication of Duty Status*, and indicating authorized personal use of CMV as described in section 4.3.2.2.2 *Driver's Indication of Situations Impacting Driving Time Recording*.
2. During a period when a driver indicates authorized personal use of CMV, the ELD must:
 - Record all new ELD events with latitude/longitude coordinates information rounded to a single decimal place resolution; and
 - Omit recording vehicle miles and engine hours fields in new ELD logs by leaving them blank, except for events corresponding to a CMV's engine power-up and shut-down activity as described in section 4.5.1.6 *Event: CMV's Engine Power Up and Shut Down Activity* of this appendix.
3. A driver's indication that the CMV is being operated for authorized personal purposes may span more than one CMV ignition on cycle if the driver proactively confirms continuation of the personal use condition prior to placing the vehicle in motion when the ELD prompts the driver at the beginning of the new ignition power on cycle.

1.8 4.8 Printout or Display

The ELD must be able to generate a compliant report as specified in this section, either as a printout or on a display. Print paper must be able to accommodate the graph grid specifications as listed in section 4.8.1.3 of this appendix.

- 1. This section does not apply if an ELD produces a printout for use at a roadside inspection.
- 2. **An ELD must be designed so that its display may be reasonably** viewed by an authorized safety official without entering the commercial motor vehicle. For example, the display may be untethered from its mount or connected in a manner that would allow it to be passed outside of the vehicle for a reasonable distance.
- (a)The printout and display must show reports for the inspected driver's profile and the unidentified driver profile separately. If there are no unidentified driver records existing on the ELD for the current 24-hour period and for any of the previous 7 98 consecutive days, an ELD does not need to print or display unidentified driver records for the authorized safety official. Otherwise, both reports must be printed or displayed and provided to the authorized safety official.
- (b)The printout and display must show the following information for the current 24-hour period and each of the previous 7 consecutive days: (Items in < . > are data elements.)

Date <Date {of Record}>

24-hour Starting Time, Time Zone Offset from UTC: <24-Hour Period Starting Time>, <Time Zone Offset from UTC>

Carrier <Carrier's USDOT number>,<Carrier Name>

Driver Name <{Driver} Last Name>, <{Driver} First Name>

Driver ID <ELD username{for the driver}>

Driver License State <{Driver} Driver License Issuing State>

Driver License Number <{Driver} Driver License Number>

Co-Driver <{Co-Driver's} Last Name>, <{Co-Driver's} First Name>

Co-Driver ID <ELD username{for the co-driver}>

Current Odometer <{Current}{Total} Vehicle Miles>

Current Engine Hours <{Current}{Total} Engine Hours>

ELD ID <ELD Registration ID>

ELD Provider <Provider>

Truck Tractor ID <CMV Power Unit Number>

Truck Tractor VIN <CMV VIN>

Shipping ID <Shipping Document Number>

Current Location <{Current} Geo-location>

Unidentified Driving Records <{Current} Data Diagnostic Event Indicator Status {for "Unidentified driving records data diagnostic" event}>

Exempt Driver Status <Exempt Driver Configuration {for the Driver}>

ELD Malfunction Indicators <Malfunction Indicator Status {and Malfunction Description} {for ELD}>

Driver's Data Diagnostic Status <Data Diagnostic Event Status {and Diagnostic Description}{for Driver}>

Date <Date {of Printout or Display}>

Change of Duty Status, Intervening Interval Records and Change in Driver's Indication of Special Driving Conditions:

<Event Record Status>,<Event Record Origin>,<Event Type>,<{Event} Date>, <{Event} Time>,<{Accumulated} Vehicle Miles>,<{Elapsed} Engine Hours>,<Geo- Location>#,<{Event} Comment/Annotation>

<Event Sequence ID Number>,<Event Record Status>,<Event Record Origin>,<Event Type>,<Event Code>,<{Event} Date>,<{Event} Time>,<{Accumulated} Vehicle Miles>,<{Elapsed} Engine Hours>,<Geo-Location>#,<{Event} Comment/Annotation> # "<Geo-location> must be substituted with "<Driver's Location Description>" field for manual entries and with "<{blank}>" field for intervening logs.

Example of Print/Display Daily Header

24 Hours [Print/Display Graph Grid]

Total hours <Total Hours {in working day so far}>

<i>Record Date</i>	<i>USDOT #</i>	<i>Driver License Number</i>	<i>Driver License State</i>	<i>ELD ID</i>	<i>Trailer ID</i>
20-Nov-14	123456789	D000368210361	IL	987654	Unit #
<i>Time Zone</i>	<i>Driver Name</i>	<i>Co-Driver Name</i>	<i>ELD Manufacturer</i>	<i>Shipping ID</i>	<i>Data Diagnostic Indicators</i>
CST	Smith, Richard	Jones, David	Acme ELDs	BL1234567890	Yes
<i>24-Period Starting Tim</i>	<i>Driver ID</i>	<i>Co-Driver ID</i>	<i>Truck Tractor ID</i>	<i>Unidentified Driver Records</i>	<i>ELD Malfunction Indicators</i>
Midnight	1234567	8910111	Unit #	No	Yes
<i>Carrier</i>	<i>Start- End Odometer</i>	<i>Truck Tractor VIN</i>	<i>Exempt Driver Status</i>	<i>Start-End engine hours</i>	
Acme Trucking	39564-40044	1M2P267Y5AM022445	No	758.2-766.7	
<i>Current Location</i>	<i>File Comment</i>		<i>Print/Display Date</i>		
Truckee, CA			20-Nov-14		

Off duty <Total Hours {logged in Off-duty status}>

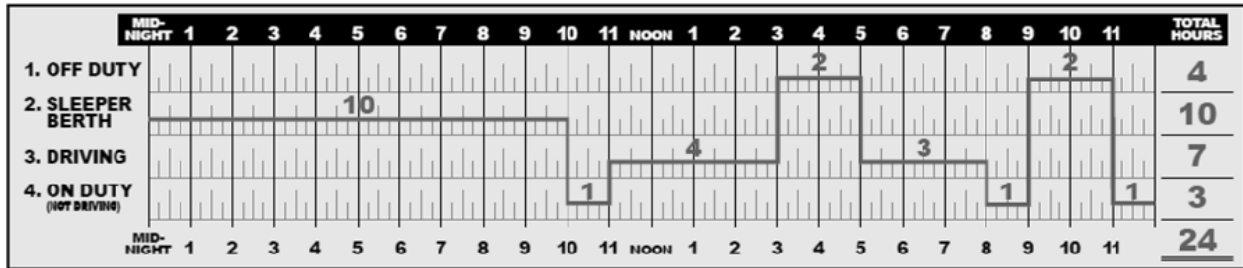
Sleeper Berth <Total Hours {logged in Sleeper berth status}>

Driving <Total Hours {logged in Driving status}>

On duty not driving <Total Hours {logged in on-duty not driving status}>

Miles Today < Vehicle Miles {Driven Today}>

Example of Print/Display 24 Hours Duty Status Grid



[For Each Row of Driver’s Record Certification Events] Time: <{Event} Time> Location: <Geo-Location># 101 Odometer: <{Total} Vehicle Miles> Engine Hours: <{Total} Engine Hours> Event:<Date {of the certified record}> Origin: Driver Comment: <{Event} Comment/Annotation>

[For Each Row of Malfunctions and Data Diagnostic Events] Time: <{Event} Time> Location: <Geo-Location># Odometer: < {Total} Vehicle Miles> Engine Hours: <{Total} Engine Hours> Event:<Event Type> Origin: <Event Record Origin> Comment: <{Event} Comment/Annotation>

[For Each Row of ELD Login/Logout Events] Time: <{Event} Time> Location: <Geo-Location># Odometer: < {Total} Vehicle Miles> Engine Hours: <{Total} Engine Hours> Event:<Event Type> Origin: <ELD username> Comment: <{Event} Comment/Annotation>

[For Each Row of CMV Engine Power up / Shut Down Events] Time: <{Event} Time> (24 hours) Location: <Geo-Location># Odometer: < {Total} Vehicle Miles> Engine Hours: <{Total} Engine Hours> Event:<Event Type> Origin: Auto Comment/Annotation> 1Printout report must only list up to 10 most recent ELD malfunctions and up to 10 most recent data diagnostics events within the time period for which the report is generated.

Example of Print/Display detail log data

Example of Full Day ELD Record:

(c) The printout and display must show a graph-grid consistent with § 395.8(g) showing each change of duty status.

Time	Location	Odometer	Eng Hours	Event Type/Status	Origin
19-Nov-14					
22:00	49 mi NNE Fallon, NV	39564	758.2	Off duty	Driver
20-Nov-14					
10:00	49 mi NNE Fallon, NV	39564	758.2	Login	Driver
10:00	49 mi NNE Fallon, NV	39564	758.2	ODND	Driver
11:52	49 mi NNE Fallon, NV	39564	758.2	PowerUp	Auto
11:52	49 mi NNE Fallon, NV	39564	758.2	Power Compliance	Auto
11:52	49 mi NNE Fallon, NV	39564	758.2	Engine Sync	Auto
12:00	49 mi NNE Fallon, NV	39564	758.3	Driving	Driver
13:00	2 mi E Fernley, NV	39624	759.3	Int Location	Auto
14:00	7 mi NNE Truckee, CA	39684	760.3	Int Location	Auto
15:00	6 mi SSE Meadow Vista, CA	39744	761.3	Int Location	Auto
16:00	3.5 mi SW Davis, CA	39804	762.3	Off duty	Driver
16:45	3.5 mi SW Davis, CA	39804	762.3	On duty	Driver
17:00	3.5 mi SW Davis, CA	39804	762.4	Driving	Auto

- (1) On the printout, the graph-grid for each day’s RODS must be at least 6 inches by 1.5 inches in size.
- (2) The graph-grid must overlay periods of driver’s indications of authorized personal use of CMV and yard moves using a different style line (such as dashed or dotted line) or shading. The appropriate abbreviation must also be indicated on the graph-grid.

1.8.1 4.8.2 ELD Data File

An ELD must have the capability to generate a consistent electronic file output compliant with the format described herein to facilitate the transfer, processing, and standardized display of ELD data sets on the authorized safety officials’ computing environments.

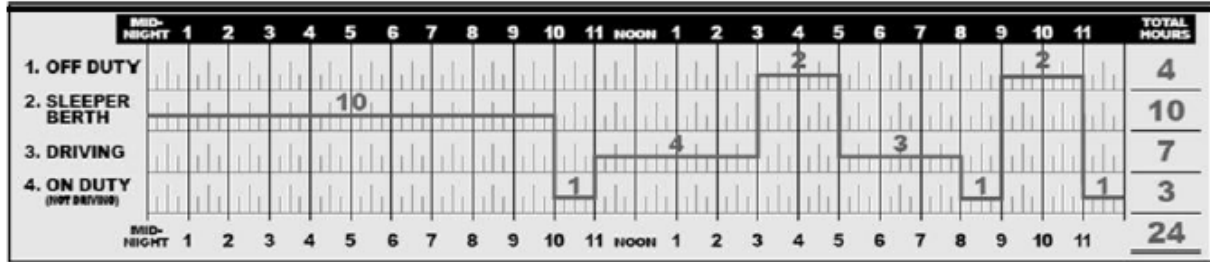
4.8.2.1 ELD Output File Standard

- 1. Regardless of the particular database architecture used for recording the ELD events in electronic format, the ELD must produce a standard ELD data output file for transfer purposes, which must be generated according to the standard specified in this section.
- 2. Data output must be provided in a single comma-delimited file outlined in this section using American National Standard Code for Information Exchange (ASCII) character sets meeting the standards of ANSI INCITS 4-1986 (R2012) (incorporated by reference, see § 395.38). It must include:
 1. A header segment, which specifies current or non-varying elements of an ELD file; and
 2. Variable length comma-delimited segments for the drivers, vehicles, ELD events, ELD malfunction and data diagnostics records, ELD login and logout activity, and unidentified driver records.
 3. Any field value that may contain a comma (“,”) or a carriage return () must be replaced with a semicolon (“;”) before generating the compliant CSV output file 105

4.8.2.1.1 Header Segment

This segment must include the following data elements and format: ELD File Header Segment: <{Driver’s} Last Name>,<{Driver’s} First Name>,< ELD username{for the driver} >,< {Driver’s} Driver’s License Issuing State>,<{Driver’s} Driver’s License Number>, <{Co-Driver’s} Last Name>,<{Co-Driver’s} First Name>,, ,, ,, <24-Hour Period Starting Time>,, ,, <{Current} Date>,< {Current} Time>,< {Current} Latitude>,<{Current} Longitude>,< {Current} {Total} Vehicle Miles>,< {Current} {Total} Engine Hours>,, ,,

Record Date	USDOT #	Driver License Number	Driver License State	ELD ID	Trailer ID			
20-Nov-14	123456789	D000368210361	IL	987654	Unit #			
<i>Time Zone</i>	<i>Driver Name</i>	<i>Co-Driver Name</i>	<i>ELD Manufacturer</i>	<i>Shipping ID</i>	<i>Data Diagnostic Indicators</i>			
CST	Smith, Richard		Acme ELDs	BL1234567890	No			
<i>24 Period Starting Time</i>	<i>Driver ID</i>	<i>Co-Driver ID</i>	<i>Truck Tractor ID</i>	<i>Unidentified Driver Records</i>	<i>ELD Malfunction Indicators</i>			
Midnight	1234567		Unit #	No	No			
<i>Carrier</i>	<i>Start</i>	<i>End</i>	<i>Odometer Miles Today</i>	<i>Truck Tractor VIN</i>	<i>Exempt Driver Status</i>	<i>Start</i>	<i>End</i>	<i>Engine Hours</i>
Acme Trucking	39564	39984	420	1M2P267Y5AM022445	No	758.2	765.7	
<i>Current Location</i>	<i>File Comment</i>			<i>Print/Display Date</i>				
6 mi. NE North Auburn, CA				20-Nov-14				



Time	Location	Odometer	Eng Hours	Event Type/Status	Origin
20-Nov-14					
0:00	49 mi NNE Fallon, NV	39564	758.2	SB	Driver
10:00	49 mi NNE Fallon, NV	39564	758.2	Login	Driver
10:00	49 mi NNE Fallon, NV	39564	758.2	ODND	Driver
10:52	49 mi NNE Fallon, NV	39564	758.2	Power Up	Auto
11:00	49 mi NNE Fallon, NV	39564	758.2	Driving	Auto
12:00	2 mi E Fernley, NV	39624	759.3	Int Location	Auto
13:00	7 mi NNE Truckee, CA	39684	760.3	Int Location	Auto
14:00	6 mi SSE Meadow Vista, CA	39744	761.3	Int Location	Auto
15:00	3.5 mi SW Davis, CA	39804	762.3	Off Duty	Driver
17:00	3.5 mi SW Davis, CA	39804	762.3	Driving	Auto
18:00	1 mi E Emeryville, CA	39864	763.4	Int Location	Auto
19:00	4 mi SSW Univ. of California,	39924	764.4	Int Location	Auto
20:00	6 mi NE North Auburn, CA	39984	765.5	ODND	Driver
21:00	6 mi NE North Auburn, CA	39984	765.7	Off Duty	Driver
23:00	6 mi NE North Auburn, CA	39984	765.7	ODND	Driver
23:58	6 mi NE North Auburn, CA	39984	765.7	Cert	Driver
23:58	6 mi NE North Auburn, CA	39984	765.7	Logout	Driver

4.8.2.1.2 User List

This segment must list all drivers and co-drivers with driving time records on the most recent CMV operated by the inspected driver and motor carrier's support personnel who requested edits within the time period for which this file is generated. The list must be in chronological order with most recent user of the ELD on top, and include the driver being inspected, the co-driver, and the unidentified driver profile. This segment has a variable number of rows depending on the number of profiles with activity over the time period for which this file is generated. This section must start with the following title: User List: Each subsequent row must have the following data elements: <{Assigned User} Order Number>,<{User's} ELD Account Type>,<{User's} Last Name>,<{User's} First Name>,

4.8.2.1.3 CMV List

This segment must list each CMV that the current driver operated and that has been recorded on the driver's ELD records within the time period for which this file is generated. The list must be rank ordered in accordance with the time of CMV operation with the most recent CMV being on top. This segment has a variable number of rows depending on the number of CMVs operated by the driver over the time period for which this file is generated. This section must start with the following title: CMV List: Each subsequent row must have the following data elements: <{Assigned CMV} Order Number>,,

4.8.2.1.4 ELD Event List for Driver's Record of Duty Status

This segment must list ELD event records tagged with event types 1 (a change in duty status as described in section 4.5.1.1 *Event: Change in Driver's Duty Status* of this appendix), 2 (an intermediate log as described in section 4.5.1.2), and 3 (a change in driver's indication of conditions 107 impacting driving time recording as described in section 4.5.1.3). The segment must list all event record status types and all event record origins for the driver, rank ordered with the most current log on top in accordance with the date and time fields of the record. This segment has a variable number of rows depending on the number of ELD events recorded for the driver over the time period for which this file is generated. This section must start with the following title: ELD Event List: Each subsequent row must have the following data elements: ,, , <{Event} Date>,<{Event} Time>,< {Accumulated} Vehicle Miles>,< {Elapsed} Engine Hours>,<{Event} Latitude>,<{Event} Longitude>,, <{Corresponding CMV} Order Number>,<{ User} Order Number {for Record Originator}>,,,

4.8.2.1.5 Event Annotations, Comments, and Driver's Location

Description This segment must list only the elements of the ELD event list created in section 4.8.2.1.4 *ELD Event List for Driver's Record of Duty Status* of this appendix that have an annotation, comment, or a manual entry of location description by the driver. This segment has a variable number of rows depending on the number of ELD events under section 4.8.2.1.4 *ELD Event List for Driver's Record of Duty Status* that feature a comment, annotation, or manual location entry by the driver. This section must start with the following title: ELD Event Annotations or Comments: Each subsequent row must have the following data elements: 108 ,< ELD username {of the Record Originator}>,<{Event} Comment Text or Annotation>,<{Event} Date>,<{Event} Time> , ,

4.8.2.1.6 ELD Event List for Driver's Certification of Own Records

This segment must list ELD event records with event type 4 (driver's certification of own records as described in section 4.5.1.4 *Event: Driver's Certification of Own Records* of this appendix) for the inspected driver for the time period for which this file is generated. It must be rank ordered with the most current record on top. This segment has a variable number of rows depending on the number of certification and re-certification actions the authenticated driver may have executed on the ELD over the time period for which this file is generated. This section must start with

the following title: Driver's Certification/Recertification Actions: Each subsequent row must have the following data elements: „,<{Event} Date>,<{Event} Time>,,<{Corresponding CMV} Order Number>,

4.8.2.1.7 Malfunction and Diagnostic Event Records

This segment must list all malfunctions that have occurred on this ELD during the time period for which this file is generated. It must list diagnostic event records related to the driver being inspected, rank ordered with the most current record on top. This segment has a variable number of rows depending on the number of ELD malfunctions and ELD diagnostic event records recorded and relevant to the inspected driver over the time period for which this file is generated. This section must start with the following title: 109 Malfunctions and Data Diagnostic Events: Each subsequent row must have the following data elements: „,<Malfunction/Diagnostic Code>,<{Event} Date>,<{Event} Time>,<{Total} Vehicle Miles>,<{Total} Engine Hours> ,<{Corresponding CMV} Order Number>,

4.8.2.1.8 ELD Login/Logout Report

This segment must list the login and logout activity on the ELD (ELD events with event type 5 (A driver's login/logout activity)) for the inspected driver for the time period for which this file is generated. It must be rank ordered with the most recent activity on top. This section must start with the following title: ELD Login/Logout Report: Each subsequent row must have the following data elements: „,<{Event} Date>,<{Event} Time>,<{Total} Vehicle Miles>,<{Total} Engine Hours>,

4.8.2.1.9 CMV's Engine Power-Up and Shut Down Activity

This segment must list the logs created when a CMV's engine is powered up and shut down (ELD events with event type 6 (CMV's engine power up/shut down)) for the time period for which this file is generated. It must be rank ordered with the latest activity on top. This section must start with the following title: CMV Engine Power-Up and Shut Down Activity: Each subsequent row must have the following data elements: „,<{Event} Date>,<{Event} 110 Time>,<{Total} Vehicle Miles>,<{Total} Engine Hours>,<{Event} Latitude>,<{Event} Longitude>,,,,,

4.8.2.1.10 ELD Event Log List for the Unidentified Driver Profile

This segment must list the ELD event records for the Unidentified Driver profile, rank ordered with most current log on top in accordance with the date and time fields of the logs. This segment has a variable number of rows depending on the number of Unidentified Driver ELD records recorded over the time period for which this file is generated. This section must start with the following title: Unidentified Driver Profile Records: Each subsequent row must have the following data elements: „,,,,<{Event} Date>,<{Event} Time>,< {Accumulated} Vehicle Miles>,< {Elapsed} Engine Hours>,<{Event} Latitude>,<{Event} Longitude>,, <{Corresponding CMV} Order Number>,,,

4.8.2.1.11 File Data Check Value

This segment lists the file data check value as specified in section [4.4.5.3 File Data Check](#) of this appendix. This part includes a single line as follows: End of File: 111

4.8.2.2 ELD Output File Name Standard

If the ELD output is saved in a file for transfer or maintenance purposes, it must follow the 25 character-long filename standard below:

- (a) The first five position characters of the filename must correspond to the first five letters of the last name of the driver for whom the file is compiled. If the last name of the driver is shorter than five characters, remaining positions must use the character “ ” [underscore] as a substitute character. For example, if the last name of the driver is “Lee”, the first five characters of the output file must feature “Lee_”.
- (b) The sixth and seventh position characters of the filename must correspond to the last two digits of the driver’s license number for the driver for whom the file is compiled.
- (c) The eighth and ninth position characters of the filename must correspond to the sum of all individual numeric digits in the driver’s license number for the driver for whom the file is compiled. The result must be represented in two-digit format. If the sum value exceeds 99, use the last two digits of the result. For example, if the result equals “113”, use “13”. If the result is less than 10, use 0 as the first digit. For example, if the result equals “5”, use “05”.
- (d) The tenth through fifteenth position characters of the filename must correspond to the date the file is created. The result must be represented in six digit format “MMDDYY” where “MM” represents the month, “DD” represents the day, and “YY” represents the last two digits of the year. For example, February 5, 2013, must be represented as “020513”.
- (e) The sixteenth position character of the filename must be a hyphen “-”. 112
- 6. The seventeenth through twenty-fifth position characters of the filename must, by default, be “000000000” but each of these nine digits can be freely configured by the motor carrier or the ELD provider to be a number between 0 and 9 or a character between A and Z to be able to produce distinct files—if or when necessary—that may otherwise be identical in filename as per the convention proposed in this section. ELD providers or motor carriers do not need to disclose details of conventions they may use for configuring the seventeenth through twenty-fifth digits of the filename.

1.9 4.9 Data Transfer Capability Requirements

An ELD must be able to present the captured ELD records of a driver in the standard electronic format as described below, and transfer the data file to an authorized safety official, on demand, for inspection purposes.

1.9.1 4.9.1 Data Transfer During Roadside Safety Inspections

- (a) On demand during a roadside safety inspection, an ELD must produce ELD records for the current 24-hour period and the previous 7 consecutive days in electronic format, in the standard data format described in section *4.8.2.1 ELD Output File Standard* of this appendix.
- (b) When a driver uses the single-step driver interface, as described in section *4.3.2.4 Driver’s Data Transfer Initiation Input* of this appendix, to indicate that the ELD compile and transfer the driver’s ELD records to authorized safety officials, the ELD must transfer the generated ELD data output to the computing environment used by authorized safety officials via the standards referenced in this section. To meet roadside electronic data transfer requirements, an ELD must do at least one of the following: (1) Option 1—Telematics transfer methods. Transfer the electronic data using both:
 - (i) Wireless Web services, and 113 (ii) Email, or
 - (2) **Option 2—Local transfer methods. Transfer the electronic data using** both:
 - (i) USB2 (incorporated by reference, see § 395.38), and
 - (ii) Bluetooth (incorporated by reference, see § 395.38).
- (c) The ELD must provide an ELD record for the current 24-hour period and the previous 7 consecutive days as described in section 4.8.1.3 either on a display or on a printout.

- (d) An ELD must support one of the two options for roadside data transfer in paragraph 2. of this section, and must certify proper operation of each element under that option. An authorized safety official will specify which transfer mechanism the official will use within the certified transfer mechanisms of an ELD.

1.9.2 4.9.2 Motor Carrier Data Reporting

- (a) An ELD must be capable of retaining copies of electronic ELD records for a period of at least 6 months from the date of receipt.
 - (b) An ELD must produce, on demand, a data file or a series of data files of ELD records for a subset of its drivers, a subset of its vehicles, and for a subset of the 6-month record retention period, to be specified by an authorized safety official, in an electronic format standard described in section 4.8.2.1 *ELD Output File Standard* of this appendix or, if the motor carrier has multiple offices or terminals, within the time permitted under § 390.29.
1. At a minimum, an ELD must be able to transfer the ELD records electronically by one of the following transfer mechanisms:
 2. Web Services as specified in section 4.10.1.1 *Wireless Data Transfer via Web Services* of this appendix (but not necessarily wirelessly), and E-mail as specified 4.10.1.2 *Wireless Data Transfer Through E-Mail* (but not necessarily wirelessly); or 114 (3) USB 2.0 as specified in section 4.10.1.3 *Data Transfer via USB 2.0* of this appendix and Bluetooth, as specified in section 4.10.1.4 *Data Transfer via Bluetooth®* (both incorporated by reference, see § 395.38).

1.10 4.10 Communications Standards for the Transmittal of Data Files

from ELDs ELDs must transmit ELD records electronically in accordance with the file format specified in section 4.8.2.1 *ELD Output File Standard* of this appendix and must be capable of a one-way transfer of these records to authorized safety officials upon request as specified in section 4.9.

1.10.1 4.10.1 Data Transfer Mechanisms

For each type of data transfer mechanism, an ELD must follow the specifications in this section.

4.10.1.1 Wireless Data Transfer via Web Services

1. Transfer of ELD data to FMCSA via Web Services must follow the following standards: (1) Web Services Description Language (WSDL) 1.1 (2) Simple Object Access Protocol (SOAP) 1.2 (incorporated by reference, see § 395.38) (3) Extensible Markup Language (XML) 1.0 5th Edition
2. If an ELD provider plans to use Web Services, upon ELD provider registration as described in section 5.1 of this appendix,
 1. FMCSA will provide formatting files necessary to convert the ELD file into an XML format and upload the data to the FMCSA servers. These files include FMCSA's Rules of Behavior, XML Schema, WSDL file, Interface Control Document (ICD), and the ELD Web Services Development Handbook, and 115 (2) ELD Providers must obtain a Public/Private Key pair compliant with the NIST SP 800-32, Introduction to Public Key Technology and the Federal PKI Infrastructure, (incorporated by reference, see § 395.38), and submit the public key with their registration. (3) ELD Providers will be required to complete a test procedure to ensure their data is properly formatted before they can begin submitting driver's ELD data to the FMCSA server.

(c) ELD data transmission must be accomplished in a way that protects the privacy of the driver(s).

(d)At roadside, if both the vehicle operator and law enforcement have an available data connection, the vehicle operator will initiate the transfer of ELD data to an authorized safety official. In some cases, an ELD may be capable of converting the ELD file to an XML format using an FMCSA-provided schema and upload it using information provided in the WSDL file using SOAP via RFC 7230, RFC 7231, and RFC 5246, Transport Layer Security (TLS) Protocol Version 1.2 (incorporated by reference, see § 395.38).

4.10.1.2 Wireless Data Transfer Through E-Mail

- 1. The ELD must attach a file to an email message to be sent using RFC 5321 Simple Mail Transfer Protocol (SMTP) (incorporated by reference, see § 395.38), to a specific email address, which will be shared with the ELD providers during the technology registration process.
- (b)The file must have the format described in section 4.8.2.1 *ELD Output File Standard* of this appendix and must be encrypted using the Secure/Multipurpose Internet Mail Extensions as described in RFC 5751 (incorporated by reference, see § 395.38), and the RSA algorithm as 116 described in RFC 4056 (incorporated by reference, see § 395.38), with the FMCSA public key compliant with NIST SP 800-32 (incorporated by reference, see § 395.38) to be provided to the ELD provider at the time of registration. The content must be encrypted using AES in FIPS Publication 197 (incorporated by reference, see § 395.38), and RFC 3565 (incorporated by reference, see § 395.38).
- (c)The email must be formatted using the RFC 5322 Internet Message Format (incorporated by reference, see § 395.38), as follows:

Element	Format
To :	<Address Provided by FMCSA during online registration>
From :	<Desired return address for confirmation>
Subject :	ELD records from <ELD Registration ID><':><ELD Identifier>
Body :	<Output File Comment>
Attachment :	MIME encoded AES-256 encrypted file with <filename>.<Date string>.<unique identifier>.aes

- (d)A message confirming receipt of the ELD file will be sent to the address specified in the email. The filename must follow the convention specified in section 4.8.2.2 *ELD Output File Name Standard* of this appendix.

4.10.1.3 Data Transfer via USB 2.0

- 1. ELDs certified for the USB data transfer mechanism must be capable of transferring ELD records using the Universal Serial Bus Specification (Revision 2.0) (incorporated by reference, see § 395.38).
- (b)Each ELD technology must implement a single USB-compliant interface with the necessary adaptors for a Type A connector. The USB interface must implement the 117 Mass Storage class (08h) for driverless operation, to comply with IEEE standard 1667- 2009, (incorporated by reference, see § 395.38).
- (c)The ELD must be capable of providing power to a standard USB-compatible drive.
- (d)An ELD must re-authenticate the driver prior to saving the driver’s ELD file to an external device.

- (e) On initiation by an authenticated driver, an ELD must be capable of saving ELD file (s) to USB-compatible drives (AES, in FIPS Publication 197, incorporated by reference, see § 395.38) that are provided by authorized safety officials during an inspection. Prior to initiating this action, ELDs must be capable of reading a text file from an authorized safety officials' drive and verifying it against a file provided to ELD providers who have registered their technologies as described in section 5.1 of this appendix.

4.10.1.4 Data Transfer via Bluetooth®

- (a) Bluetooth SIG Specification of the Bluetooth System covering core package version 2.1 + EDR (incorporated by reference, see § 395.38) must be followed. ELDs using this standard must be capable of displaying a Personal Identification Number generated by the Bluetooth application profile for bonding with other devices (incorporated by reference, see § 395.38).
- (b) Upon request of an authorized official, the ELD must become discoverable by the authorized safety officials' Bluetooth-enabled computing platform, and generate a random code, which the driver must share with the official (incorporated by reference, see § 395.38). 118
- 3. The ELD must connect to the roadside authorized safety officials' technology via wireless personal area network and transmit the required data via Web Services as described in section 4.10.1.1 of this appendix.

1.10.2 4.10.2 Motor Carrier Data Transmission

Regardless of the roadside transmission option supported by an ELD, ELD records are to be retained and must be able to transmit enforcement-specified historical data for their drivers using one of the methods specified under section 4.9.2 of this appendix.

- (a) Web services option must follow the specifications described under section *4.10.1.1 Wireless Data Transfer via Web Services* of this appendix.
- (b) The email option must follow the specifications described under section *4.10.1.2 Wireless Data Transfer Through E-Mail* of this appendix.
- (c) The USB option must follow the specifications of Universal Serial Bus Specification, revision 2.0 (incorporated by reference, see § 395.38) and described in section *4.10.1.3 Data Transfer via USB 2.0* of this appendix.
- (d) Bluetooth must follow the specifications incorporated by reference (see § 395.38) and described in section *4.10.1.4 Data Transfer via Bluetooth®* of this appendix.

5. ELD REGISTRATION AND CERTIFICATION

As described in § 395.22(a) of this part, motor carriers must only use ELDs that are listed on the FMCSA Web site. An ELD provider must register with FMCSA and certify each ELD model and version for that ELD to be listed on this Web site. Appendix C- ELD Functional Requirements (Sections 5-7) APPENDIX TO SUBPART B OF PART 395—FUNCTIONAL SPECIFICATIONS FOR ALL ELECTRONIC LOGGING DEVICES (ELDS)

2.1 5.1. ELD Provider's Registration

2.1.1 5.1.1. Registering Online

(a)An ELD provider developing an ELD technology must register online at a secure FMCSA Web site where the ELD provider can securely certify that its ELD is compliant with this appendix. (b)Provider's registration must include the following information: (1)Company name of the technology provider/manufacture. (2)Name of an individual authorized by the provider to verify that the ELD is compliant with this appendix and to certify it under section 5.2 of this appendix. (3)Address of the registrant. (4)E-mail address of the registrant. (5)Telephone number of the registrant.

2.1.2 5.1.2 Keeping Information Current

The ELD provider must keep the information in section 5.1.1(b) of this appendix current through FMCSA's Web site.

2.1.3 5.1.3 Authentication Information Distribution

FMCSA will provide a unique ELD registration ID, authentication key(s), authentication file(s), and formatting and configuration details required in this appendix to registered providers during the registration process.

2.2 5.2 Certification of Conformity with FMCSA Standards

A registered ELD provider must certify that each ELD model and version has been sufficiently tested to meet the functional requirements included in this appendix under the conditions in which the ELD would be used.

2.2.1 5.2.1 Online Certification

(a) An ELD provider registered online as described in section 5.1.1 of this appendix must disclose the information in paragraph (b) of this section about each ELD model and version and certify that the particular ELD is compliant with the requirements of this appendix. (b) The online process will only allow a provider to complete certification if the provider successfully discloses all of the following required information:

1. Name of the product.
2. Model number of the product.
3. Software version of the product.
4. An ELD identifier, uniquely identifying the certified model and version of the ELD, assigned by the ELD provider in accordance with section 7.15 of this appendix.
5. Picture and/or screen shot of the product.
6. User's manual describing how to operate the ELD.
7. Description of the supported and certified data transfer mechanisms and step-by-step instructions for a driver to produce and transfer the ELD records to an authorized safety official.
8. Summary description of ELD malfunctions.
9. Procedure to validate an ELD authentication value as described in section 7.14 of this appendix.
10. Certifying statement describing how the product was tested to comply with FMCSA regulations.

2.2.2 5.2.2 Procedure to Validate an ELD's Authenticity

Paragraph 5.2.1(b)(9) of this appendix requires that the ELD provider identify its authentication process and disclose necessary details for FMCSA systems to independently verify the ELD authentication values included in the dataset of inspected ELD outputs. The authentication value must include a hash component that only uses data elements included in the ELD dataset and data file. ELD authentication value must meet the requirements specified in section 7.14 of this appendix.

2.3 5.3 Publicly Available Information

Except for the information listed under paragraphs 5.1.1(b)(2), (4), and (5) and 5.2.1(b)(9) of this appendix, FMCSA will make the information in sections 5.1.1 and 5.2.1 for each certified ELD publicly available on a Web site to allow motor carriers to determine which products have been properly registered and certified as ELDs compliant with this appendix.

2.4 5.4 Removal of Listed Certification

2.4.1 5.4.1 Removal Process

FMCSA may remove an ELD model or version from the list of ELDs on the FMCSA Website in accordance with this section.

2.4.2 5.4.2 Notice

FMCSA shall initiate the removal of an ELD model or version from the list of ELDs on the FMCSA Web site by providing the ELD provider written notice stating: (a) The reasons FMCSA proposes to remove the model or version from the FMCSA list; and (b) Any corrective action that the ELD provider must take for the ELD model or version to remain on the list.

2.4.3 5.4.3 Response

An ELD provider that receives notice under section 5.4.2 of this appendix may submit a response to the Director, Office of Carrier Driver, and Vehicle Safety Standards no later than 30 days after issuance of the notice of proposed removal, explaining:

- (a) The reasons why the ELD provider believes the facts relied on by the Agency, in proposing removal, are wrong; or
- (b) The action the ELD provider will take to correct the deficiencies that FMCSA identified.

2.4.4 5.4.4 Agency Action

(a) If the ELD provider fails to respond within 30 days of the date of the notice issued under section 5.4.2 of this appendix, the ELD model or version shall be removed from the FMCSA list. (b) If the ELD provider submits a timely response, the Director, Office of Carrier, Driver, and Vehicle Safety Standards, shall review the response and withdraw the notice of proposed removal, modify the notice of proposed removal, or affirm the notice of proposed removal, and notify the ELD provider in writing of the determination. (c) Within 60 days of the determination, the ELD provider shall take any action required to comply. If the Director determines that the ELD provider failed to timely take the required action within the 60 day period, the ELD model or version shall be removed from the FMCSA list. (d) The Director, Office of Carrier, Driver, and Vehicle Safety Standards may request from the ELD provider any information that the Director considers necessary to make a determination under this section.

2.5 5.4.5 Administrative Review

- (a) Within 30 days of removal of an ELD model or version from the FMCSA list of certified ELDs under section 5.4.4 of this appendix, the ELD provider may request administrative review. (b) A request for administrative review must be submitted in writing to the FMCSA Associate Administrator for Policy. The request must explain the error committed in removing the ELD model or version from the FMCSA list, identify all factual, legal, and procedural issues in dispute, and include any supporting information or documents. (c) The Associate Administrator may ask the ELD provider to submit additional information or attend a conference to discuss the removal. If the ELD provider does not submit the requested information or attend the scheduled conference, the Associate Administrator may dismiss the request for administrative review. (d) The Associate Administrator will complete the administrative review and notify the ELD provider of the decision in writing. The decision constitutes a final Agency action.

6. REFERENCES

(a) American National Standards Institute (ANSI). 11 West 42nd Street, New York, New York 10036, <http://webstore.ansi.org>, (212) 642-4900. 124

(1) ANSI INCITS 4-1986 (R2012), American National Standard for Information Systems – Coded Character Sets – 7-Bit American National Standard Code for Information Interchange (7-Bit ASCII), approved June 14, 2007, IBR in section 4.8.2.1, Appendix A to subpart B.

(2) ANSI INCITS 446-2008 (R2013), American National Standard for Information Technology – Identifying Attributes for Named Physical and Cultural Geographic Features (Except Roads and Highways) of the United States, Territories, Outlying Areas, and Freely Associated Areas, and the Waters of the Same to the Limit of the Twelve-Mile Statutory Zone, approved October 28, 2008, IBR in section 4.4.2, Appendix A to subpart B.

(b) Bluetooth SIG, Inc. 5209 Lake Washington Blvd NE., Suite 350, Kirkland, WA 98033, <https://www.bluetooth.org/Technical/Specifications/adopted.htm>, (425) 6913535.

(1) Bluetooth SIG, Inc., Specification of the Bluetooth System: Wireless Connections Made Easy, Covered Core Package version 2.1 + EDR, volumes 0 through 4, approved July 26, 2007, IBR in sections 4.9.1, 4.9.2, 4.10.1.4, 4.10.2, Appendix A to subpart B.

2. [Reserved]

(c) Institute of Electrical and Electronic Engineers (IEEE) Standards Association. 445 Hoes Lane, Piscataway, NJ 08854-4141, <http://standards.ieee.org/index.html>, (732) 981-0060. 125

(1) IEEE Std 1667-2009, IEEE Standard for Authentication in Host Attachments of Transient Storage Devices, approved 11 November 2009, IBR in section 4.10.1.3, Appendix A to subpart B.

2. [Reserved]

(d) Internet Engineering Task Force (IETF). C/o Association Management Solutions, LLC (AMS) 48377 Fremont Blvd., Suite 117, Fremont, CA 94538, (510) 492-4080.

(1) IETF RFC 3565, Use of the Advanced Encryption Standard (AES) Encryption Algorithm in Cryptographic Message Syntax (CMS), approved July 2003, IBR in section 4.10.1.2, Appendix A to subpart B.

- (2) IETF RFC 4056, Use of the RSASSA-PSS Signature Algorithm in Cryptographic Message Syntax (CMS), approved June 2005, IBR in section 4.10.1.2, Appendix A to subpart B.
 - (3) IETF RFC 5246, The Transport Layer Security (TLS) Protocol Version 1.2, approved August 2008, IBR in section 4.10.1.1, Appendix A to subpart B.
 - (4) IETF RFC 5321, Simple Mail Transfer Protocol, approved October 2008, IBR in section 4.10.1.2, Appendix A to subpart B.
 - (5) IETF RFC 5322, Internet Message Format, approved October 2008, IBR in section 4.10.1.2, Appendix A to subpart B.
 - (6) IETF RFC 5751, Secure/Multipurpose Internet Mail Extensions (S/MIME) Version 3.2, Message Specification, approved January 2010, IBR in section 4.10.1.2, Appendix A to subpart B.
 - (7) IETF RFC 7230, Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing, approved June 2014, IBR in section 4.10.1.1, Appendix A to subpart B. 126
 - (8) IETF RFC 7231, Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content, approved June 2014, IBR in section 4.10.1.1, Appendix A to subpart B.
- (e) National Institute of Standards and Technology (NIST). 100 Bureau Drive, Stop 1070, Gaithersburg, MD 20899-1070, <http://www.nist.gov>, (301) 975-6478. (1) Federal Information Processing Standards Publication (FIPS PUB) 197, Advanced Encryption Standard (AES), approved November 26, 2001, IBR in sections 4.10.1.2 and 4.10.1.3, Appendix A to subpart B.
- (2) SP 800-32, Introduction to Public Key Technology and the Federal PKI Infrastructure, approved February 26, 2001, IBR in section 4.10.1.2, Appendix A to subpart B.
- (f) Universal Serial Bus Implementers Forum (USBIF). 3855 SW. 153rd Drive, Beaverton, Oregon 97006, <http://www.usb.org>, (503) 619-0426.
- (1)USB Implementers Forum, Inc., Universal Serial Bus Specification, Revision 2.0, approved April 27, 2000, as revised through April 3, 2015, IBR in sections 4.9.1, 4.9.2, 4.10.1.3, and 4.10.2, Appendix A to subpart B.
 - (2)[Reserved]
- (g) World Wide Web Consortium (W3C). 32 Vassar Street, Building 32-G514, Cambridge, MA 02139, <http://www.w3.org>, (617) 253-2613.
- (1)W3C Recommendation 27, SOAP Version 1.2 Part 1: Messaging Framework (Second Edition), including errata, approved April 2007, IBR in section 4.10.1.1, Appendix A to subpart B.
 - (2)[Reserved]

7. DATA ELEMENTS DICTIONARY

4.1 7.1 24-Hour Period Starting Time

Description This data element refers to the 24-hour period starting time specified by the motor carrier for driver's home terminal.

Purpose Identifies the bookends of the work day for the driver; makes ELD records consistent with § 395.8 requirements, which require this information to be included on the form.

Source Motor carrier.

Used in ELD account profile; ELD outputs.

Data Type Programmed or populated on the ELD during account creation and maintained by the motor carrier to reflect true and accurate information for drivers.

Data Range 000000 to 235959; first two digits 00 to 23; middle two digits and last two digits 00 to 59.

Data Length 6 characters.

Data Format <HHMMSS> Military time format, where "HH" refers to hours,

"MM" refers to minutes, and "SS" refers to seconds; designation for start time expressed in time standard in effect at the driver's home terminal.

Disposition Mandatory.

Examples [060000], [073000], [180000].

4.2 7.2 Carrier Name

Description This data element refers to the motor carrier's legal name for conducting commercial business.

Purpose Provides a recognizable identifier about the motor carrier on viewable ELD outputs; provides ability to cross check against USDOT number.

Source FMCSA's Safety and Fitness Electronic Records (SAFER) System.

Used in ELD account profile.

Data Type Programmed on the ELD or entered once during the ELD account creation process.

Data Range Any alphanumeric combination.

Data Length Minimum: 4; Maximum: 120 characters.

Data Format <Carrier Name> as in <CCCC> to <CCCC CCCC>.

Disposition Mandatory.

Example [CONSOLIDATED TRUCKLOAD INC.].

4.3 7.3 Carrier's USDOT Number

Description This data element refers to the motor carrier's USDOT number.

Purpose Uniquely identifies the motor carrier employing the driver using the ELD.

Source FMCSA's Safety and Fitness Electronic Records (SAFER) System.

Used in ELD account profiles; ELD event records; ELD output file.

Data Type Programmed on the ELD or entered once during the ELD account creation process.

Data Range An integer number of length 1-8 assigned to the motor carrier by FMCSA (9 position numbers reserved).

Data Length Minimum: 1; Maximum: 9 characters.

Data Format <Carrier's USDOT Number> as in <C> to <CCCCCCCC>.

Disposition Mandatory.

Examples [1], [1000003].

4.4 7.4 CMV Power Unit Number

Description This data element refers to the identifier the motor carrier uses for their CMVs in their normal course of business.

Purpose Identifies the vehicle a driver operates while a driver's ELD records are recorded; Makes ELD records consistent with § 395.8 requirements, which require the truck or tractor number to be included on the form.

Source Unique CMV identifiers a motor carrier uses in its normal course of business and includes on dispatch documents, or the license number and the licensing State of the power unit.

Used in ELD event records; ELD output file.

Data Type Programmed on the ELD or populated by motor carrier's extended ELD system or entered by the driver.

Data Range Any alphanumeric combination.

Data Length Minimum: 1; Maximum: 10 characters.

Data Format <CMV Power Unit Number> as in <C> to <CCCCCCCC>.

Disposition Mandatory for all CMVs operated while using an ELD.

Examples [123], [00123], [BLUEKW123], [TX12345].

4.5 7.5 CMV VIN

Description This data element refers to the manufacturer-assigned vehicle identification number (VIN) for the CMV powered unit.

Purpose Uniquely identifies the operated CMV not only within a motor carrier at a given time but across all CMVs sold within a 30-year rolling period.

Source A robust unique CMV identifier standardized in North America.

Used in ELD event records; ELD output file.

Data Type Retrieved from the engine ECM via the vehicle databus.

Data Range Either blank or 17 characters long as specified by NHTSA in 49 CFR part 565, or 18 characters long with first character assigned as “-” (dash) followed by the 17 character long VIN. Check digit, i.e., VIN character position 9, as specified in 49 CFR part 565 must imply a valid VIN.

Data Length Blank or 17-18 characters.

Data Format* : <CMV VIN> or <“-”><CMV VIN> or <{*blank}> as in <CCCCCCCCCCCC-CCCC>, or <-CCCCCCCCCCCCCCCC> or <>.

Disposition Mandatory for all ELDs linked to the engine ECM and when VIN is available from the engine ECM over the vehicle databus; otherwise optional. If optionally populated and source is not the engine ECM, precede VIN with the character “-” in records.

Examples [1FUJGHDV0CLBP8834], [-1FUJGHDV0CLBP8896], [].

4.6 7.6 Comment/Annotation

Description This is a textual note related to a record, update, or edit capturing the comment or annotation a driver or authorized support personnel may input to the ELD.

Purpose Provides ability for a driver to offer explanations to records, selections, edits, or entries.

Source Driver or authorized support personnel.

Used in ELD events; ELD outputs.

Data Type Entered by the authenticated user via ELD’s interface.

Data Range Free form text of any alphanumeric combination.

Data Length 0-60 characters if optionally entered; 4-60 characters if annotation is required and driver is prompted by the ELD.

Data Format <Comment/Annotation> as in <{blank}> or <C> to <CCC CCC >. **Disposition** : Optional in general; Mandatory if prompted by ELD.

Examples [], [Personal Conveyance. Driving to Restaurant in bobtail mode],
[Forgot to switch to SB. Correcting here].

4.7 7.7 Data Diagnostic Event Indicator Status

Description This is a Boolean indicator identifying whether the used ELD unit has an active data diagnostic event set for the authenticated driver at the time of event recording.

Purpose Documents the snapshot of ELD’s data diagnostic status for the authenticated driver at the time of an event recording.

Source ELD internal monitoring functions.

Used in ELD events; ELD outputs.

Data Type Internally monitored and managed.

Data Range 0 (no active data diagnostic events for the driver) or 1 (at least one active data diagnostic event set for the driver).

Data Length 1 character.

Data Format <Data Diagnostic Event Indicator Status> as in <C>.

Disposition Mandatory.

Examples [0] or [1].

4.8 7.8 Date

Description In combination with the variable “Time”, this parameter stamps records with a reference in time; even though date and time must be captured in UTC, event records must use date and time converted to the time zone in effect at the driver’s home terminal as specified in section *4.4.3 Date and Time Conversions*.

Purpose Provides ability to record the instance of recorded events.

Source ELD’s converted time measurement.

Used in ELD events; ELD outputs.

Data Type UTC date must be automatically captured by ELD; date in effect at the driver’s home terminal must be calculated as specified in section *4.4.3 Date and Time Conversions*.

Data Range Any valid date combination expressed in <MMDDYY> format where “MM” refers to months, “DD” refers to days of the month and “YY” refers to the last two digits of the calendar year.

Data Length 6 characters.

Data Format <MMDDYY> where <MM> must be between 01 and 12, <DD> must be between 01 and 31, and <YY> must be between 00 and 99.

Disposition Mandatory.

Examples [122815], [010114], [061228].

4.9 7.9 Distance Since Last Valid Coordinates

Description Distance in whole miles traveled since the last valid latitude, longitude pair the ELD measured with the required accuracy.

Purpose Provides ability to keep track of location for recorded events in cases of temporary position measurement outage.

Source : ELD internal calculations.

Used in ELD events; ELD outputs.

Data Type Kept track of by the ELD based on position measurement validity.

Data Range An integer value between 0 and 6; If the distance traveled since the last valid coordinate measurement exceeds 6 miles, the ELD must enter the value as 6.

Data Length 1 character.

Data Format <Distance Since Last Valid Coordinates> as in <C>.

Disposition Mandatory.

Examples : [0], [1], [5], [6].

4.10 7.10 Driver's License Issuing State

Description This data element refers to the issuing State, Province or jurisdiction of the listed Driver's License for the ELD account holder.

Purpose In combination with "Driver's License Number", it links the ELD driver account holder uniquely to an individual with driving credentials; ensures that only one driver account can be created per individual.

Source Driver's license.

Used in ELD account profile(s); ELD output file.

Data Type Entered (during the creation of a new ELD account).

Data Range To character abbreviation listed on Table 5 of this appendix.

Data Length 2 characters.

Data Format <Driver's License Issuing State> as in <CC>.

Disposition Mandatory for all driver accounts created on the ELD; optional for "non- driver" accounts.

Example [WA].

4.10.1 Table 5 - State and Province Abbreviation Codes

U.S.A	STATE	STATE CODE	STATE
STATE CODE			
AL	ALABAMA	MT	MONTANA
AK	ALASKA	NC	NORTH CAROLINA
AR	ARKANSAS	ND	NORTH DAKOTA
AZ	ARIZONA	NE	NEBRASKA
CA	CALIFORNIA	NH	NEW HAMPSHIRE
CO	COLORADO	NJ	NEW JERSEY
CT	CONNECTICUT	NM	NEW MEXICO
DC	DIST of COL	NV	NEVADA
DE	DELAWARE	NY	NEW YORK
FL	FLORIDA	OH	OHIO
GA	GEORGIA	OK	OKLAHOMA
HI	HAWAII	OR	OREGON
IA	IOWA	PA	PENNSYLVANIA
ID	IDAHO	RI	RHODE ISLAND
IL	ILLINOIS	SC	SOUTH CAROLINA
IN	INDIANA	SD	SOUTH DAKOTA
KS	KANSAS	TN	TENNESSEE
KY	KENTUCKY	TX	TEXAS
LA	LOUISIANA	UT	UTAH
MA	MASSACHUSETTS	VA	VIRGINIA
MD	MARYLAND	VT	VERMONT
ME	MAINE	WA	WASHINGTON
MI	MICHIGAN	WI	WISCONSIN
MN	MINNESOTA	WV	WEST VIRGINIA
MO	MISSOURI	WY	WYOMING
MS	MISSISSIPPI		

4.10.2 AMERICAN POSSESSIONS OR PROTECTORATES

STATE CODE	STATE
AS	AMERICAN SAMOA
GU	GUAM
MP	NORTHERN MARIANAS
PR	PUERTO RICO
VI	VIRGIN ISLANDS

4.10.3 CANADA

PROVINCE CODE	PROVINCE
AB	ALBERTA
BC	BRITISH COLUMBIA
MB	MANITOBA
NB	NEW BRUNSWICK
NF	NEWFOUNDLAND
NS	NOVA SCOTIA
NT	NORTHWEST TERRITORIES
ON	ONTARIO
PE	PRINCE EDWARD ISLAND
QC	QUEBEC
SK	SASKATCHEWAN
YT	YUKON TERRITORY

4.10.4 MEXICO

STATE CODE	STATE	STATE CODE	STATE
AG	AGUASCALIENTES	MX	MEXICO
BN	BAJA CALIFORNIA NORTE	NA	NAYARIT
BS	BAJA CALIFORNIA SUR	NL	NUEVO LEON
CH	COAHUILA	OA	OAXACA
CI	CHIHUAHUA	PU	PUEBLA
CL	COLIMA	QE	QUERETARO
CP	CAMPECHE	QI	QUINTANA ROO
CS	CHIAPAS	SI	SINALOA
DF	DISTRICTO FEDERAL	SL	SAN LUIS POTOSI
DG	DURANGO	SO	SONORA
GE	GUERRERO	TA	TAMAULIPAS
GJ	GUANAJUATO	TB	TABASCO
HD	HIDALGO	TL	TLAXCALA
JA	JALISCO	VC	VERACRUZ
MC	MICHOACAN	YU	YUCATAN
MR	MORELOS	ZA	ZACATECAS

4.10.5 OTHER

PROVINCE CODE	PROVINCE, STATE or COUNTRY
OT	ALL OTHERS NOT COVERED ABOVE

4.11 7.11 Driver's License Number

Description : This data element refers to the unique Driver's License information required for each driver account on the ELD.

Purpose : In combination with driver’s license issuing State, it links the ELD driver account holder to an individual with driving credentials; ensures that only one driver account can be created per individual.

Source Driver’s license.

Used in ELD account profile(s); ELD output file.

Data Type Entered (during the creation of a new ELD account).

Data Range Any alphanumeric combination.

Data Length Minimum: 1; Maximum: 20 characters.

Data Format <Driver’s License Number > as in <C> to <CCCCCCCCCCCCCCCCCCCC>. For ELD record keeping purposes, ELD must only retain characters in a Driver’s License Number entered during an account creation process that are a number between 0-9 or a character between AZ (non-case sensitive).

Disposition Mandatory for all driver accounts created on the ELD; optional for “nondriver” accounts.

Examples [SAMPLMJ065LD], [D000368210361], [198], [N02632676353666].465

4.12 7.12 Driver’s Location Description

Description This is a textual note related to the location of the CMV input by the driver upon ELD’s prompt.

Purpose Provides ability for a driver to enter location information related to entry of missing records; provides ability to accommodate temporary positioning service interruptions or outage without setting positioning malfunctions.

Source Driver, only when prompted by the ELD.

Used in ELD events; ELD outputs.

Data Type Entered by the authenticated driver when ELD solicits this information as specified in section *4.3.2.7 Driver’s Entry of Location Information*.

Data Range Free form text of any alphanumeric combination.

Data Length 5-60 characters.

Data Format <CCCCC> to <CCC CCC >.

Disposition Mandatory when prompted by ELD.

Examples [], [5 miles SW of Indianapolis, IN], [Reston, VA].

4.13 7.13 ELD Account Type

Description An indicator designating whether an ELD account is a driver account or support personnel (non-driver) account.

Purpose Enables authorized safety officials to verify account type specific requirements set forth in this document.

Source ELD designated.

Used in ELD outputs.

Data Type Specified during the account creation process and recorded on ELD.

Data Range Character “D”, indicating account type “Driver”, or “S”, indicating account type “motor carrier’s support personnel” (i.e. non-driver); “Unidentified Driver” account must be designated with type “D”.

Data Length 1 character.

Data Format <C>.

Disposition Mandatory.

Examples [D], [S].

4.14 7.14 ELD Authentication Value

Description An alphanumeric value that is unique to an ELD and verifies the authenticity of the given ELD.

Purpose Provides ability to cross-check the authenticity of an ELD used in the recording of a driver’s records during inspections.

Source ELD provider-assigned value; includes a certificate component and a hashed component; necessary information related to authentication keys and hash procedures disclosed by the registered ELD provider during the online ELD certification process for independent verification by FMCSA systems.

Used in ELD outputs.

Data Type Calculated from the authentication key and calculation procedure privately distributed by the ELD provider to FMCSA during the ELD registration process.

Data Range Alphanumeric combination.

Data Length 16-32 characters.

Data Format <CCCC CCCC>.

Disposition Mandatory.

Example [D3A4506EC8FF566B506EC8FF566BDFBB].

4.15 7.15 ELD Identifier

Description An alphanumeric identifier assigned by the ELD provider to the ELD technology that is certified by the registered provider at FMCSA’s Web site.

Purpose Provides ability to cross-check that the ELD used in the recording of a driver’s records is certified through FMCSA’s registration and certification process as required.

Source Assigned and submitted by the ELD provider during the online certification of an ELD model and version.

Used in ELD outputs.

Data Type Coded on the ELD by the ELD provider and disclosed to FMCSA during the online certification process.

Data Range A six character alphanumeric identifier using characters A-Z and number 0-9.

Data Length 6 characters.

Data Format <ELD Identifier> as in <CCCCCC>.

Disposition Mandatory.

Examples [1001ZE], [GAM112], [02P3P1].

4.16 7.16 ELD Provider

Description An alphanumeric company name of the technology provider as registered at the FMCSA's Web site.

Purpose Provides ability to cross-check that the ELD used in the recording of a driver's records is certified through FMCSA's registration and certification process as required.

Source Assigned and submitted by the ELD provider during the online registration process.

Used in ELD outputs.

Data Type Coded on the ELD by the ELD provider and disclosed to FMCSA during the online registration process.

Data Range Any alphanumeric combination.

Data Length Minimum: 4; Maximum 120 characters.

Data Format <ELD Provider> as in <CCCC> to <CCCC CCCC>.

Disposition Mandatory.

Examples [ELD PROVIDER INC].

4.17 7.17 ELD Registration ID

Description An alphanumeric registration identifier assigned to the ELD provider that is registered with FMCSA during the ELD registration process.

Purpose Provides ability to cross-check that the ELD provider has registered as required.

Source Received from FMCSA during online provider registration.

Used in ELD outputs.

Data Type Coded on the ELD by the provider.

Data Range A four character alphanumeric registration identifier using characters A- Z and numbers 0-9.

Data Length 4 characters.

Data Format <ELD Registration ID> as in <CCCC>.

Disposition Mandatory.

Examples [ZA10], [QA0C], [FAZ2].

4.18 7.18 ELD Username

Description This data element refers to the unique user identifier assigned to the account holder on the ELD to authenticate the corresponding individual during an ELD login process; the individual may be a driver or a motor carrier's support personnel.

Purpose Documents the user identifier assigned to the driver linked to the ELD account.

Source Assigned by the motor carrier during the creation of a new ELD account.

Used in ELD account profile; event records; ELD login process.

Data Type Entered (during account creation and user authentication).

Data Range Any alphanumeric combination.

Data Length Minimum: 4; Maximum: 60 characters.

Data Format <ELD Username> as in <CCCC> to <CCCC CCCC>.

Disposition Mandatory for all accounts created on the ELD.

Examples [smithj], [100384], [sj2345], [john.smith].

4.19 7.19 Engine Hours

Description This data element refers to the time the CMV’s engine is powered in decimal hours with 0.1 hr (6-minute) resolution; this parameter is a placeholder for <{Total} Engine Hours>, which refers to the aggregated time of a vehicle’s engine’s operation since its inception, and used in recording “engine power on” and “engine shut down” events, and also for <{Elapsed} Engine Hours>, which refers to the elapsed time in the engine’s operation in the given ignition power on cycle, and used in the recording of all other events.

Purpose Provides ability to identify gaps in the operation of a CMV, when the vehicle’s engine may be powered but the ELD may not; provides ability to cross check integrity of recorded data elements in events and prevent gaps in the recording of ELD.

Source ELD measurement or sensing.

Used in ELD events; ELD outputs.

Data Type Acquired from the engine ECM or a comparable other source as allowed in section [4.3.1.4 Engine Hours](#).

Data Range For <{Total} Engine Hours>, range is between 0.0 and 99,999.9; for <{Elapsed} Engine Hours>, range is between 0.0 and 99.9.

Data Length 3-7 characters.

Data Format <Vehicle Miles> as in <C.C> to <CCCCCC.C>.

Disposition Mandatory.

Examples [0.0], [9.9], [346.1], [2891.4].

4.20 7.20 Event Code

Description A dependent attribute on “Event Type” parameter that further specifies the nature of the change indicated in “Event Type”; this parameter indicates the new status after the change.

Purpose Provides ability to code the specific nature of the change electronically.

Source ELD internal calculations.

Used in ELD event records; ELD outputs.

Data Type ELD recorded and maintained event attribute in accordance with the type of event and nature of the new status being recorded.

Data Range Dependent on the “Event Type” as indicated on Table 6 of this appendix.

Data Length 1 character.

Data Format <Event Type> as in <C>.

Disposition Mandatory.

Examples [0], [1], [4], [9].

4.20.1 Table 6 - “Event Type” Parameter Coding

Event Type	Event Code	Event Code Description
1	1	Driver’s duty status changed to “Off-duty”
1	2	Driver’s duty status changed to “Sleeper Berth”
1	3	Driver’s duty status changed to “Driving”
1	4	Driver’s duty status changed to “On-duty not driving”
2	1	Intermediate log with conventional location precision
2	2	Intermediate log with reduced location precision
3	1	Driver indicates “Authorized Personal Use of CMV”
3	2	Driver indicates “Yard Moves”
3	0	Driver indication for PC, YM and WT cleared
4	1	Driver’s first certification of a daily record
4	n	Driver’s n’th certification of a daily record (when recertification necessary). “n” is an integer between 1 and 9. If more than 9 certifications needed, use 9 for each new re-certification record.
5	1	Authenticated driver’s ELD login activity
5	2	Authenticated driver’s ELD logout activity
6	1	Engine power-up with conventional location precision
6	2	Engine power-up with reduced location precision
6	3	Engine shut-down with conventional location precision
6	4	Engine shut-down with reduced location precision
7	1	An ELD malfunction logged
7	2	An ELD malfunction cleared
7	3	A data diagnostic event logged
7	4	A data diagnostic event cleared

4.21 7.21 Event Data Check Value

Description A hexadecimal “check” value calculated in accordance with the procedure outlined in section 4.4.5.1 *Event Data Check* of this appendix and attached to each event record at the time of recording.

Purpose Provides ability to identify cases where an ELD event record may have been inappropriately modified after its original recording.

Source ELD internal.

Used in ELD events; ELD output file.

Data Type Calculated by the ELD in accordance with section 4.4.5.1 *Event Data Check* of this appendix.

Data Range A number between hexadecimal 00 (decimal 0) and hexadecimal FF (decimal 255).

Data Length 2 characters.

Data Format <Event Data Check Value> as in <CC>.

Disposition Mandatory.

Examples [05], [CA], [F3].

4.22 7.22 Event Record Origin

Description An attribute for the event record indicating whether it is automatically recorded, or edited, entered or accepted by the driver, requested by another authenticated user, or assumed from unidentified driver profile.

Purpose Provides ability to track origin of the records.

Source ELD internal calculations.

Used in ELD event records; ELD outputs.

Data Type ELD recorded and maintained event attribute in accordance with the procedures outlined in sections 4.4.4.2.2 *Driver Edits*, 4.4.4.2.3 *Driver Entries*, 4.4.4.2.4 *Driver’s Assumption of Unidentified Driver Logs*, 4.4.4.2.5 *Motor Carrier Edit Suggestions*, and 4.4.4.2.6 *Driver’s Actions Over Motor Carrier Edit Suggestions* of this appendix.

Data Range 1, 2, 3 or 4 as described on Table 7 of this appendix.

Data Length 1 character.

Data Format <Event Record Origin> as in <C>.

Disposition Mandatory.

Examples [1], [2], [3], [4].

4.22.1 Table 7 - “Event Record Origin” Parameter Coding

Event Record Origin	Event Record Origin Code
Automatically recorded by ELD	1
Edited or entered by the Driver	2
Edit requested by an Authenticated User other than the Driver	3
Assumed from Unidentified Driver profile	4

4.23 7.23 Event Record Status

Description An attribute for the event record indicating whether an event is active or inactive and further, if inactive, whether it is due to a change or lack of confirmation by the driver or due to a driver's rejection of change request.

Purpose Provides ability to keep track of edits and entries performed over ELD records while retaining original records.

Source ELD internal calculations.

Used in ELD event records; ELD outputs.

Data Type ELD recorded and maintained event attribute in accordance with the procedures outlined in sections *4.4.4.2.2 Driver Edits*, *4.4.4.2.3 Driver Entries*, *4.4.4.2.4 Driver's Assumption of Unidentified Driver Logs*, *4.4.4.2.5 Motor Carrier Edit Suggestions*, and *4.4.4.2.6 Driver's Actions Over Motor Carrier Edit Suggestions* of this appendix.

Data Range 1, 2, 3 or 4 as described on Table 8 of this appendix.

Data Length 1 character.

Data Format <Event Record Status> as in <C>.

Disposition Mandatory.

Examples [1], [2], [3], [4]

4.23.1 Table 8 - "Event Record Status" Parameter Coding

Event Record Status	Event Record Status Code
Active	1
Inactive – Changed	2
Inactive – Change Requested	3
Inactive – Change Rejected	4

4.24 7.24 Event Sequence ID Number

Description This data element refers to the serial identifier assigned to each required ELD event as described in section *4.5.1 Events and Data to Record* of this appendix.

Purpose Provides ability to keep a continuous record, on a given ELD, across all users of that ELD.

Source ELD internal calculations.

Used in ELD event records; ELD outputs.

Data Type ELD maintained; incremented by 1 for each new record on the ELD; continuous for each new event the ELD records regardless of owner of the records.

Data Range 0 to FFFF; initial factory value must be 0; after FFFF hexadecimal (decimal 65535), the next Event Sequence ID number must be 0.

Data Length 1-4 characters.

Data Format <Event Sequence ID Number > as in <C> to <CCCC>.

Disposition Mandatory.

Examples [1], [1F2C], [2D3], [BB], [FFFE].

4.25 7.25 Event Type

Description An attribute specifying the type of the event record.

Purpose : Provides ability to code the type of the recorded event in electronic format.

Source ELD internal calculations.

Used in ELD event records; ELD outputs.

Data Type ELD recorded and maintained event attribute in accordance with the type of event being recorded.

Data Range 1-7 as described on Table 9 of this appendix.

Data Length 1 character.

Data Format <Event Type> as in <C>.

Disposition Mandatory.

Examples [1], [5], [4], [7].

4.25.1 Table 9 - “Event Type” Parameter Coding

Event Type	Event Type Code
A change in driver’s duty-status	1
An intermediate log	2
A change in driver’s indication of authorized personal use of CMV or yard moves	3
A driver’s certification/re-certification of records	4
A driver’s login/logout activity	5
CMV’s engine power up / shut down activity	6
A malfunction or data diagnostic detection occurrence	7

4.26 7.26 Exempt Driver Configuration

Description A parameter indicating whether the motor carrier configured a driver’s profile to claim exemption from ELD use.

Purpose : Provides ability to code the motor carrier-indicated exemption for the driver electronically.

Source Motor carrier’s configuration for a given driver.

Used in ELD outputs.

Data Type Motor carrier configured and maintained parameter in accordance with the qualification requirements listed in § 395.1.

Data Range E (exempt) or 0 (number zero).

Data Length 1 character.

Data Format <Exempt Driver Configuration> as in <C>.

Disposition Mandatory.

Examples [E], [0].

4.27 7.27 File Data Check Value

Description A hexadecimal “check” value calculated in accordance with the procedure outlined in section 4.4.5.3 *File Data Check* of this appendix and attached to each ELD output file.

Purpose : Provides ability to identify cases where an ELD file may have been inappropriately modified after its original creation.

Source ELD internal.

Used in ELD output files.

Data Type Calculated by the ELD in accordance with section 4.4.5.3 *File Data Check* of this appendix.

Data Range A number between hexadecimal 0000 (decimal 0) and hexadecimal FFFF (decimal 65535).

Data Length 4 characters.

Data Format <File Data Check Value> as in <CCCC>.

Disposition Mandatory.

Examples [F0B5], [00CA], [523E].

4.28 7.28 First Name

Description This data element refers to the given name of the individual holding an ELD account.

Purpose Links an individual to the associated ELD account.

Source Driver’s license for driver accounts; driver’s license or government-issued ID for support personnel accounts.

Used in ELD account profile(s); ELD outputs (display and file).

Data Type Entered (during the creation of a new ELD account).

Data Range Any alphanumeric combination.

Data Length Minimum: 2; Maximum: 30 characters.

Data Format <First Name> as in <CC> to <CC CC> where “C” denotes a character.

Disposition Mandatory for all accounts created on the ELD.

Example [John].

4.29 7.29 Geo-Location

Description A descriptive indicator of the CMV position in terms of a distance and direction to a recognizable location derived from a GNIS database at a minimum containing all cities, towns and villages with a population of 5,000 or greater.

Purpose Provide recognizable location information on a display or printout to users of the ELD.

Source ELD internal calculations as specified in section 4.4.2 *Geo-Location Conversions* of this appendix.

Used in ELD display or printout.

Data Type Identified from the underlying latitude/longitude coordinates by the ELD. **Data Range** : Contains four segments in one text field; a recognizable location driven from GNIS database containing—at a minimum—all cities, towns and villages with a population of 5,000 in text format containing a location name and the State abbreviation, distance from this location and direction from this location.

Data Length Minimum: 5; Maximum: 60 characters.

Data Format* : <Distance from **{identified}** Geo-location> <'mi '> <Direction from **{identified}** Geo-location> <' '> <State Abbreviation **{of identified}** Geo Location> <' '> <Place name of **{identified}*** Geo-location> **where:** <Distance from **{identified}** Geo-location> must either be <{blank}> or <C> or <CC> where the up-to two character number specifies absolute distance between identified geo-location and event location; <Direction from **{identified}** Geo-location> must either be <{blank}> or <C> or <CC> or <CCC> , must represent direction of event location with respect to the identified geo-location, and must take a value listed on Table 10 of this appendix; <State Abbreviation **{of identified}** Geo Location> must take values listed on Table 5; <Place name of **{identified}** Geo-location> must be the text description of the identified reference location; Overall length of the “Geo-location” parameter must not be longer than 60 characters long.

Disposition Mandatory.

Examples [2mi ESE IL Darien], [1mi SE TX Dallas], [11mi NNW IN West Lafayette].

4.29.1 Table 10 - Conventional Compass Rose Direction Coding To Be Used in the Geo-Location Parameter.

Direction	Direction Code
At indicated geo-location	{blank}
North of indicated geo-location	N
North – North East of indicated geo-location	NNE
North East of indicated geo-location	NE
East – North East of indicated geo-location	ENE
East of indicated geo-location	E
East – South East of indicated geo-location	ESE
South East of indicated geo-location	SE
South – South East of indicated geo-location	SSE
South of indicated geo-location	S
South – South West of indicated geo-location	SSW
South West of indicated geo-location	SW
West – South West of indicated geo-location	WSW
West of indicated geo-location	W
West – North West of indicated geo-location	WNW
North West of indicated geo-location	NW
North– North West of indicated geo-location	NNW

4.30 7.30 Last Name

Description This data element refers to the last name of the individual holding an ELD account.

Purpose Links an individual to the associated ELD account.

Source Driver's license for driver accounts; driver's license or government-issued ID for support personnel accounts.

Used in ELD account profile(s); ELD outputs (display and file).

Data Type Entered (during the creation of a new ELD account).

Data Range Any alphanumeric combination.

Data Length Minimum: 2; Maximum: 30 characters

Data Format <Last Name> as in <CC> to <CC CC>.

Disposition Mandatory for all accounts created on the ELD.

Example [Smith].

4.31 7.31 Latitude

Description An angular distance in degrees north and south of the equator.

Purpose In combination with the variable "Longitude", this parameter stamps records requiring a position attribute with a reference point on the face of the earth.

Source ELD's position measurement.

Used in ELD events; ELD outputs.

Data Type Latitude and Longitude must be automatically captured by the ELD. **Data Range** : -90.00 to 90.00 in decimal degrees (two decimal point resolution) in records using conventional positioning precision; -90.0 to 90.0 in decimal degrees (single decimal point resolution) in records using reduced positioning precision when allowed; latitudes north of the equator must be specified by the absence of a minus sign (-) preceding the digits designating degrees; latitudes south of the Equator must be designated by a minus sign (-) preceding the digits designating degrees.

Data Length 3 to 6 characters.

Data Format First character: [<'-'> or <{blank}>]; then [<C> or <CC>]; then <'.'>; then [<C> or <CC>].

Disposition Mandatory.

Examples [-15.68], [38.89], [5.07], [-6.11], [-15.7], [38.9], [5.1], [-6.1].

4.32 7.32 Line Data Check Value

Description A hexadecimal "check" value calculated in accordance with procedure outlined in section [4.4.5.2 Line Data Check](#) and attached to each line of output featuring data at the time of output file being generated.

Purpose Provides ability to identify cases where an ELD output file may have been inappropriately modified after its original generation.

Source ELD internal.

Used in ELD output file.

Data Type Calculated by the ELD in accordance with *4.4.5.2 Line Data Check*.

Data Range A number between hexadecimal 00 (decimal 0) and hexadecimal FF (decimal 255) .

Data Length 2 characters.

Data Format <Line Data Check Value> as in <CC>.

Disposition Mandatory.

Examples [01], [A4], [CC].

4.33 7.33 Longitude

Description An angular distance in degrees measured on a circle of reference with respect to the zero (or prime) meridian; The prime meridian runs through Greenwich, England.

Purpose In combination with the variable “Latitude”, this parameter stamps records requiring a position attribute with a reference point on the face of the earth.

Source ELD’s position measurement.

Used in ELD events; ELD outputs.

Data Type Latitude and Longitude must be automatically captured by the ELD. **Data Range** : -179.99 to 180.00 in decimal degrees (two decimal point resolution) in records using conventional positioning precision; -179.9 to 180.0 in decimal degrees (single decimal point resolution) in records using reduced positioning precision when allowed; longitudes east of the prime meridian must be specified by the absence of a minus sign (-) preceding the digits designating degrees of longitude; longitudes west of the prime meridian must be designated by minus sign (-) preceding the digits designating degrees.

Data Length 3 to 7 characters.

Data Format First character: [<’-’> or <{blank}>]; then [<C>, <CC> or <CCC>]; then <’.’>; then [<C> or <CC>].

Disposition Mandatory.

Examples [-157.81], [-77.03], [9.05], [-0.15], [-157.8], [-77.0], [9.1], [-0.2].

4.34 7.34 Malfunction/Diagnostic Code

Description A code that further specifies the underlying malfunction or data diagnostic event.

Purpose : Enables coding the type of malfunction and data diagnostic event to cover the standardized set in Table 4 of this appendix.

Source ELD internal monitoring.

Used in ELD events; ELD outputs.

Data Type Recorded by ELD when malfunctions and data diagnostic events are set or reset.

Data Range As specified in Table 4 of this appendix.

Data Length 1 character.

Data Format <C>.

Disposition _ Mandatory.

Examples [1], [5], [P], [L].

4.35 7.35 Malfunction Indicator Status

Description This is a Boolean indicator identifying whether the used ELD unit has an active malfunction set at the time of event recording.

Purpose Documents the snapshot of ELD's malfunction status at the time of an event recording.

Source ELD internal monitoring functions.

Used in ELD events; ELD outputs.

Data Type Internally monitored and managed.

Data Range 0 (no active malfunction) or 1 (at least one active malfunction).

Data Length 1 character.

Data Format <Malfunction Indicator Status> as in <C>.

Disposition Mandatory.

Examples [0] or [1].

4.36 7.36 Multiday Basis Used

Description This data element refers to the multiday basis (7 or 8 days) used by the motor carrier to compute cumulative duty hours.

Purpose Provides ability to apply the HOS rules accordingly.

Source : Motor carrier.

Used in ELD account profile; ELD outputs.

Data Type Entered by the motor carrier during account creation process.

Data Range 7 or 8.

Data Length 1 character.

Data Format <Multiday basis used> as in <C>.

Disposition Mandatory.

Examples [7], [8].

4.37 7.37 Order Number

Description A continuous integer number assigned in the forming of a list, starting at 1 and incremented by 1 for each unique item on the list.

Purpose Allows for more compact report file output generation avoiding repetitious use of CMV identifiers and usernames affected in records.

Source ELD internal.

Used in ELD outputs, listing of users and CMVs referenced in ELD logs.

Data Type Managed by ELD.

Data Range Integer between 1 and 99.

Data Length 1-2 characters.

Data Format <Order Number> as in <C> or <CC>.

Disposition Mandatory.

Examples [1], [5], [11], [28].

4.38 7.38 Output File Comment

Description A textual field that may be populated with information pertaining to the created ELD output file; An authorized safety official may provide a key phrase or code to be included in the output file comment, which may be used to link the requested data to an inspection, inquiry, or other enforcement action; if provided to the driver by an authorized safety official, it must be entered into the ELD and included in the exchanged dataset as specified.

Purpose The output file comment field provides an ability to link submitted data to an inspection, inquiry, or other enforcement action, if deemed necessary; further, it may also link a dataset to a vehicle, driver, carrier, and/or ELD that may participate in voluntary future programs that may involve exchange of ELD data.

Source Enforcement personnel or driver or motor carrier.

Used in ELD outputs.

Data Type If provided, output file comment is entered or appended to the ELD dataset prior to submission of ELD data to enforcement.

Data Range Blank or any alphanumeric combination specified and provided by an authorized safety official.

Data Length 0-60 characters.

Data Format : <{blank}>, or <C> thru <CCCC CCCC>.

Disposition : Mandatory.

Examples [], [3BHG701015], [113G1EFW02], [7353930].

4.39 7.39 Shipping Document Number

Description Shipping document number the motor carrier uses in their system and dispatch documents.

Purpose Links ELD data to the shipping records; makes ELD dataset consistent with § 395.8 requirements.

Source Motor carrier.

Used in ELD outputs.

Data Type Entered in the ELD by the authenticated driver or motor carrier and verified by the driver.

Data Range Any alphanumeric combination.

Data Length 0-40 characters.

Data Format <{blank}>, or <C> thru <CCCC CCCC>.

Disposition Mandatory if a shipping number is used on motor carrier's system.

Examples [], [B 75354], [FX334411707].

4.40 7.40 Time

Description In combination with the variable "Date", this parameter stamps records with a reference in time; even though date and time must be captured in UTC, event records must use date and time converted to the time zone in effect at the driver's home terminal as specified in section *4.4.3 Date and Time Conversions* of this appendix.

Purpose Provides ability to record the instance of recorded events.

Source ELD's converted time measurement.

Used in ELD events; ELD outputs.

Data Type UTC time must be automatically captured by ELD; time in effect at the driver's home terminal must be calculated as specified in section *4.4.3 Date and Time Conversions* of this appendix.

Data Range Any valid date combination expressed in <HHMMSS> format where "HH" refers to hours of the day, "MM" refers to minutes, and "SS" refers to seconds.

Data Length 6 characters.

Data Format <HHMMSS> where <HH> must be between 00 and 23, <MM> and <SS> must be between 00 and 59.

Disposition Mandatory.

Examples [070111], [001259], [151522], [230945].

4.41 7.41 Time Zone Offset from UTC

Description This data element refers to the offset in time between UTC time and the time standard in effect at the driver's home terminal.

Purpose Establishes the ability to link records stamped with local time to a universal reference.

Source Calculated from measured variable <{UTC} Time> and <{Time Standard in Effect at driver's home terminal} Time>; Maintained together with "24-hour Period Starting Time" parameter by the motor carrier or tracked automatically by ELD.

Used in ELD account profile; ELD event: Driver's certification of own records.

Data Type Programmed or populated on the ELD during account creation and maintained by the motor carrier or ELD to reflect true and accurate information for drivers. This parameter must adjust for Daylight Saving Time changes in effect at the driver's home terminal.

Data Range 04 to 11; omit sign.

Data Length 2 characters.

Data Format <Time Zone Offset from UTC> as in <HH> where “HH” refer to hours in difference.

Disposition Mandatory.

Examples [04], [05], [10].

4.42 7.42 Trailer Number(s)

Description This data element refers to the identifier(s) the motor carrier uses for the trailers in their normal course of business.

Purpose Identifies the trailer(s) a driver operates while a driver’s ELD records are recorded; makes ELD records consistent with § 395.8 which requires the trailer number(s) to be included on the form.

Source Unique trailer identifiers a motor carrier uses in their normal course of business and includes on dispatch documents, or the license number and licensing State of each towed unit; trailer number(s) must be updated each time hauled trailers change.

Data Type Automatically captured by the ELD or populated by motor carrier’s extended ELD system or entered by the driver; must be updated each time the hauled trailer(s) change.

Data Range Any alphanumeric combination.

Data Length Minimum: blank; Maximum: 32 characters (3 trailer numbers each maximum 10 characters long, separated by spaces).

Data Format Trailer numbers; separated by space in case of multiple trailers hauled at one time; field to be left blank” for non-combination vehicles (such as a straight truck or bobtail tractor).

<Trailer Unit Number {#1}><’ ‘><Trailer Unit Number {#2}> <’ ‘><Trailer Unit Number {#3}>
as in <{blank}> to <CCCCCCCCCC CCCCCCCCCCC CCCCCCCCCCC>.

Disposition Mandatory when operating combination vehicles.

Examples [987], [00987 PP2345], [BX987 POP712 10567], [TX12345 LA22A21], [].

4.43 7.43 Vehicle Miles

Description This data element refers to the distance traveled using the CMV in whole miles; this parameter is a placeholder for <{Total} Vehicle Miles>, which refers to the odometer reading and is used in recording “engine power on” and “engine shut down” events, and also for <{Accumulated} Vehicle Miles>, which refers to the accumulated miles in the given ignition power on cycle and is used in the recording of all other events.

Purpose Provides ability to track distance traveled while operating the CMV in each duty status. Total miles traveled within a 24-hour period is a required field in § 395.8.

Source ELD measurement or sensing.

Used in ELD events; ELD outputs.

Data Type Acquired from the engine ECM or a comparable other source as allowed in section [4.3.1.3 Vehicle Miles](#).

Data Range For <{Total} Vehicle Miles>, range is between 0 and 9,999,999; for <{Accumulated} Vehicle Miles>, range is between 0 and 9,999.

Data Length 1-7 characters.

Data Format <Vehicle Miles> as in <C> to <CCCCCCC>.

Disposition Mandatory.

Examples [99], [1004566], [0], [422].

General FAQ's - 2017 DECEMBER

Content Pulled from: <https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/regulations/hours-service/elds/74541/eldrulefaqs-dec2017.pdf>

5.1 General Information about the ELD Rule

5.1.1 1. What are the key requirements of the Electronic Logging Device (ELD) rule?

The ELD rule: * Requires ELD use by commercial drivers who are required to prepare hours-of-service (HOS) records of duty status (RODS). * Sets ELD performance and design standards, and requires ELDs to be certified and registered with FMCSA. * Establishes what supporting documents drivers and carriers are required to keep. * Prohibits harassment of drivers based on ELD data or connected technology (such as fleet management system). The rule also provides recourse for drivers who believe they have been harassed.

5.1.2 2. What is the mandate in the Moving Ahead for Progress in the 21st Century Act (MAP-21) for the Electronic Logging Device (ELD) rule?

Section 32301(b) of the Commercial Motor Vehicle Safety Enhancement Act, enacted as part of MAP-21, (Pub. L. 112-141, 126 Stat. 405, 786-788, July 6, 2012), mandates the ELD rule. It calls for the Secretary of Transportation to adopt regulations requiring ELD use in commercial motor vehicles (CMVs) involved in interstate commerce, when operated by drivers who are required to keep records of duty status (RODS).

5.1.3 3. Who must comply with the electronic logging device (ELD) rule?

The ELD applies to most motor carriers and drivers who are currently required to maintain records of duty status (RODS) per Part 395, 49 CFR 395.8(a). The rule applies to commercial buses as well as trucks, and to Canada- and Mexico-domiciled drivers. The ELD rule allows limited exceptions to the ELD mandate, including: * Drivers who operate under the short-haul exceptions may continue using timecards; they are not required to keep RODS and will

not be required to use ELDs. * Drivers who use paper RODS for not more than 8 days out of every 30-day period.
* Drivers who conduct drive-away-tow-away operations, in which the vehicle being driven is the commodity being delivered. * Drivers of vehicles manufactured before 2000.

5.1.4 4. What electronic logging device (ELD) user documentation must be onboard a driver's commercial motor vehicle?

Beginning on December 18, 2017, a driver using an ELD must have an ELD information packet onboard the commercial motor vehicle (CMV) containing the following items:

1. A user's manual for the driver describing how to operate the ELD;
2. An instruction sheet describing the data transfer mechanisms supported by the ELD and step-by-step instructions to produce and transfer the driver's hours-of-service records to an authorized safety official;
3. An instruction sheet for the driver describing ELD malfunction reporting requirements and record-keeping procedures during ELD malfunctions; and
4. A supply of blank driver's records of duty status (RODS) graph-grids sufficient to record the driver's duty status and other related information for a minimum of 8 days.

Prior to December 18, 2017, FMCSA recommends that drivers have the user's manual, malfunction instruction sheet, and graph-grids.

5.1.5 5. Can the ELD information packet be in electronic form?

Yes. The user's manual, instruction sheet, and malfunction instruction sheet can be in electronic form. This is in accordance with the federal register titled "Regulatory Guidance Concerning Electronic Signatures and Documents" (76 FR 411).

5.1.6 6. Can an electronic logging device (ELD) be on a smartphone or other wireless device?

Yes. An ELD can be on a smartphone or other wireless device if the device meets the ELD rule's technical specifications.

5.1.7 7. Can a driver use a portable electronic logging device (ELD)?

Yes. A driver may use a portable ELD. A portable ELD must be mounted in a fixed position during commercial motor vehicle (CMV) operation (CMV) and visible to the driver from a normal seated driving position. This information can be found in the ELD Rule section 395.22(g).

5.1.8 8. How long must a motor carrier retain electronic logging device (ELD) record of duty status (RODS) data?

A motor carrier must retain ELD record of duty status (RODS) data and back-up data for six months. The back-up copy of ELD records must be maintained on a device separate from that where original data are stored. Additionally, a motor carrier must retain a driver's ELD records in a manner that protects driver privacy.

5.1.9 9. What electronically transferred data from electronic logging devices (ELDs) will be retained by Federal Motor Carrier Safety Administration (FMCSA) and other authorized safety officials?

FMCSA will not retain any ELD data unless there is a violation.

5.1.10 10 . What is the carrier’s responsibility in ensuring that they are using a registered device?

The motor carrier is responsible for checking that their device is registered. This includes checking both the registration and revocation list periodically. The list of registered and revoked ELDs can be found on the following link: <https://3pdp.fmcsa.dot.gov/ELD/ELDLList.aspx>. In the event that an ELD is removed from the registration list, FMCSA will make efforts to notify the public and affected users. Motor carriers and drivers are encouraged to sign-up for ELD updates to receive notifications on when an ELD has been listed on the Revocation List.

5.1.11 11 . How will the ELD display screen or printout reflect special driving categories; yard moves and personal conveyance?

While not required, if the motor carrier configured the driver user account to authorize a special driving category, then the graph-grid will overlay periods using a different style line (such as dashed, dotted line, or shading) in accordance with section 4.8.1.3(c)(1) of the ELD Functional Specifications. The appropriate abbreviation must also be indicated on the graph-grid. If the motor carrier does not configure the driver user account to authorize special driving categories, then the driver must annotate the beginning and end of the applicable special driving category.

12 . If the vehicle registration for a commercial motor vehicle reflects a model year of 2000 or newer, but the vehicle was manufactured without an engine control module (ECM), is the carrier required to comply with the ELD rule?

Yes, a motor carrier operating a vehicle with a manufactured model year of 2000 and newer and without an ECM is subject to the ELD rule. If the currently installed engine does not support an ECM and is unable to obtain or estimate the required vehicle parameters, then the operator must use an ELD that does not rely on ECM connectivity, but nevertheless meets the accuracy requirements of the final rule. See Appendix A to Subpart B of Part 395 sections 4.2 and 4.3.1 of the ELD rule for accuracy requirements.

5.1.12 13 . How are motor carriers required to present records of duty status (RODS) from December 11-17, 2017? Will drivers be required to present their records of duty status on electronic logging devices (ELDs)?

No, drivers will not be required to present RODS on ELDs from December 11, 2017, to December 17, 2017. Drivers can present their previous 7 days of RODS through any of the following: * Paper records, * A printout from an electronic logging device, * A display from a device installed with logging software and electronic signature capabilities, * Having the records available by entering them into an ELD, or * Continued use of a grandfathered automatic on-board recording device.

14 . How must a driver reflect their record of duty status for the previous 7 days during a roadside inspection, if he or she is employed by multiple motor carriers that are using ELDs?

The driver can either, (1) print out their hours-of-service from the other motor carrier, (2) if operating with compatible devices the ELD data can be transferred between the motor carriers with the driver’s approval, or (3) manually add the hours of service while operating for that motor carrier into the current ELD using the editing and annotation functions of the ELD.

5.1.13 15 . How must a driver who is starting to work for a new motor carrier present their prior 7 days' records of duty status to the new carrier?

Section 395.8(j)(2) provides that “(2) Motor carriers, when using a driver for the first time or intermittently, shall obtain from the driver a signed statement giving the total time on duty during the immediately preceding 7 days and the time at which the driver was last relieved from duty prior to beginning work for the motor carriers.” In the alternative, the driver may present copies of the prior 7 days' records of duty status or a print-out of the prior 7 days from the prior carrier's ELD system.

5.2 Electronic Logging Device Exemptions

5.2.1 1. Who is exempt from the ELD rule?

Drivers who use the timecard exception are not required to keep records of duty status (RODS) or use ELDs. Additionally, the following drivers are not required to use ELDs; however, they are still bound by the RODS requirements in 49 CFR 395 and must prepare logs on paper, using an Automatic On-Board Recording Device (AOBRD), or with a logging software program when required: * Drivers who use paper RODS for not more than 8 days out of every 30-day period. * Drivers of vehicles manufactured before 2000. * Drivers who are required to keep RODS not more than 8 days within any 30-day period. * Drivers who conduct drive-away-tow-away operations, where the vehicle being driven is the commodity being delivered, or the vehicle being transported is a motor home or a recreation vehicle trailer with one or more sets of wheels on the surface of the roadway. * Drivers of vehicles manufactured before the model year 2000. (As reflected on the vehicle registration)

5.2.2 2. What time periods can be used to determine the 8 days in any 30-day period?

The 30-day period is not restricted to a single month, but applies to any 30-day period. For example, June 15 to July 15 is considered a 30-day period.

5.2.3 3. What information may be requested to support the exemption for drivers not required to use records of duty status (RODS) more than 8 days in any 30-day period?

Authorized safety officials may inspect and copy motor carrier records and request any records needed to perform their duties.

5.2.4 4. If the vehicle registration for a commercial motor vehicle reflect a model year of 2000 or newer, but the engine plate or documentation from the manufacturer indicates that the engine is older than model year 2000, is the vehicle exempt from the ELD rule?

Yes. While an ELD may voluntarily be used in vehicles that are model year 1999 or older, use of an ELD is not required in these vehicles; likewise, vehicles with engines predating model year 2000 are to be treated as exempt, even if the VIN number reported on the registration indicates that the CMV is a later model year. When a vehicle is registered, the model year should follow the criteria established by the National Highway Traffic Safety Administration (NHTSA). There may be instances where the model year reflected on the vehicle registration is not the same as the engine model year, most commonly when a vehicle is rebuilt using a “glider kit.” In this circumstance, an inspector/investigator should use the model year on the engine to determine if the driver is exempt from the ELD requirements. If the engine

model year is older than 2000, the driver is not subject to the ELD rule. While the driver is not required to possess documentation that confirms the vehicle engine model year, 49 CFR Part 379 Appendix A requires motor carriers to maintain all documentation on motor and engine changes at the principle place of business. If a determination cannot be made at the roadside, safety official should refer the case for further investigation.

5.2.5 5. If a motor carrier's operation is exempt from the requirements of 49 CFR Part 395.8, is the motor carrier also exempt from the ELD rule?

Yes. Motor carriers with operations that are exempt from the requirements of 395.8 are exempt from the ELD rule.

5.2.6 6. Are Canada- and Mexico-domiciled drivers required to use electronic logging devices (ELDs) when they are operating in the United States?

Yes. Canada- and Mexico-domiciled drivers must comply with the Federal hours of service rules while operating in the United States. This includes using ELDs compliant with 49 CFR Part 395, unless they qualify for one of the exceptions. A driver operating in multiple jurisdictions will be able to annotate the driver's record of duty status on the ELD with information on periods of operation outside the United States.

5.2.7 7. How should an ELD record a driver's hours of service when operating in another country such as Canada?

The ELD provider may tailor the device to its customers' needs/operations to assist them in accurately monitoring drivers' hours of service compliance in accordance with the hours of service standards of the country operated in, such as cross-border operations.

5.2.8 8. Can drivers operate commercial motor vehicles (CMVs) equipped with electronic logging devices (ELDs), if they are not required to use them due to an exception?

Yes. Drivers can drive CMVs equipped with ELDs and still use their exception. A motor carrier may configure an ELD to show the exception for drivers exempt from using the ELD, or use the ELD annotation to record the status.

5.2.9 9. Are motor carriers that meet the agricultural exemption defined in 395.1(k) or the covered farm vehicle 395.1(s) subject to the ELD rule?

The ELD rule does not change any of the current hours of service exemptions. Therefore, motor carriers that meet the exemptions defined in 395.1 are not subject to Part 395, including the ELD rule while they are operating under the terms of the exemption. The duty status of the driver may be noted as either off-duty (with appropriate annotation), or "exempt." [Click here](#) for additional information on the agriculture exemption.

5.2.10 10 . Can a driver use an ELD on a commercial motor vehicle with a model year older than 2000?

Yes. However, the ELD must comply with the ELD rule's technical specifications. The ELD may use alternative sources to obtain or estimate the required vehicle parameters, in accordance with the accuracy requirements in Section 4.3.1 of the ELD rule.

5.2.11 11 . Are transporters of mobile or modular homes considered Drive-away/Towaway operations under Section 395.8 (a)(1)(iii)(A)(2) or (3) and therefore exempt from the ELD rule?

No. The transportation of mobile or modular homes does not qualify for an exception under 395.8(a)(1)(iii) (A)(2) because the vehicle driven in transporting the mobile or modular home is not part of the shipment, nor does the transport qualify under 395.8(a)(1)(iii)(A)(3) because the shipment is neither a motor home or recreational vehicle trailer.

5.3 Voluntary Usage and Compliance Phases

5.3.1 1. How soon can electronic logging devices (ELDs) be installed and used in commercial motor vehicles (CMVs)?

Since February 16, 2016, ELD manufacturers have been able to register and self-certify their ELDs with FMCSA, and motor carriers have been able to elect to use ELDs listed on the website. All motor carriers and drivers subject to the requirements in the ELD rule must begin using an ELD or “grandfathered AOB RD” on December 18, 2017, the compliance date of the ELD rule.

5.3.2 2. What are the enforcement procedures for registered electronic logging devices (ELDs) installed and used in commercial motor vehicles (CMVs) prior to the compliance date of the ELD rule?

Prior to the compliance date of December 18, 2017, ELD use is voluntary. Safety officials will review ELD information to determine compliance with the hours of service regulations and to detect falsifications.

5.3.3 3. What are the options for carriers and drivers to complete records of duty status (RODS) prior to the Electronic Logging Device (ELD) rule compliance date?

Prior to December 18, 2017 drivers and motor carriers can use: * Automatic onboard recording device (AOBRDs), * ELDs, * Paper logs or * Devices with logging software programs.

5.3.4 4. What is a “grandfathered” automatic onboard recording device (AOBRD)?

A “grandfathered” AOBRD is a device that a motor carrier installed and required its drivers to use before the electronic logging device (ELD) rule compliance date of December 18, 2017. The device must meet the requirements of 49 CFR 395.15. A motor carrier may continue to use grandfathered AOBRDs no later than December 16, 2019. After that, the motor carrier and its drivers must use ELDs. See Section 395.15 (a) of the ELD final rule.

5.3.5 5. When are drivers subject to the ELD rule required to start using electronic logging devices (ELDs)?

Motor carriers and drivers subject to the ELD rule must start using ELDs by the compliance date of December 18, 2017, unless they are using a grandfathered Automatic On-board Recording Device (AOBRD).

5.3.6 6. What will be the enforcement procedures for “grandfathered” automatic onboard recording devices (AOBRDs) and electronic logging devices (ELD) during the two-year period following the compliance date of the ELD rule?

During the period when both “grandfathered” AOBRDs and ELDs will be used (December 18, 2017 to December 16, 2019), authorized safety officials will enforce ELD rule requirements for ELDs and the requirements in 49 CFR 395.15 for “grandfathered” AOBRDs. The supporting document requirements for drivers and motor carriers using either device will take effect on the ELD rule compliance date of December 18, 2017.

5.3.7 7. According to § 395.8, if a motor carrier “installs and requires a driver to use an AOBRD. . . before December 18, 2017 they may continue to use the AOBRD until December 16, 2019.” Does this mean I can move an AOBRD from one vehicle to another after December 18, 2017?

If your operation uses AOBRDs before December 18, 2017, and you replace vehicles in your fleet you can install an AOBRD that was used in the previous CMV. However, you may not purchase and install a new AOBRD in a vehicle after December 18, 2017.

5.4 Supporting Documents

5.4.1 1. When are motor carriers and drivers required to comply with the supporting document requirements?

All motor carriers and drivers must comply with the supporting documents requirements starting December 18, 2017.

5.4.2 2. How many supporting documents must be retained by motor carriers, and when must drivers submit them to the motor carrier?

Motor carriers must retain up to eight supporting documents for every 24-hour period that a driver is on duty. Drivers must submit their records of duty status (RODS) and supporting documents to the motor carrier no later than 13 days after receiving them. If a motor carrier retains more than 8 supporting documents, the motor carrier must maintain the first and last document generated during the regular course of business

5.4.3 3. How long must motor carriers retain records of duty status (RODS) and supporting documents?

Motor carriers must retain RODS and supporting documents for six months.

5.4.4 4. What are the categories of supporting documents?

Supporting documents required in the normal course of business are important to verify a driver’s records of duty status (RODS). They consist of five categories, described in 49 CFR 395.11(c): * Bills of lading, itineraries, schedules, or equivalent documents that indicate the origin and destination of each trip; * Dispatch records, trip records, or equivalent documents; * Expense receipts related to any on-duty not-driving time; * Electronic mobile communication records, reflecting communications transmitted through a fleet management system; and * Payroll records, settlement sheets, or equivalent documents that indicate what and how a driver was paid. If a driver keeps paper RODS under 49 CFR

395.8(a)(1)(iii), the carrier must also retain toll receipts. For drivers using paper RODS, toll receipts do not count toward the eight-document cap.

5.4.5 5. Are there specific categories of supporting documents that drivers can provide electronically?

Two categories—electronic mobile communications and payroll records—are not documents a driver would have to physically retain. They may be part of a larger record that the carrier retains electronically or physically at the dispatch location or principal place of business. In applying the eight-document limit, all information in an electronic mobile communication record will be counted as one document per duty day.

5.4.6 6. Can supporting documents be limited to only those acquired at the beginning and end of the workday?

No. Documents acquired throughout the day are important in enforcing the 60/70-hour rule—a crucial part of ensuring hours of service compliance. Compliance with the 60/70-hour rule is based on the cumulative hours an individual works over a period of days. Supporting documents are critical to verify the proper duty statuses in assessing compliance with the 60/70 hour rules. 7

5.4.7 7. What information should be in the supporting documents?

Supporting documents must contain the following elements: * Driver name or carrier-assigned identification number, either on the document or on another document enabling the carrier to link the document to the driver. The vehicle unit number can also be used if it can be linked to the driver; * Date; * Location (including name of nearest city, town, or village); and * Time.

5.4.8 8. Can a document with fewer than four required elements be used as a supporting document?

If a driver has fewer than eight documents that include all four elements, a document that contains all of the elements except “time” is considered a supporting document.

5.4.9 9. What supporting documents should a motor carrier retain if a driver submits more than eight documents for a 24-hour period?

If a driver submits more than eight documents, the motor carrier must retain the first and last documents for that day and six other supporting documents. If a driver submits fewer than eight documents, the motor carrier must keep each document.

5.4.10 10 . Are drivers required to show supporting documents during roadside inspections?

Upon request, a driver must provide any supporting document in the driver’s possession for an authorized safety official’s review.

5.5 Editing and Annotations

5.5.1 1. What is the difference between “paper records of duty status (RODS)” and printouts of RODS from electronic logging devices (ELDs)?

“Paper RODS” means RODS that are not kept on an ELD or automatic onboard recording device (AOBRD), but that are either recorded manually (in accordance with 49 CFR 395.8(f)) or on a computer not synchronized with the vehicle or that is otherwise not qualified to be an ELD or AOBRD. Printouts of RODS from ELDs are the reports that ELDs must be able to generate upon request from an authorized safety official, per section 4.8.1 of the ELD rule.

5.5.2 2. What is the difference between an “edit” and an “annotation”?

An edit is a change to an electronic logging device (ELD) record that does not overwrite the original record, while an annotation is a note related to a record, update, or edit that a driver or authorized support personnel may input to the ELD. Section 49 CFR 395.30(c)(2) requires that all edits, whether made by a driver or the motor carrier, be annotated to document the reason for the change. For example, an edit showing time being switched from “off duty” to “on-duty not driving” could be annotated by the carrier to note, “Driver logged training time incorrectly as off duty.” This edit and annotation would then be sent to the driver for approval.

5.5.3 3. Can a driver annotate the electronic logging device (ELD) record?

Yes. A driver can use annotations to indicate the beginning and end of a period of authorized personal commercial vehicle use, or yard moves, as well as other special driving categories, such as adverse driving conditions (49 CFR 395.1(b)) or oilfield operations (49 CFR 395.1(d)).

5.5.4 4. Who can edit an electronic logging device (ELD) record?

Both the driver and authorized carrier staff can make limited edits to an ELD record to correct mistakes or add missing information. All edits must include a note (annotation) to explain the reason for the edit. In addition, the driver must confirm (certify) that any carrier edit is accurate, and resubmit the records. If the driver chooses not to re-certify RODs, this is also reflected in the ELD record. The ELD must keep the original, unedited record, along with the edits. Example: a carrier edits a record to switch a period of time from “off-duty” to “on-duty not driving”, with a note that explains “Driver logged training time incorrectly as off-duty”. The edit and annotation are sent to the driver to verify. The edit is not accepted until the driver confirms it and resubmits the RODS.

5.5.5 5. Who is responsible for the integrity of records of duty status in regards to the editing and certification rights of drivers and motor carriers?

Although the ELD reflects the driver’s RODS, the driver and carrier share responsibility for the integrity of the records. The driver certification is intended, in part, to protect drivers from unilateral changes. However, if the driver is unavailable or unwilling to recertify the record, the carrier’s proposed edit and annotation would remain part of the record.

5.5.6 6. Are the original electronic logging device (ELD) records retained after edits are made, and accessible to drivers?

Yes. The original ELD records are retained even when allowed edits and annotations are made. If the driver cannot independently access the records from the ELD, the motor carrier must provide access on request. However, the right

to access is limited to a six-month period, consistent with the period during which a motor carrier must retain drivers' records of duty status (RODS).

5.5.7 7. Can a user edit or change driving time that has been recorded by an electronic logging device (ELD) to non-driving time?

No. An ELD automatically records all of the time that a CMV is in motion as driving time that cannot be edited or changed to non-driving time.

5.5.8 8. How can a driver record their on-duty not driving status, such as working in a warehouse, on an ELD, prior to operating a commercial motor vehicle equipped with an ELD?

All of the driver's hours of service must be accounted for when subject to the HOS rules. Prior to operating a commercial motor vehicle equipped with an ELD, the driver can manually add any on-duty not driving time accrued prior to.

5.5.9 9. Are drivers allowed to edit their records of duty status (RODS) using the electronic logging device (ELD) back office support systems once they leave the commercial motor vehicle (CMV)?

Yes. Drivers may edit their RODS using ELD back office support systems. While these edits or corrections are allowed to ensure an accurate record of the driver's duty status, the electronic record must retain what was originally recorded, as well as the date, time, and identity of the individual entering the corrections or edits.

5.5.10 10. What procedure should be followed if multiple, compatible electronic logging devices (ELDs) are used to record a driver's record of duty status (RODS) within a motor carrier's operation?

If multiple, compatible ELDs are used to record a driver's RODS within a motor carrier's operation, the ELD in the vehicle the driver is operating must be able to produce a complete ELD report for that driver, on demand, for the current 24-hour period and the previous 7 consecutive days.

5.5.11 11. What procedure should be followed if multiple, incompatible electronic logging devices (ELDs) are used to record a driver's record of duty status (RODS)?

The motor carrier and the driver are responsible for ensuring that all of the RODS information required by the HOS rules is available for review by authorized safety officials at the roadside. If the driver uses multiple ELDs that are not compatible (e.g., the data file from one system cannot be uploaded into the other system), the driver must either manually enter the missing duty status information or provide a printout from the other system(s) so that an accurate accounting of the duty status for the current and previous seven days is available for the authorized safety official.

5.5.12 12 . What procedure should be followed if an electronic logging device (ELD) is replaced or reset?

For a reset or replaced ELD, the ELD rule requires data or documents showing the driver's records of duty status (RODS) history in the vehicle. This data would include the driver's past seven days of RODS, either loaded into the "new" ELD or in paper format to be provided at roadside.

5.5.13 13 . When a motor carrier discovers a driver in a team driving operation failed to log in and his or her activities were assigned to the co-driver, can the motor carrier reassign the generated data?

For team drivers, the driver account associated with the driving time records may be edited and reassigned between the team drivers, if there was a mistake resulting in a mismatch between the actual driver and the driver recorded by the ELD, and if both team drivers were indicated in one another's records as a co-driver. Each co-driver must confirm the change for the corrective action to take effect.

5.5.14 14 . What must a driver do with unassigned driving time when he or she logs into the electronic logging device (ELD)?

A driver must review any unassigned driving time when he or she logs into the ELD. If the unassigned records do not belong to the driver, the driver must indicate that in the ELD record. If driving time logged under this unassigned account belongs to the driver, the driver must add that driving time to his or her own record.

5.5.15 15 . What must a motor carrier do with unassigned driving records from an electronic logging device (ELD)?

A motor carrier must either explain why the time is unassigned or assign the time to the appropriate driver. The motor carrier must retain unidentified driving records for at least six months as a part of its hours of service (HOS) ELD records and make them available to authorized safety officials.

5.5.16 16 . If a driver is permitted to use a Commercial Motor Vehicle (CMV) for personal reasons, how must the driving time be recorded?

The driver must identify the driving time as personal conveyance on the device.

5.6 Harassment

5.6.1 1. What is the definition of harassment in the Electronic Logging Device (ELD) rule?

FMCSA defines harassment as an action by a motor carrier toward one of its drivers that the motor carrier knew, or should have known, would result in the driver violating hours of service (HOS) rules in 49 CFR 395 or 49 CFR 392.3. These rules prohibit carriers from requiring drivers to drive when their ability or alertness is impaired due to fatigue, illness or other causes that compromise safety. To be considered harassment, the action must involve information available to the motor carrier through an ELD or other technology used in combination with an ELD. FMCSA explicitly prohibits a motor carrier from harassing a driver.

5.6.2 2. How does the Electronic Logging Device (ELD) rule address harassment of drivers using ELDs?

The ELD rule has provisions to prevent the use of ELDs to harass drivers. FMCSA explicitly prohibits a motor carrier from harassing a driver, and provides that a driver may file a written complaint under 49 CFR 38 6.12(b) if the driver was subject to harassment. Technical provisions that address harassment include a mute function to ensure that a driver is not interrupted in the sleeper berth. Furthermore, the design of the ELD allows only limited edits of an ELD record by both the driver and the motor carrier's agents, and in either case, the original ELD record cannot be changed. As a result, motor carriers will be limited in forcing drivers to violate the hours of service (HOS) rules without leaving an electronic trail that would point to the original and revised records. The driver certification is also intended, in part, to protect drivers from unilateral changes—a factor that drivers identified as contributing to harassment.

Harassment will be considered in cases of alleged hours of service (HOS) violations; therefore, the penalty for harassment is in addition to the underlying violation under 49 CFR 392.3 or part 395. An underlying HOS violation must be found for a harassment penalty to be assessed.

5.6.3 3. Does the Electronic Logging Device (ELD) rule require real-time tracking of commercial motor vehicle (CMVs) with ELDs?

No. Real-time tracking of CMVs is not required in the ELD rule. However, a motor carrier may use technology to track its CMVs in real time for business purposes. A motor carrier is free to use this data as long as it does not engage in harassment or violate the Federal Motor Carrier Safety Regulations (FMCSRs).

5.6.4 4. What are the differences between harassment and coercion?

A motor carrier can only be found to have committed harassment if the driver commits a specified underlying hours of service (HOS) violation based on the carrier's actions and there is a connection to the electronic logging device (ELD). Adverse action against the driver is not required, because the driver complied with the carrier's instructions. In contrast, coercion is much broader in terms of entities covered, and addresses the threat to withhold work from or take adverse employment action against a driver in order to induce the driver to violate a broader range of regulatory provisions or to take adverse action to punish a driver for the driver's refusal to operate a commercial motor vehicle (CMV) in violation of the specified regulations. Unlike harassment, coercion does not have to result in the driver being in violation of the regulations and does not have to involve the use of an ELD.

5.6.5 5. What should a driver consider before filing a harassment complaint?

FMCSA encourages any driver who feels that he or she was the subject of harassment to also consider FMCSA's coercion rule and the Department of Labor's whistleblower law (enacted as part of the Surface Transportation Assistance Act (49 U.S.C. 31105)), which provides retaliation protection.

5.6.6 6. How much time is allowed for a driver to file a harassment complaint?

A driver must file a written harassment complaint no later than 90 days after the event.

5.6.7 7. Where should a driver file a harassment complaint?

The driver's must file a written complaint with the National Consumer Complaint Database at <http://nccdb.fmcsa.dot.gov> or with the FMCSA Division Administrator for the State where the driver is employed (<http://www.fmcsa.dot.gov/mission/field-offices>).

5.6.8 8. What information must be submitted in a harassment complaint?

The following information must be submitted in writing:

1. Driver’s name, address, and telephone number;
2. Name and address of the motor carrier allegedly harassing the driver; and
3. Statement of the facts to prove each allegation of harassment, including:
 - a.How the electronic logging device (ELD) or other technology used with the ELD contributed to harassment.
 - b.The date of the alleged action.
 - c.How the motor carrier’s action violated either 49 CFR 392.3 or 49 CFR 395.

5.6.9 4. Driver’s signature.

Any supporting evidence that will assist FMCSA in the investigation of the complaint should also be included along with the complaint.

5.7 ELD Functions

5.7.1 1. What information is automatically recorded by an electronic logging device (ELD)?

An ELD automatically records the following data elements at certain intervals: date; time; location information; engine hours; vehicle miles; and identification information for the driver, authenticated user, vehicle, and motor carrier.

5.7.2 2. When is location data recorded by an electronic logging device (ELD)?

Location data must be recorded by an ELD at 60-minute intervals when the vehicle is in motion, and when the driver powers up and shuts down the engine, changes duty status, and indicates personal use or yard moves.

5.7.3 3. Will the vehicle location information identify street addresses?

No. Vehicle location information is not sufficiently precise to identify street addresses. For each change in duty status, the ELD must convert automatically captured vehicle position in latitude/longitude coordinates into geo-location information that indicates the approximate distance and direction to an identifiable location corresponding to the name of a nearby city, town, or village, with a State abbreviation.

5.7.4 4. Is an electronic logging device (ELD) required to collect data about vehicle performance?

No. ELDs are not required to collect data on vehicle speed, braking action, steering function or other vehicle performance parameters. ELDs are only required to collect data to determine compliance with hours of service (HOS) regulations.

5. Do the specifications in the ELD rule for electronic logging devices (ELDs) include requirements to automatically control the vehicle, such as other safety systems that may automatically reduce acceleration or apply braking?

No. The specifications for ELDs do not include requirements to control the vehicle. An ELD is a recording device

that records vehicle parameters through its synchronization to the vehicle's engine, and allows for entries related to a driver's record of duty status (RODS).

5.7.5 6. What is the level of accuracy for commercial motor vehicle (CMV) location information recorded by an electronic logging device (ELD)?

During on-duty driving periods, the location accuracy is approximately within a 1-mile radius. When a driver operates a CMV for personal use, the position reporting accuracy would be approximately within a 10-mile radius.

5.7.6 7. What does engine synchronization mean for the purposes of electronic logging device (ELD) compliance?

An ELD must be integrally synchronized with the engine of the commercial motor vehicle (CMV). Engine synchronization means monitoring engine operation to automatically capture the engine power status, vehicle motion status, miles driven, and engine hours.

5.7.7 8. Will GPS-derived data for mileage be allowed as a substitute for data that cannot be readily obtained from a vehicle electronic control module (ECM)?

No, the ELD must be able to monitor engine operation to automatically capture required data. A GPS is not integrally synchronized with a vehicle's engine, and cannot be a substitute for required ECM data to comply with the ELD rule.

5.7.8 9. Can an electronic logging device (ELD) have a feature to warn drivers about approaching hours of service (HOS) limits?

Yes. FMCSA allows, but does not require, warning or notification to drivers when they are nearing their HOS limits.

5.7.9 10 . When will an electronic logging device (ELD) automatically start to record a driving mode or status?

An ELD must automatically switch to driving mode once the commercial motor vehicle (CMV) is moving up to a set speed threshold of five miles per hour. As a result, the in-motion state must not be configured greater than five miles per hour. The vehicle will be considered stopped once its speed falls to zero miles per hour and stays at zero miles per hour for three consecutive seconds.

5.7.10 11 . When will an electronic logging device (ELD) automatically change the duty status from driving to the default duty status of on-duty not driving?

When the duty status is set to driving, and the commercial motor vehicle (CMV) has not been in motion for five consecutive minutes, the ELD must prompt the driver to confirm a continued driving status or enter the proper duty status. If the driver does not respond to the ELD prompt within one minute, the ELD must automatically switch the duty status to on-duty not driving.

5.7.11 12 . How must a driver be able to access records of duty status (RODS) from an electronic logging device (ELD)?

Since all ELD data file output will be a standard comma-delimited file, a driver may import the data output file into Microsoft Excel, Word, notepad, or other common tools. A driver will also be able to access ELD records through a screen display or a printout, depending on the ELD design.

5.7.12 13 . How does the electronic logging device reflect personal conveyance when the personal conveyance status is selected and the commercial motor vehicle (CMV) is driven?

When the personal conveyance status is selected (as allowed and configured by the motor carrier), the CMV’s location is recorded with a lower level of precision (i.e., an approximate 10-mile radius). Personal conveyance will be reflected on the ELD using a different style line (such as dashed or dotted line).

14 . What are the display requirements for team drivers using the same electronic logging device (ELD) on their commercial motor vehicle (CMV)?

In the event of team drivers, the ELD must display the data for both co-drivers who are logged into the system.

5.7.13 15 . Can a logged-in co-driver make entries over his or her records using the electronic logging device (ELD) when he or she is not driving?

Yes. The driver who is not operating the vehicle may make entries over his or her own records when the vehicle is in motion. However, co-drivers cannot switch driving roles on the ELD when the vehicle is in motion.

5.7.14 16 . Can an electronic logging device (ELD) record be set to record minimum duty status durations, such as 15 minutes?

No. The ELD will capture all entered duty statuses, and there is no minimum amount of time that these statuses must or should be engaged. While longstanding industry and enforcement practices may have relied upon minimum intervals of 15 minutes in handwritten records of duty status (RODS), an ELD provides a more accurate accounting of drivers’ time. This should not be construed to indicate that the activities electronically recorded as less than 15 minutes are suspect, only that the time actually required to complete the task may be less than what had been traditionally noted in the paper RODS.

5.7.15 17 . As a motor carrier, how can I be sure an electronic logging device (ELD) is compliant?

You should only purchase an ELD that is self-certified by the manufacturer to be compliant and that is registered and listed on the FMCSA website. The list of registered ELDs can be found at <https://3pdp.fmcsa.dot.gov/ELD/ELDLList.aspx>. Motor carriers should also familiarize themselves with the ELD checklist and the ELD rule, located at <https://www.fmcsa.dot.gov/hours-service/elds/drivers-and-carriers>.

5.7.16 18 . May an ELD device be used to track mileage for tax reporting purposes?

The device manufacturer may offer that service as part of a fleet management package but mileage tracking for tax reporting purposes is not part of the ELD data established in Part 395.

5.8 ELD Data Transfer

5.8.1 1. What are the options for electronic logging devices (ELDs) to electronically transfer data?

According to the ELD rule technical specifications, an ELD must support one of two options for electronic data transfer:

1. The first option is a “telematics” transfer type ELD. At a minimum, it must electronically transfer data to an authorized safety official on demand via wireless Web services and email.
2. The second option is a “local” transfer type ELD. At a minimum, it must electronically transfer data to an authorized safety official on demand via USB2.0 and Bluetooth®. To ensure that law enforcement is always able to receive the hours of service (HOS) data during a roadside inspection, a driver must be able to provide either the display or a printout when an authorized safety official requests a physical display of the information.

5.8.2 2. How will safety officials receive data electronically from the two different types of ELDs with options for different methods of electronic data transfer (“telematics” and “local”)?

Authorized safety officials who conduct roadside enforcement activities (i.e., traffic enforcement and inspections) or compliance safety investigations will have the option of choosing a minimum of one electronic data transfer method (wireless Web services or email) and one “local” electronic data transfer method (USB2.0 or Bluetooth) for the electronic transfer of ELD data, depending on the type of ELD.

5.8.3 3. What is the process for transferring data via USB2.0?

If a driver is using a “local” ELD with USB 2.0 capabilities, an authorized safety official will provide a secure USB device to allow the driver to electronically transfer data from the ELD to the official. The driver will return the USB device to the safety official, who will transfer the data to a computing device.

5.8.4 4. What is the process for transferring data via email?

If the driver is using a “telematics” ELD with email capabilities, the authorized safety official will request that the electronic data transfer file be sent as an attachment to an e-mail. This e-mail address is preprogrammed in the ELD by the vendor. The safety official will provide the driver with a routing code to reference in the email.

5.8.5 5. What is the process for transferring data via Bluetooth?

While the local Bluetooth requires the use of web services, local Bluetooth data transfer only requires the safety official to have internet connectivity and not the ELD. The driver’s/motor carrier’s ELD will use the safety official’s internet connection to transfer data. The internet connection between the ELD and the safety official will be limited and can only be used for the purpose of transferring the ELD data via the web service. During Bluetooth data transfer, the driver/motor carrier must make the ELD discoverable. Once the ELD detects the safety official’s laptop, the safety official will provide the driver/motor carrier with a Bluetooth code to enter into the ELD and confirm Bluetooth connectivity between the safety official’s laptop and the ELD. Once the connection between the safety official’s laptop and the ELD has been confirmed, the safety official will provide the driver/motor carrier with the safety official’s unique code, and the driver/motor carrier will transfer the ELD data to web services for the safety official to retrieve.

5.8.6 6. What is the process for transferring data via web services?

If the driver is using a “telematics” ELD with wireless Web services capabilities, the authorized safety official will give the driver a routing code to assist the official in locating the data once transmitted, and the driver will initiate a web transfer to an FMCSA server to be retrieved by the safety official’s software.

5.8.7 7. Would an electronic logging device (ELD) be non-compliant with the ELD rule if the data cannot be sent electronically to an authorized safety official at roadside?

No. If the electronic means for transferring data is unavailable or fails, the driver can still be compliant by showing either a printout or the actual ELD display of their RODS.

5.9 ELD Malfunctions and Data Diagnostic Events

5.9.1 1. Is an ELD required to monitor its compliance with the ELD technical requirements?

Yes. An ELD must monitor its compliance with the ELD technical requirements and detect malfunctions and data inconsistencies related to power, data synchronization, missing data, timing, positioning, data recording, data transfer, and unidentified driver records requirements. The ELD output will identify these data diagnostic and malfunction events and their status as either “detected” or “cleared.” Typically, a driver can follow the ELD provider’s and the motor carrier’s recommendations to resolve the data inconsistencies that generate an ELD data diagnostic event, while a motor carrier must correct a malfunction.

2. When do electronic logging device (ELD) “power data diagnostic events” and “power compliance malfunctions” occur? *****
 “Power data diagnostic events” occur when an ELD is not powered and fully functional within one minute of the vehicle’s engine receiving power and does not remain powered for as long as the vehicle’s engine stays powered.

“Power compliance malfunctions” occur when an ELD is not powered for an aggregated in-motion driving time of 30 minutes or more over a 24-hour period across all driver profiles.

5.9.2 3. When do electronic logging device (ELD) “engine synchronization data diagnostic events” and “engine synchronization compliance malfunctions” occur?

“Engine synchronization data diagnostic events” occur when an ELD loses ECM connectivity to any of the required data sources (engine power status, vehicle motion status, miles driven, and engine hours) and can no longer acquire updated values for the required ELD parameters within five seconds of the need. “Engine synchronization compliance malfunctions” occur when ECM connectivity to any of the required data sources (engine power status, vehicle motion status, miles driven, and engine hours) is lost for more than 30 minutes during a 24-hour period aggregated across all driver profiles.

5.9.3 4. When does an electronic logging device (ELD) “timing compliance malfunction” occur?

A “timing compliance malfunction” occurs when the ELD can no longer meet the underlying compliance requirement to record Coordinated Universal Time (UTC), where ELD time must be synchronized with UTC, not to exceed an absolute deviation of 10 minutes at any time.

5.9.4 5. When does an electronic logging device (ELD) “positioning compliance malfunction” occur?

When an ELD fails to acquire a valid position measurement within 5 miles of the commercial motor vehicle moving and 60 minutes has passed, a “position compliance malfunction” will be recorded in the data diagnostic.

5.9.5 6. When does an electronic logging device (ELD) “data recording compliance malfunction” occur?

A “data recording compliance malfunction” occurs when an ELD can no longer record or retain required events or retrieve recorded logs that are not kept remotely by the motor carrier.

5.9.6 7. When does an electronic logging device (ELD) “missing required data elements data diagnostic event” occur?

A “missing required data elements data diagnostic event” occurs when any required data field is missing at the time of its recording.

5.9.7 8. When do electronic logging device (ELD) “data transfer data diagnostic events” and “data transfer compliance malfunctions” occur?

A “data transfer data diagnostic event” occurs when the operation of the data transfer mechanism(s) is not confirmed.

A “data transfer compliance” malfunction occurs when the ELD stays in the unconfirmed data transfer mode following the next three consecutive monitoring checks.

5.9.8 9. When does an electronic logging device (ELD) “unidentified driving records data diagnostic event” occur?

An “unidentified driving records data diagnostic event” occurs when more than 30 minutes of driving time for an unidentified driver is recorded within a 24-hour period.

5.9.9 10 . What must a driver do if there is an electronic logging device (ELD) malfunction?

If an ELD malfunctions, a driver must:

1. Note the malfunction of the ELD and provide written notice of the malfunction to the motor carrier within 24 hours;
2. Reconstruct the record of duty status (RODS) for the current 24-hour period and the previous 7 consecutive days, and record the records of duty status on graph-grid paper logs that comply with 49 CFR 395.8, unless the driver already has the records or retrieves them from the ELD; and
3. Continue to manually prepare RODS in accordance with 49 CFR 395.8 until the ELD is serviced and back in compliance. The recording of the driver’s hours of service on a paper log cannot continue for more than 8 days after the malfunction; a driver that continues to record his or her hours of service on a paper log beyond 8 days risk being placed out of service.

5.9.10 11 . What must a motor carrier do if there is an electronic logging device (ELD) malfunction?

If an ELD malfunctions, a motor carrier must:

1. Correct, repair, replace, or service the malfunctioning ELD within eight days of discovering the condition or a driver's notification to the motor carrier, whichever occurs first; and
2. Require the driver to maintain paper record of duty status (RODS) until the ELD is back in service.

5.9.11 12 . When should a driver certify his or her record of duty status (RODS) on the electronic logging device (ELD) to avoid malfunction codes?

FMCSA recommends that drivers first certify their RODS before logging off the ELDs and then shutting down their CMVs' engines. If drivers don't follow this recommendation, malfunction codes may occur, such as indicating unaccounted odometer changes and suspicious driving activity.

5.9.12 13 . What types of visual indicators must be displayed by an ELD?

An ELD must display a single visual malfunction indicator on the ELD's display or on a stand-alone indicator for all drivers using the ELD. The visual signal must be visible to the driver, be continuously communicated to the driver when the ELD is powered, and clearly illuminate an active malfunction. An ELD must also display a single visual data diagnostics indicator, apart from the malfunction indicator, for active data diagnostics events. The ELD may also provide an audible signal for the data diagnostics indicator.

5.9.13 14 . In the event of a malfunction that requires a driver to reconstruct his/her previous 7 days, can a driver use a printed copy of their previous 7 days, such as a PDF copy, instead of manually recording their previous 7 days?

Yes. In the event that the driver experiences a malfunction that impairs the ELD ability to present the driver's previous 7 days, the driver may present their previous 7 days by way of any printed copy, or in an electronic form, such as a PDF.

5.9.14 15 . If an ELD malfunction corrects itself after the driver has reconstructed his or her records of duty status, must the driver present their reconstructed records of duty status during an inspection?

Yes, the reconstructed records of duty status along with ELD data must be presented to a safety official during a roadside inspection in order to satisfy the requirement to display the current day and the previous seven days of duty status.

5.10 ELD Accounts

5.10.1 1. What electronic logging device (ELD) user accounts must be set up by a motor carrier?

ELD user accounts must be set up by a motor carrier for:

1. Commercial motor vehicle (CMV) drivers who are employed by the motor carrier and who are required to use the ELD, and
2. Support personnel who have been authorized by the motor carrier to create, remove, and manage user accounts; configure allowed ELD parameters; and access, review, and manage drivers' ELD records on behalf of the motor carrier.

5.10.2 2. Can a motor carrier create electronic logging device (ELD) accounts on individual ELDs or its support system?

Yes. ELD user accounts can be created on individual ELDs or the ELD support system.

5.10.3 3. What information is required to create electronic logging device (ELD) user accounts for drivers?

Each driver account must be created by entering the driver's license number and the State of jurisdiction that issued the driver's license. The driver's license information is only required to set up the driver's user account and verify his or her identity; it is not used as part of the daily process for entering duty status information.

5.10.4 4. How many electronic logging device (ELD) accounts can be established by a motor carrier for one of its ELD drivers?

A motor carrier must assign only one ELD driver account for each of its drivers required to use an ELD. An ELD must not allow the creation of more than one driver account associated with a driver's license for a given motor carrier. The motor carrier is also responsible for establishing requirements for unique user identifications and passwords.

5.10.5 5. Can a driver's electronic logging device (ELD) single user account be authorized for administrative functions, in addition to its driver-related functions?

No. Each driver should have one account that allows him or her to log in and perform driver-related functions. All other administrative functions should be based on the discretion of each company or its provider. This means a driver who is also the owner of the company would have a single account authorizing entries as a driver, and a separate account for administrative functions. Accounts can be created on the ELD or the ELD support system.

5.10.6 6. Driver accounts must include the CDL number and state. If a driver relocates to another state and obtains a new commercial driver's license, can the ELD allow for editing the driver profile to change the license number and state or must a new driver account be created? If so, how would the two link together to allow for recording the prior seven days?

Section 395.22(b)(2)(i) states that a motor carrier must manage ELD accounts. Therefore, the driver's license information must be updated in the ELD. If the data files from an individual's old and new driver license files cannot be merged, the driver must either manually enter the previous duty status information or provide a printout from the older HOS to provide an accurate accounting of the duty status for the current and previous seven days for authorized safety officials.

5.10.7 7. Can a motor carrier set up a driver account as an “exempt driver” and have another account for the same driver as a regular driver account?

No. The ELD rule prohibits multiple driver accounts for one driver. The motor carrier must proactively change the driver’s status to and from exempt and non-exempt.

5.11 ELD Registration and Certification

5.11.1 1. When will electronic logging device (ELD) system suppliers be able to start registering their ELDs with FMCSA?

Since February 16, 2016, ELD system suppliers have been able to self-certify and register devices with the FMCSA through the following link: <https://www.fmcsa.dot.gov/hours-service/elds/equipment-registration>.

5.11.2 2. What happens if a registered device listed on FMCSA’s website is later found not to meet the technical specifications in the Electronic Logging Device (ELD) rule?

The ELD rule includes a procedure to remove a listed registered device from the FMCSA website, to provide additional assurance to motor carriers that ELDs on the vendor registration website are compliant. This procedure also protects an ELD vendor’s interest in its product.

5.11.3 3. What is the procedure to remove a listed certified electronic logging device (ELD) from FMCSA’s website?

FMCSA may initiate removal of an ELD model or version from the list in accordance with section 5.4 in the ELD rule, by providing written notice to the ELD provider stating: * (a) The reasons the FMCSA proposes to remove the model or version from the FMCSA list; and * (b) Any corrective action that the ELD provider must take for the ELD model or version to remain on the list.

5.11.4 4. Is the electronic logging device (ELD) vendor/manufacture required to notify motor carriers if a device is removed from FMCSA’s ELD registration list because it was determined to be noncompliant?

No, ELD vendors/manufacturers are not required to notify motor carriers if a device has been removed from the ELD registration list. However, FMCSA will maintain on its website a list of devices that are removed from the list, and will make every effort to ensure that industry is aware.

5.11.5 5. What happens if an electronic logging device (ELD) is found to be non-compliant after it is in use?

As a motor carrier, you will have 8 days from notification to replace your noncompliant device with a compliant one. This is the same time allowed to take action on ELDs that need to be repaired, replaced, or serviced. In the event of a widespread issue, FMCSA will work with affected motor carriers to establish a reasonable timeframe for replacing non-compliant devices with ELDs that meet the requirements.

5.12 Differences between AOBRDs and ELDs

5.12.1 1. What are the differences in the technical specifications in the 1988 automatic onboard recording device (AOBRD) Rule (49 CFR 395.15) and the Electronic Logging Device (ELD) rule?

The table below compares the technical specifications in the AOBRD rule (49 CFR 395.15) and the ELD rule. Feature/Function 1988 AOBRD Rule ELD Rule Integral Synchronization Integral synchronization required, but term not defined in the Federal Motor Carrier Safety Regulations (FMCSRs). Integral synchronization interfacing with the CMV engine electronic control module (ECM), to automatically capture engine power status, vehicle motion status, miles driven, engine hours. (CMVs older than model year 2000 exempted.) Recording Location Information of Commercial Motor Vehicle (CMV) Required at each change of duty status. Manual or automated. Requires automated entry at each change of duty status, at 60-minute intervals while CMV is in motion, at engine-on and engineoff instances, and at beginning and end of personal use and yard moves. Graph Grid Display Not required – “time and sequence of duty status changes.” An ELD must be able to present a graph grid of driver’s daily duty status changes either on a display or on a printout. Hours of Service (HOS) Driver Advisory Messages Not addressed. HOS limits notification is not required. “Unassigned driving time/miles” warning must be provided upon login. Device “Default” Duty Status Not addressed. On-duty not driving status, when CMV has not been in-motion for five consecutive minutes, and driver has not responded to an ELD prompt within one minute. No other non-driver-initiated status change is allowed. Clock Time Drift Not addressed. ELD time must be synchronized to Universal Coordinated Time (UTC); absolute deviation must not exceed 10 minutes at any time. Communications Methods Not addressed – focused on interface between AOBRD support systems and printers. Two Options:

5.12.2 1- “Telematics”: As a minimum, the ELD

must transfer data via both wireless Web services and wireless e-mail.

5.12.3 2- “Local Transfer”: As a minimum, the ELD

must transfer data via both USB 2.0 and Bluetooth. Both types of ELDs must be capable of displaying a standardized ELD data set to authorized safety officials via display or printout. Resistance to Tampering AOBRD and support systems must be tamperproof, to the maximum extent practical. An ELD must not permit alteration or erasure of the original information collected concerning the driver’s ELD records or alteration of the source data streams used to provide that information. ELD must support data integrity check functions. Identification of Sensor Failures and Edited Data AOBRD must identify sensor failures and edited data. An ELD must have the capability to monitor its compliance (engine connectivity, timing, positioning, etc.) for detectable malfunctions and data inconsistencies. An ELD must record these occurrences.

5.13 Differences between AOBRDs and Logging Software Programs

5.13.1 1. What are the differences between automatic onboard recording devices (AOBRDs) and devices using logging software programs?

A key difference between devices with logging software programs and AOBRDs relates to connectivity with the commercial motor vehicle (CMV) operations. An AOBRD must be integrally synchronized with the specific operations of the CMV on which it is installed. AOBRDs must also record engine use, speed, miles driven, and date and time of day, as specified in 49 CFR 395.2. AOBRDs automatically record engine data for driving time versus the use of Global Positioning System (GPS) data or a driver inputting his or her driving status hours. The display and output from devices using logging software must meet the requirements in 49 CFR 395.8. Drivers can manually enter their

hours of service (HOS) information using the application or software program on the device, and then manually or electronically sign the RODS at the end of each 24-hour period to certify that all required entries are true and correct. During a roadside inspection, drivers using logging software programs can hand their device to the safety official to review their RODS. Additionally, officers conducting inspections can request a printed copy of the driver's log with the current and prior seven days HOS information.

5.14 Specialty Operations

5.14.1 1. In an operation that involves a tillerman and a driver, what method should the tillerman use to record his or her hours-of-service?

Because the ECM will not support two ELDs and only one driver can be logged into the ELD, the driver in the front cab must log into the ELD and make an annotation that he or she is operating with a tillerman. The tillerman has the option of manually adding their hours of service to the ELD under their ELD driver account or keep the previous 7 days of their records of duty status in their possession for roadside inspections. The same options apply to the motor carrier maintaining the tillerman's records of duty status for 6 months.

5.14.2 2. Is a driver required to maintain their records of duty status on an ELD while operating a rental vehicle?

The Federal Motor Carrier Safety Administration (FMCSA) issued a limited exemption to motor carriers that operate with a rented commercial motor vehicle for 8 days or less. This limited exemption provides that all drivers of property-carrying commercial motor vehicles rented for 8 days or less, regardless of reason, are not required to use an ELD in the vehicle. To meet this exemption, the driver and the motor carrier must maintain the following:

- A copy of federal register notice (FRN) 82 FR 47306 Hours of Service of Drivers: Application for Exemption; Truck Renting and Leasing Association (TRALA) or equivalent signed FMCSA exemption document. This document must be provided to the safety official upon request;
- A copy of rental agreement with parties to the agreement clearly identified, the vehicle, and the dates of the rental period; and
- A copy of the driver's records of duty status for the current day and the prior 7 days if required on those days.
- For additional information see FRN 82 FR 47306 Hours of Service of Drivers: Application for Exemption; Truck Renting and Leasing Association (TRALA), published on October 11, 2017.

5.14.3 3. Are drivers that operate in Canada and Mexico required to use an ELD when driving in the US?

Yes, if a driver that operates in Canada or in Mexico operates and drives in the US, and does not meet one of the ELD exemptions, said driver must use an ELD while operating in the US.

5.15 ELD Technical Specifications

5.15.1 1. Why are technical specifications in the Electronic Logging Device (ELD) rule?

The technical specifications in the ELD rule ensure that manufactures develop compliant devices and systems for uniform enforcement of hours of service.

5.15.2 2. Will FMCSA provide the eRODS application for vendors to test against?

No, FMCSA will not provide the RODS application for vendors to test against. Compliance test procedures are available on the ELD website to allow vendors to test their devices' compliance with the ELD rule technical specifications.

5.15.3 3. Is a physical connection between the ECM and ELD required in order to establish integral synchronization with the engine?

No. The ECM and ELD may be connected by serial or Control Area Network communication protocols. Hard wiring to the J1939 plug and Bluetooth connectivity are examples of methods of receiving the data from the ECM or vehicle data bus.

5.15.4 4. If an ELD loses connection to the ECM how will the device report a system failure?

An ELD must use onboard sensors and data record history to identify instances when it may not have complied with the power requirements specified in the ELD rule.

5.15.5 5. Must the manufacturer self-certify and register every version or firmware update to the ELD?

The manufacture must register each model and version and self-certify that each particular ELD is compliant with the ELD rule. The manufacturer must decide whether a firmware update is sufficiently significant to change the registration information. FMCSA did not specify parameters for version revisions.

5.15.6 6. Are vendors required to update or register each different configuration of hardware, even though the product is the same as an application (APP) (e.g., black box and Samsung, black box and iPhone, black box and Nexus)?

Vendors should register each device bundle if they have different operating systems (e.g., an iOS-based bundle and an Android-based bundle would be considered two registered devices).

5.15.7 7. Does the registration process require companies to exclusively use FMCSA's test procedure? Will vendors have access to testing facilities for ELDs?.

No. ELD manufacturers may use any test procedure they choose and note this in the registration. FMCSA will not provide a third-party testing service. FMCSA will only investigate devices that are suspected of not conforming to specifications, and will conduct testing with the FMCSA compliance test procedure during its investigation.

5.15.8 8. How will CMV environmental specifics be tested with the ELD – for example, mounting and connections to the ECM?

FMCSA does not specify testing requirements for connectivity with the vehicle. Each ELD provider is responsible for connectivity testing.

5.15.9 9. How will the ELD report on-duty not-driving status when the origin of the duty status is automatic instead of driver-input?

The ELD will report on-duty not-driving status based on automatic detection, starting from the time the vehicle is no longer in motion.

5.15.10 10 . The Event Checksum Calculation describes the individual items to be included in the calculation. Number 9 says “CMV Number.” Is this the CMV VIN or the CMV Power Unit Number?

FMCSA showed a CMV number, as an example, in the header output file. The intent was to allow an additional vehicle identification number if an operator had numbered vehicles and chose to add companyassigned numbers to the CMV header data.

5.15.11 11 . Are unassigned driving reports required to be available at roadside?

Yes. Section 4.8.1.3, requires the inspected driver’s profile and the unidentified driver profile to be available as separate reports at roadside either by printout or display. If there are no unidentified driver records existing on the ELD for the current 24-hour period or for any of the previous 7 consecutive days, an ELD does not need to print or display unidentified driver records for the authorized safety official. Otherwise, both reports must be printed or displayed and provided to the authorized safety official.

12 . How should the ELD handle the dashboard odometer display not matching the odometer value returned by the Engine Control Module (ECM)? For instance, when the engine is replaced and the value is not synchronized. The ELD is required to obtain and display the ECM value at all times. Safety officials will use the odometer value reported on the ELD. Note that documentation of engine changes is required by 49 CFR Part 379 Appendix A to be maintained at the carrier’s place of business.

5.16 ELD Manufacturer Compliance

5.16.1 1. As an electronic logging device (ELD) manufacturer, how can I make sure that my product is compliant?

You should review the technical specifications included in the final rule, along with the FMCSA’s compliance test procedures. You are required to self-certify your device, stating that it is in compliance with all of the technical specifications. The compliance test procedures are designed to assist manufacturers in determining whether their product meets the ELD rule requirements. While ELD manufacturers are not required to use FMCSA’s compliance test procedure, they are required to ensure that their products are compliant with the ELD rule.

5.17 Automatic On-Board Recording Device (AOBRD)

5.17.1 1. Can a motor carrier purchase automatic on-board recording devices (AOBRDs) in bulk quantities for installation after December 18, 2017?

No. To be grandfathered, an AOBRD must be installed in a CMV prior to December 18, 2017. If a grandfathered AOBRD subsequently becomes inoperable, then that AOBRD must be replaced by an ELD.

5.17.2 2. If a motor carrier adds an owner operator to its fleet after December 18, 2017, and the owner operator operates with a grandfathered AOBRD in their CMV, can the owner operator continue to use its grandfathered AOBRD while employed by the motor carrier?

Yes, an owner operator that operates with a grandfathered AOBRD and is hired by a motor carrier after December 18, 2017 may continue to operate with its grandfathered AOBRD while employed by the motor carrier.

5.17.3 3. If an AOBRD becomes inoperable after December 18, 2017, can that AOBRD be replaced if it is under warranty?

Yes, if an AOBRD is under warranty and becomes inoperable after December 18, 2017, then that AOBRD can be replaced with another AOBRD within the terms of the manufacturer's warranty. Motor carriers should note that 49 CFR Part 379 Appendix A requires the motor carrier to maintain records pertaining to replacement of equipment. If the AOBRD is not under warranty and becomes inoperable after December 18, 2017, then that AOBRD must be replaced with an ELD.

This set of questions is from the *Eld Technical FAQs - CSA Compliance, Safety, Accountability* <https://csa.fmcsa.dot.gov/ELD/File/Index/b9d89f57-b7ae-da42-86fd-679779a6cbbd>

This document was updated on 2018-02-22 with additions from the FMCSA Technical FAQ's September, 2017 revisions. <https://csa.fmcsa.dot.gov/ELD/File/Index/400fd7dc-7169-724c-9de9-e7f52913a02d>

6.1 ELD Systems

6.1.1 What is an ELD system? What is an ELD support system?

For clarity, an ELD system will be referred to as an ELD. The ELD includes all components required to record, retain, and transfer data. The ELD must be capable of maintaining ELD records for at least six months from the date of receipt of the record, including edited and original records. Whereas the ELD Support System refers to the central support system through which carriers manage and store records separate from the device. The ELD support system is not a required system.

6.1.2 How can a driver edit their ELD data after leaving the vehicle?

While not required, the motor carrier can include an ELD support system that allows drivers to make edits to ELD data when away from the ELD. Otherwise, the driver must return to the ELD and make edits. Can an ELD system be mobile (e.g., an app on a smartphone or tablet)? Yes, the rule does allow for the use of a mobile device (commonly called a portable or handheld unit). Apps are allowed to be ELDs as long as they have connectivity to the electronic control module (ECM) bus for the required data and meet all the technical specs.

6.2 Functional Specifications

6.3 User Accounts

6.3.1 Can a driver have more than one user account?

An ELD must not allow creation of more than one driver account associated with a driver's license for a given motor carrier.

In the case of owner-operator, the same person may have two accounts: a driver account for logging hours of service and a supporting personnel account for managing the backend.

6.3.2 Are ELDs required to be interoperable?

No, the ELD Rule does not require interoperability—one device does not need to have the capability to transfer data from one ELD to another. As a minimal requirement, the driver would need to have printed ELD records with them to reflect their previous seven days or manually add the hours of service records from the previous seven days.

6.4 Exempt Driving Status

6.4.1 Is the ELD required to offer an exempt driver account?

There is no separate exempt driver account; rather, the ELD must allow for a driver account to be configured as exempt by the carrier. The ELD must prompt the carrier to add an annotation justifying the exemption. The default setting for a new driver account must be “no exemption.”

6.4.2 Can a driver select exempt driver status?

The ELD must allow the motor carrier the option to proactively configure a driver account as an exempt driver. The ELD must prompt the motor carrier to annotate the record and provide an explanation for the configuration of the exemption. If the motor carrier elects to create an exempt driver account, then the ELD must present the configured indication that is in effect for that driver during the ELD login and logout processes. The driver cannot change their status from exempt without the motor carrier changing the driver account.

6.4.3 How should the ELD function if the driver is operating under a situation that is exempt from the ELD rule?

When the exempt driver status is in effect, the ELD must continue to record ELD driving time but suspend detection of missing required data elements data diagnostic event for the driver described in Section 4.6.1.5 of the appendix and data transfer compliance monitoring function described in Section 4.6.1.7 when such driver is authenticated on the ELD.

6.5 Unidentified Driver Account

6.5.1 Section 4.6.1.6(d) states that “An unidentified driving records data diagnostic event can be cleared by the ELD when driving time logged under the unidentified driver profile for the current 24hour period and the previous 7 consecutive days drops to 15 minutes or less.” Does this mean 15 minutes or less in each of the 7 previous days, or does it mean the sum of all unidentified driving time over the previous 7 days totals 15 minutes or less?

The aggregate – 15 minutes total. Note that only “unidentified driving records data diagnostic event” can be cleared (in other words, marked inactive). The underlying records that generated the event may not be deleted.

6.5.2 What data does the ELD need to log when there is an unidentified driver? (added Sept-2017)

When a driver does not log into the ELD and does not respond to the ELD visual and audible prompts, the ELD must record accumulated driving and On-Duty Not-Driving time in accordance with the ELD defaults (see Section 4.4.1). When more than 30 minutes of driving in a 24-hour period accumulate in the unidentified driver profile, the ELD data diagnostic indicator must be turned on across all drivers logged into that ELD for the current day and the following 7 days. Other events that must be associated with the unidentified driver profile include the CMV engine power up and shut down and power compliance monitoring. The ELD must not allow entry of any information into the ELD other than a response to the login prompt. The Event Log List for the Unidentified Driver Profile may be found in 4.8.2.1.10.

6.5.3 How can unidentified driving time be assigned? (added Sept-2017)

Unidentified driving time can be assigned in two ways. The driver can claim the driving time when prompted by the ELD, or the motor carrier can later assign the unidentified driving time to the appropriate driver, which must be accepted by the driver.

6.5.4 If the unidentified driving time is accepted by the driver, will the ELD still show the driving time as unidentified? (added Sept-2017)

The original records reflecting unidentified driving will remain, but with an inactive status. When unidentified records are assumed, a new event record(s) for the driver is created using elements of the unidentified driver log(s) and driver input to populate missing elements of the log originally recorded under the unidentified driver profile.

6.5.5 If the driver rejects unidentified driving, should that be displayed on the ELD for the roadside inspection view and output file view? (added Sept-2017)

The rejected unidentified driving events must remain available for review at roadside for eight days and should be included in the output file.

6.5.6 How should “odometer jumps,” caused by a driver unplugging the ELD from the ECM be captured? (added Sept-2017)

If the driver unplugs an ELD from the ECM and later plugs the ELD back into the ECM, the ELD must identify any odometer jump in between as a malfunction (see Table 4 of Appendix A to Subpart B of Part 395). In addition, if

the ECM is not disconnected, however connectivity is lost for more than 30 minutes in a 24-hour period, an engine synchronization malfunction must be recorded.

6.5.7 In the case of portable device platforms, if a driver forgets his or her phone or tablet, must unidentified driving time still be collected through an engine tied device or is it considered uninstalled? (added Sept-2017)

If more than one component is required to ensure the ELD is compliant with Subpart B and Appendix A of the ELD rule, all components must be present for the driver to be operating with an ELD when an ELD is required. A manufacturer could choose, as a service to the carrier, to record time that was generated in the absence of one of the components from the black box as unidentified driving time.

6.5.8 Can ELD events remain unassigned after a trip is assigned to a driver? (added Sept-2017)

Yes. Once the unassigned driving time has been reviewed and only certain records were attributable to and assumed by a driver, in accordance with 49 CFR 395.32, it is expected that some events will remain associated with the unidentified driving profile. These event types include intermediate logs, power-up/shut-down, and malfunction/diagnostic, which cannot be edited.

6.6 Powering On/Sensing

6.6.1 Can an ELD provider pass the one-minute boot time rule by requiring the driver to power on the device (or an app) prior to starting the engine?

Yes. If the ELD is an application on a separate device, the driver must understand that manual power must be on and the ELD application launched prior to starting the vehicle so that the device can recognize the engine start. Failure to start the application would result in the driver operating without an ELD, which would be in violation of the ELD rule.

6.6.2 Is it permissible to allow the ELD to power up, boot, and accept driver logins before the engine is powered?

Yes, this is an acceptable way for all ELDs to function. If the ELD is structured such that the device must be powered on and logged into before the engine is powered to meet the requirements of the rule, this should be made clear to the driver through the device manual and carriers should include this in their driver training.

6.6.3 Can a mobile app and the vehicle engine communicate over cellular?

Yes, the rule does allow for this. However, manufacturers should keep in mind that in places without coverage, and without cellular communication, the device may not be able to record or display Records of Duty Status, which would leave the driver operating without logs—a violation of the hours of service rules.

6.6.4 What is a manufacturer required to do when required data is not available from the ECM?

If the vehicle does not have an ECM or the ECM does not provide all the information required for, it must be acquired using an independent source apart from the positioning services described under Section 4.3.1.6 of the appendix and

must meet accuracy levels laid out in the rule. Global Positioning Systems cannot be used to identify the vehicle's motion status.

Please note that if there is a means for retrieving data from the ECM, the provider is obligated to use that means (for example, using a synthesized odometer or entering into an agreement with an OEM to access proprietary information). If FMCSA is made aware that a provider has chosen not to undertake the effort to secure data from the ECM that is, in fact, retrievable, the device would be considered non-compliant and removed from the self-certified and registered ELDs.

6.6.5 Is the ELD required to retrieve the CMV position from the device connected to the port, or can this be retrieved by using a smartphone or tablet?

Position information is not intended to be collected from the ECM. The ability to retrieve the CMV's position should be provided by part of the ELD System in compliance with 4.6.1.4.

6.6.6 Can the partial VIN value obtained from the controller area network bus be used for reporting?

Partial VIN is not permitted. If the VIN cannot be fully obtained from the ECM, it must be entered manually; however, a partial VIN broadcast can be used to aid the driver in entering a manual VIN. Please note:

- Providers are encouraged to use the VIN check digit calculation to help prevent user entry errors.
- A VIN with any level of manual entry must be prefixed by a "-" character in the output file.
- Manual VIN entry cannot be used when the complete VIN can be obtained from the ECM. A device using manual entry when the complete VIN is in fact available from the ECM would not be in compliance with the rule and would be subject to removal from the list of self-certified and registered ELDs.

6.6.7 If the required ELD data from the ECM is private and requires an agreement with the original equipment manufacturer (OEM) to obtain said data, are ELD providers required to enter an agreement with the OEM?

The ELD provider is required to use all means necessary to obtain the required ELD data from the ECM; this may include entering into an agreement with the OEM or another third party. Using manual entry when the ECM is available would not be in compliance with the rule and the device would be subject to removal from the list of self-certified and registered ELDs.

6.6.8 How should the ELD handle the dashboard odometer display not matching the odometer value returned by the ECM? For instance, when the engine is replaced and the value is not synced.

If the dashboard odometer display does not match the odometer value returned by the ECM, the ECM odometer value must be identified as the valid value.

6.7 Data Recording

6.7.1 How should the Time Zone Offset from UTC handle daylight savings time?

The rule calls for storing date/time information using UTC and transmitting data in the data file using the UTC offset in effect at the carrier's home terminal. This means that when daylight saving's time is in effect at the home terminal, it should be included in the UTC offset. It would not be included in the UTC offset if daylight savings time is not in effect at the home terminal.

6.7.2 Would server-based events (e.g., edits and assignment of unassigned events) generate a different sequence ID than that generated by the ELD?

The sequence ID must be continuous to its source device. In an ELD support system, that system may have its own sequence ID generator. Because events cannot be deleted, it should be possible to observe each component in the ELD system which generates sequence IDs and find a continuous list of events for each sequence number without any gaps.

6.7.3 In a portable device platform, should the event identifier sequence number be associated with the portable device or the vehicle's black box?

The ELD Rule requires that the event identifier sequence number be consistently applied. It does not specify if the event identifier sequence number must be associated with the portable device or the vehicle's black box, this is left to the discretion of the provider.

6.7.4 When an existing record becomes inactive and its replacement record becomes active or inactive-change-requested, is it acceptable that the replacement record has the same sequence ID as the record it replaces?

No, the replacement record must have its own sequence ID number.

When a driver edits an event or a motor carrier suggests an edit, the new event record should have a new sequence ID number.

6.7.5 When creating an ELD file as specified in Section 4.9.2, when a field specifies activities on a per-CMV basis (such as engine power-up and shut-down activities), which records should be included?

The ELD file referenced in Section 4.9.2 is specific to the file that the motor carrier must provide to the safety official during an investigation. Therefore, any subset of drivers and vehicles, for a subset 6-months specified by an authorized safety official must be included.

6.8 Malfunctions

6.8.1 In Section 4.6.1.7, the rule requires that "an ELD must verify [data transfer] functionality every seven days." What does this mean?

The ELD must verify that it continues to transfer data using the methods it is designed to support. This verification must happen every seven days, either automatically or requiring a manual step from the driver. The specific means of

verification are left up to the provider. If the ELD has transferred data in this timeframe, that would be an acceptable means of verifying connectivity. FMCSA will also make available a verification function for the telematics option that may be used to verify connectivity without actually transferring an ELD file. Check the ELD Provider Website for more information.

6.8.2 How should an ELD respond to battery issues, such as an ELD battery dying due to high temperatures or when charge power runs out? (added Sept-2017)

In cases when the ELD's battery dies or when the charge power runs out, the ELD must generate a malfunction event. The ELD must set a power compliance malfunction if the power data diagnostics event indicates an aggregated in motion driving time understatement of 30 minutes or more on the ELD over a 24-hour period across all driver profiles, including unidentified driver profile.

6.8.3 How will FMCSA ensure that the ELD data is transferred securely? (added Sept-2017)

During data transfers, Appendix A requires additional security protocol through encryption, American National Standard for Information Technology, IEEE Standards Association, and others as incorporated by reference in Section 6.

6.9 Driver Edits

6.9.1 Does the rule require that the driver have editing capabilities?

Yes, the ELD must allow the driver to review, edit, and annotate their ELD records to account for errors and omissions, as specified in Section 4.3.2.8.

6.9.2 If a driver makes an error, can that record be deleted?

Deleting records is not permitted. To correct errors, drivers must be able to edit, enter missing information into, and annotate the ELD records. The original record must be retained and receive an inactive status.

6.9.3 Can a carrier make edits to a driver's logs?

The rule does allow for carriers, using the support personnel account, to propose changes to a driver's ELD data. To protect the driver's logs from manipulation, edits requested by anyone or any system other than the driver must require the driver's electronic confirmation or rejection.

6.9.4 Are there any edits that are not permitted?

Events of type 2 (intermediate log), 5 (login/logout), 6 (CMV power-up/shut-down) or 7 (malfunction/diagnostic) may not be edited in any way. This includes assumption of logs from the unidentified driving profile. If unidentified driving time gets assumed by a driver, the automatically generated change in duty status events would be associated with the driver, but any intermediate logs would not.

Edits which reduce the total amount of driving time recorded by the ELD are not allowed. Unidentified driving time may be transferred to a driver and driving time may be transferred between drivers in a team driving scenario, but

driving time may not otherwise be re-assigned and may never be cumulatively changed. See section 4.3.2.8.2 for more information on editing limitations.

6.9.5 Will hours of service violations notification be eliminated upon an annotation being made by the driver or motor carrier? (added Sept-2017)

No, the annotations made by the driver or the motor carrier will be used by safety officials to help determine if an hours of service violation has occurred. Annotations cannot impact any automatically recorded driving time.

6.9.6 What is the Commercial Motor Vehicle Power Unit Number?

The power unit number is the identifier the motor carrier uses to identify the power unit.

6.9.7 How should CMV Power units be listed if power units are used more than once by the driver within the period set requested?

The User list will include all drivers and co-drivers. The CMV list will include multiple trucks in rank order of use, not just one entry per truck (see Sections 4.8.2.1.2 and 4.8.2.1.3).

6.10 Duty Status Categories

6.10.1 How should the duty status categories be displayed? (added Sept-2017)

In displaying the duty status, the full name of the duty status should be used (i.e., Off Duty, Sleeper Berth, Driving, or On-Duty Not-Driving)

6.10.2 Is the ELD required to automatically change duty status from Sleeper Berth to Driving upon sensing movement?

Yes, the ELD is required to automatically change a driver's duty status to Driving when the vehicle reaches the 5 mph threshold or less after being in the Sleeper Berth duty status.

6.10.3 In Table 6, Event Type 3, it lists "Driver indication for PC, YM, and WT cleared." What does WT refer to?

"WT" refers to "waiting time." This language is carried over from the draft rule and was included in the final version in error. There are no other references to WT found within the rule.

6.10.4 When is the ELD required to automatically change the driver's duty status to driving? (added Sept-2017)

The "driving" duty status must be automatically recorded by the ELD when the operated vehicle meets the configured threshold; not to exceed 5 mph. See Section 4.4.1.

6.10.5 Is the ELD required to automatically change duty status from Sleeper Berth to Driving upon sensing movement? (added Sept-2017)

Yes, the ELD is required to automatically change a driver's duty status to Driving when the vehicle reaches the 5 mph threshold or less after being in the Sleeper Berth duty status.

6.10.6 If a driver forgets to indicate the start of Personal Conveyance (PC) or Yard Moves (YM), can they later edit that automatically generated driving event and change that Off Duty to PC or On Duty to YM? (added Sept-2017)

If a driver forgets to select special driving categories (Personal Conveyance or Yard Move) at the beginning and/or end of the special driving category, then the driver can make an annotation in the ELD record identifying the start and end of the special driving category. The ELD rule does allow driving time to be shortened for the purpose of correcting special driving category selection.

6.11 Yard Moves

6.11.1 How can yard moves be reflected on the ELD? (added Sept-2017)

The ELD must provide an option to preconfigure drivers' accounts with yard moves. Should the motor carrier opt to preconfigure a driver's account with yard moves, the driver must select the beginning and end of the yard move period. The graph-grid must overlay periods of driver's indications of yard moves using a different style line (such as dashed or dotted line) or shading. The appropriate abbreviation must also be indicated on the graph-grid.

6.11.2 What driver duty status should yard moves be reflected under? (added Sept-2017)

Yard moves must be reflected as an On-Duty Not-Driving duty status.

6.11.3 Can an ELD use geofencing to automatically change a driver's duty status to Yard Move?

No. While this was permitted for AOBDRs, this is not permitted under the ELD rule. The device can use geofencing to prompt the driver to change their duty status, but it cannot change the duty status automatically.

6.11.4 Is there a requirement to indicate odometer or positioning at the beginning and end of a Yard Move category?

The position, engine hours, and vehicle miles should be recoded when the yard move starting and ending events are created as specified in Section 4.5.1.3 (Note: these elements are included by reference as Section 4.5.1.3 indicates all elements defined in Section 4.5.1.1 be included).

6.11.5 Can an ELD maintain a Yard Move status after the truck has been turned off?

No, once the vehicle has been turned off the yard move status is cleared. It is permissible—though not required—to prompt the driver to resume the previous duty status.

6.11.6 Can a carrier set parameters for yard moves via the technical specifications? (added Sept-2017)

Yes, while the yard move status must be selected by the driver, the ELD may allow the carrier to configure scenarios in which the driver can and cannot select the yard move.

6.12 Display and Print Requirement

6.12.1 Does the rule require that an ELD be able to both display electronically and print?

No. The display and print requirement serves as a backup to the data transfer methods. In the event that data transmission fails during a roadside inspection, the safety official must be able to view the required information without entering the cab of the truck. This can be accomplished via either the ELD screen or a printout from the ELD, whichever is supported by the device. If a provider selects the display requirement as the backup method, the device is not required to meet the print requirement and vice versa.

6.12.2 Would a PDF that can be transmitted wirelessly be acceptable in lieu of a print feature?

No. A PDF print transmitted wirelessly would not satisfy the requirement, as print serves as a backup to data transfer.

6.12.3 In 4.8.1.2, the rule requires that an ELD without a printer be designed so that “the display may be reasonably viewed by an authorized safety official without entering the commercial motor vehicle.” Can you define “reasonable distance”?

This distance is not specified in order to account for the variety in size of screens. The safety official must be able to read the screen display without having to physically enter the cab of the CMV.

6.12.4 The rule indicates that the graph-grid for each day’s records of duty status must be at least 6 inches by 1.5 inches in size. Can you clarify what this means for requirements for screen size?

This size requirement is for print display only, it does not apply to the ELD screen itself.

6.12.5 Is the display required to be handed to the inspector outside the truck?

The display must be designed so that it can be reasonably viewed from outside the cab of the vehicle. That may require the device to be untethered from its mount or connected in a manner that would allow it to be passed outside of the vehicle for a reasonable distance.

6.12.6 Can the driver's license information be omitted or redacted from the printed logs?

The driver's license information cannot be omitted or redacted. Section 395.25(c) lists the information the motor carrier must provide when creating a driver account and Section 4.8.1.3 lists the information that must be present on the ELD display screen or printout. This information includes the driver's first and last name and driver's license number and issuing state.

6.12.7 Section 4.8.1.3 indicates that location needs to be displayed for login/logout events. However, Section 4.5.1.5 lists required data elements for login/logout events and does not indicate that latitude and longitude need to be recorded. Which is accurate?

Section 4.5.1.5 is correct, location is not required for display of login/logout events, and it is not included in the data file.

6.12.8 In the ELD header, should miles driven reflect miles in the current CMV or all CMVs that the driver has operated on the displayed date? What about Start End Odometer and Engine Hours?

The ELD header must reflect data for the current CMV. See Section 4.3.1.3 and Section 4.3.1.4.

6.12.9 Will ELD providers have access to the eRODS view of the extracted ELD data?

ELD providers will not have access to the eRODS view of the extracted ELD data.

6.12.10 When a driver makes an edit, should the original record be visible in the print or display option? (added Sept-2017)

There should be an annotation on the new record indicating the edit occurred and the old record must be retained, accessible, and included in ELD outputs.

6.12.11 When is the ELD required to display data? (added Sept-2017)

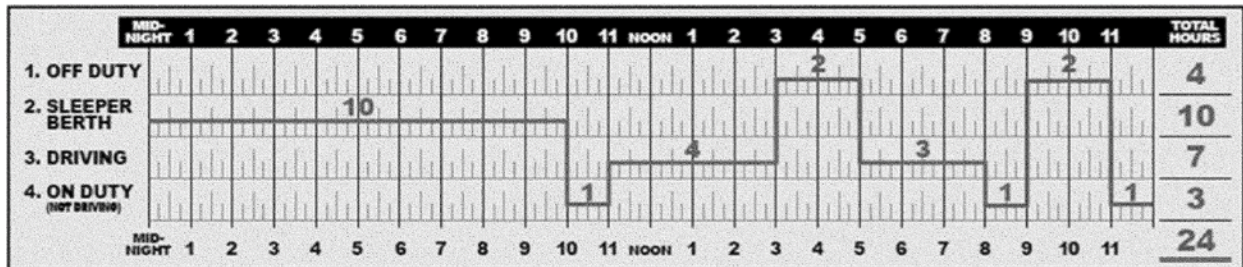
The ELD must be able to retrieve and display current data via display screen of the ELD or from a printout from the ELD at the request of a safety official.

6.12.12 What information must be displayed on the ELD or provided on the ELD printout? (added Sept-2017)

The ELD must show the following information via the display of the ELD or printout:

ELD Documentation Documentation, Release

Record Date	USDOT #	Driver License Number	Driver License State	ELD ID	Trailer ID
20-Nov-14	123456789	D000368210361	IL	987654	Unit #
Time Zone	Driver Name	Co-Driver Name	ELD Manufacturer	Shipping ID	Data Diagnostic Indicators
CST	Smith, Richard		Acme ELDs	BL1234567890	No
24 Period Starting Time	Driver ID	Co-Driver ID	Truck Tractor ID	Unidentified Driver Records	ELD Malfunction Indicators
Midnight	1234567		Unit #	No	No
Carrier	Start End Odometer	Miles Today	Truck Tractor VIN	Exempt Driver Status	Start End Engine Hours
Acme Trucking	39564 - 39984	420	1M2P267Y5AM022445	No	758.2-765.7
Current Location	File Comment		Print/Display Date		
6 mi. NE North Auburn, CA			20-Nov-14		



Time	Location	Odometer	Eng Hours	Event Type/Status	Origin
20-Nov-14					
0:00	49 mi NNE Fallon, NV	39564	758.2	SB	Driver
10:00	49 mi NNE Fallon, NV	39564	758.2	Login	Driver
10:00	49 mi NNE Fallon, NV	39564	758.2	ODND	Driver
10:52	49 mi NNE Fallon, NV	39564	758.2	Power Up	Auto
11:00	49 mi NNE Fallon, NV	39564	758.2	Driving	Auto
12:00	2 mi E Fernley, NV	39624	759.3	Int Location	Auto
13:00	7 mi NNE Truckee, CA	39684	760.3	Int Location	Auto
14:00	6 mi SSE Meadow Vista, CA	39744	761.3	Int Location	Auto
15:00	3.5 mi SW Davis, CA	39804	762.3	Off Duty	Driver
17:00	3.5 mi SW Davis, CA	39804	762.3	Driving	Auto
18:00	1 mi E Emeryville, CA	39864	763.4	Int Location	Auto
19:00	4 mi SSW Univ. of California, CA	39924	764.4	Int Location	Auto
20:00	6 mi NE North Auburn, CA	39984	765.5	ODND	Driver
21:00	6 mi NE North Auburn, CA	39984	765.7	Off Duty	Driver
23:00	6 mi NE North Auburn, CA	39984	765.7	ODND	Driver
23:58	6 mi NE North Auburn, CA	39984	765.7	Cert	Driver
23:58	6 mi NE North Auburn, CA	39984	765.7	Logout	Driver

6.12.13 What information should be displayed on the header for co-driver operations? (added Sept-2017)

The header should contain the information of the most recent co-driver. If there is no co-driver to report then this field should be left blank.

6.13 Data Transfer

6.13.1 Would it be acceptable for the data transfer to be initiated by the ELD but relayed through and communicated to FMCSA Service from the provider's backend?

Yes. As long as the file is being transferred to FMCSA through one of the acceptable data transfer methods and is being triggered by the action at roadside or a compliance investigation.

6.13.2 If a multi-function portable device is used for the front end of the ELD Device (i.e., user may be in a GPS application and need to switch back to the ELD application), does this count as a click in the single-step interface requirement?

The single-step requirement refers to compiling of the driver's records and initiating the data transfer from within the ELD application. This step would take place once logged into the ELD application.

6.13.3 Will FMCSA collect State enforcement agency data transfer capabilities/preferences?

The Federal Motor Carrier Safety Administration will not collect state enforcement agencies data transfer preferences.

6.13.4 Is it necessary for drivers to enter their user credentials before starting the data transfer process? (added Sept-2017)

No, the data transfer process does not require a driver to enter user credentials.

6.14 ELD Output File

6.14.1 Section 4.8.2.1.1 specifies that the ELD output file must have one line for co-driver information and one line for CMV information. There may be multiple co-drivers and/or multiple CMVs. Should it contain the first co-driver and CMV in the day, or the last one, or is there any other option?

The co-driver and CMV at the time the file is generated must be reflected. The file contains sections for listing all user accounts and CMVs which are referenced during events transmitted as a part of the ELD file.

6.14.2 If a driver operates with multiple commercial motor vehicles (CMV), which CMV’s records must be included in the ELD file?

The file must contain all relevant records for all CMVs the driver operated within the selected reporting period.

6.14.3 Must the daily header display “ELD Registration ID” or “ELD Identifier”?

The daily header must display the ELD Identifier.

6.14.4 During an investigation, how should the header section reflect ELD data?

The header should be populated with the most recent CMV data and Co-Driver data (if applicable) within the report period. The actual date and location information (if available) must be reflected in the ELD data.

6.14.5 Is it permitted to leave certain fields blank (e.g., sequence id, record origin) for records that were originally obtained from an AOBRD (e.g., operating in a mixed fleet) or will these files be rejected?

ELD output files with blank sequence ids, or record origins will be rejected. Automatic syncing of AOBRD records into an ELD system should appear as manual entries made by the driver. It is permissible for the edits to be created automatically by the system, but they must be approved by the driver.

6.14.6 For ELD Event Annotations or Comments records in Section 4.8.2.1.5 (ELD Data File), what do the <{Event} Date> and <{Event} Time> refer to?

The <{Event} Date> and <{Event} Time> refers to the date and time of the event in the ELD Event List corresponding with the annotation or comment.

6.14.7 Regarding Section 4.8.2.1.9, which Power Up and Power Down events should be included?

All Power Up and Power Down events for all CMVs used by the driver within the time period that is being requested should be included, including those events that belong to another driver (e.g., if the driver was not using that CMV on that day).

6.15 Data Transfer Methods

6.15.1 The rule states an ELD must use option 1 or 2 for data transfer. Can an ELD offer Web Services and USB?

The manufacturer must select at least one complete option, either telematics (Email and Web Services) or local transfer (USB 2.0 and Bluetooth). So long as one option, which includes both methods, is met, the ELD is compliant. Manufacturers may offer additional methods if they choose.

For telematics data transfer, which email address should be used in the recipient field?
***** g ***** During Phase 1, for any ELDs self-certified and registered, it was at the inspector’s discretion to provide their email and have

data sent to them directly, electronically. Starting December 18, 2017, the ELD must use the email address provided to the provider during the ELD registration process. The provided email address will be the same address provided to all providers.

6.15.2 Why is there a reference to the internet in Bluetooth transfer when it is part of the local transfer option?

“Local” in this option is referring to the ELD device, which does not need its own connection to the internet. When using Bluetooth, the inspector will share an internet connection that will be used by the ELD device to submit the output file via Web Services.

Note: The Bluetooth connection can only be guaranteed to offer connectivity to the FMCSA Web Service, so the connection in this case must come from the device itself as it may not be possible to connect to a back-office system using this connection.

6.15.3 Is the ELD required to encrypt files during a USB electronic data transfer?

The USB device will be self-encrypting, and will not rely on the ELD device for encryption.

6.16 Data Transfer/Connectivity Issues

6.16.1 What if there is no internet connectivity to perform telematics data transfer between the ELD and the safety official? (added Sept-2017)

If both the safety official and the driver are experiencing internet connectivity issues, then the safety official will use the ELD display screen or a printout from the ELD to review the ELD data. However, if the internet connectivity issue is only being experienced by the ELD, the device may be identified as a noncompliant device and the use of the display screen or printout to review the ELD data will be left to the discretion of the safety official. For web services and email, the device must be capable of independently connecting to the internet in a reliable manner whenever a roadside inspection occurs. An implementation that depends on Wi-Fi being present at the roadside or that only offers an extremely limited coverage area may not meet the requirements of an ELD.

6.16.2 Can an ELD connect to the ECM in a manner that relies on internet connectivity? (added Sept-2017)

Yes, however, the driver’s records of duty status must always be available. Therefore, if the driver is unable to access their records of duty status for a period of time due to operating in an area that has limited coverage, the driver would be considered operating without logs for that time.

6.16.3 What is the resolution process if the FMCSA data transfer mechanism incorrectly rejects a data file during an electronic data transfer? (added Sept-2017)

If a data transfer method fails and another is available, the safety official can elect to try the alternate transfer method, or review the ELD data via display screen or printout. If validation fails and provides an error code, the provider should have a process in place that allows its customers to report the error. FMCSA will have a process in place for diagnosing and communicating any issues that arise as a result of technical difficulties experienced by the Agency.

6.17 Registration and Self-Certification

6.17.1 Is the data submission and test certification a one-time effort?

After the initial self-certification, providers will only need to update FMCSA with any major changes to the device.

6.17.2 What is the purpose of the authentication value?

The purpose of the field is to confirm that a specific file came from a specific ELD in a specific vehicle.

6.17.3 Can the required ELD user manual be in digital format?

Yes, the required ELD manuals listed in 395.22(h) can be in digital format.

6.17.4 To ensure that the list of self-certified ELDs is current, ELD providers must notify FMCSA of any major changes to their device. What constitutes a major change to an ELD? (added Sept-2017)

If the provider makes a change that would cause any of the registered ELD values to change, an update to the ELD registration must be made; updated information will be vetted by FMCSA. The provider can also determine the best route for making this change—either updating a current listing, or registering a new ELD.

Note: Any change that results in an update to the ELD Identifier or provider public/private key pair must be reflected on the ELD registration website.

6.17.5 Will ELD providers be able to provide an updated public key in the event of a security breach? (added Sept-2017)

Yes. The public key is required to be kept updated as part of the self-certification process. Public key updates will be vetted by FMCSA. Additional time will be needed to propagate the update into FMCSA's systems.

6.17.6 Must a provider self-certify ELD software and compatible devices, i.e., smartphone, tablet? (added Sept-2017)

The ELD solution must be certified and registered with FMCSA. For example, if the ELD solution is using a bring-your-own device platform or a portable device, then the software provider must self-certify and register the software and list the compatible devices.

6.17.7 If you are creating an application to be used on a smartphone or tablet, do you have to verify and list all the devices that the application works on? (added Sept-2017)

No. For an app, it is not required that the vendor verify every single device the app will work on, but the registration must include the entire platform (i.e., Android or iPhone). The device that allows connection to the ECM, the phone/tablet OS with version range, and the app together can be certified.

If the ELD only works on certain models, the provider will need to specify (e.g., a 64-bit iPhone model with iOS 7 and above).

Note: There should be separate registrations for each platform (i.e., “ELD for Apple” and “ELD for Android” would be registered separately).

6.17.8 If a manufacturer offers a white-label device for sale to others with their logo on it, must all “providers” self-certify so that their own offering with branding is listed on the self-certified list? (added Sept-2017)

As part of the registration process, three pieces of information are necessary to identify a device: ELD Identifier, ELD public key (both from registering company), and ELD Registration ID (from FMCSA). It is allowable to register multiple devices with the same ELD Identifier and public key, but each registered device will have its own unique ELD Registration ID. The rule does not require that certification be done by the company manufacturing the device. Branding partners can use the certification performed by the white label company.

6.17.9 In what format should I submit my public key to FMCSA? (added Sept-2017)

Public keys should be submitted as a public key certificate. This certificate may be self-signed. The certificate must conform to the specifications outlined in Section 2.2.1 of the ELD Interface Control Document and Web Services Development Handbook.

6.17.10 What is an authentication value? (added Sept-2017)

The purpose of the authentication value is to provide a mechanism for cross-checking a transmitted ELD file’s authenticity. Below is one example of a pseudo-algorithm that could serve as the basis for generating an ELD authentication value:

1. Extract some subject of the final ELD Output file. This could be as little as a few fields or as much as the entire file (minus the ELD Authentication Value). Including the ELD Registration ID would satisfy the requirement that the ELD Authentication Value verify the ELD that generated the value.
2. Use a standard signing algorithm. Generate a signature for this content using one of the certificates submitted during ELD registration.
3. Convert this binary signature to a string using a string encoding algorithm that does not use any of the ELD reserved characters (comma—ASCII 44 and carriage return—ASCII 13).

6.17.11 How many characters should my authentication value be? (added Sept-2017)

An authentication value must be greater than or equal to 16 characters. For more information on this update to the technical specifications, see the ELD Interface Control Document and Web Services Development Handbook.

6.18 Removal Process

6.18.1 When will FMCSA start testing ELDs that have been self-certified? (added Sept-2017)

While FMCSA will not be testing ELDs that are currently listed on the ELD registration list or during the registration process, ELD providers have the option of using the file validator available on the ELD registration page to test that their ELD produces a valid file. The ELD registration page will soon be updated with a data transfer testing environment for providers to test their ELD solution data transfer capabilities.

**6.18.2 Will FMCSA notify the industry when an ELD is under an investigation?
(added Sept-2017)**

No. Consistent with its approach to other investigations, FMCSA will not publicize ELD investigations. Should an ELD investigation result in a device being deemed a noncompliant device, then that device will be listed on the ELD revoked list.

CHAPTER 7

Indices and tables

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