Comments and Recommendations

To

Notice of Proposed Rulemaking

On

Electronic On-Board Recorders for Hours of Service Compliance

DOT DMS Docket Number FMCSA-2004-18940

RIN-2126-AA89

Submitted by

QUALCOMM Incorporated
5775 Morehouse Drive
San Diego, CA 92121-1714

Dave Kraft Senior Manager, Business Development QUALCOMM Wireless Business Solutions (847) 476-0906 dkraft@qualcomm.com	Chris Robison Staff Project Manager QUALCOMM Wireless Business Solutions (503) 353-0456 crobison@qualcomm.com	David Arnold Senior Legal Counsel QUALCOMM Wireless Business Solutions (858) 651-5143 darnold@qualcomm.com

I. Introduction and Executive Summary.

On January 18, 2007, the Federal Motor Carrier Safety Administration ("FMCSA") issued its Notice of Proposed Rulemaking ("NPRM"), requesting comments related to proposed amendments to the Federal Motor Carrier Safety Regulations ("FMCSR") to incorporate new performance standards for electronic on-board recorders ("EOBR") installed in commercial motor vehicles ("CMV") manufactured two (2) years after the effective date of a final rule. Generally, the NPRM can be compiled into three categories: (1) performance requirements for EOBRs; (2) mandatory EOBR use requirements for certain motor carriers; and (3) incentives offered to motor carriers that voluntarily elect to utilize EOBR technology.

As noted in its comments and recommendations with respect to the FMCSA's Advanced Notice of Proposed Rulemaking on this same topic (Docket No. FMCSA-2004-17286), QUALCOMM neither supports nor opposes adoption of any regulation mandating the use of EOBRs to document compliance with the HOS rules. QUALCOMM does encourage the FMCSA to offer real and substantial incentives to those motor carriers that voluntarily decide to invest in EOBRs for their driver workforce. However, the primary purpose in submitting these comments and recommendations is for QUALCOMM to address the EOBR performance requirements proposed by the FMCSA in the NPRM.

Specifically, as will be discussed in further detail below, QUALCOMM believes that the technical aspects of the NPRM could be substantially improved upon by addressing the following issues:

- The NPRM should address the use of a secured server as a key component of an EOBR system. When EOBRs are used with a secure server, there are substantial opportunities to improve safety performance, hours of service ("HOS") compliance monitoring and proactive safety management.

- The NPRM tolerance standards for clock and mileage accuracy are not in alignment with what is available in affordable technology solutions and with current industry standards.

- Due to the inherent limitations of the solution, the FMCSA should reconsider its proposed allowance of EOBR systems that capture mileage and driving time data using only GPS readings. QUALCOMM strongly believes that the EOBR rule should continue to require integral synchronization with the vehicle's electronic computer module ("ECM") for capturing driving time and mileage.

- The rules for what a driver's obligation is for responsive action when technical out-of-tolerance conditions occur is not clearly stated in the NPRM.

- The NPRM's technical requirements for alert thresholds and on-board display information should be more flexible to support wider adoption of EOBRs by motor carriers.

- The NPRM's technical requirements for reporting driving time/on-duty thresholds and for recordkeeping and amendment of record of duty status ("RODS") should be more flexible to support wider adoption of EOBRs by motor carriers.

- QUALCOMM supports the TMC EOBR Task Force Technical Policy Advisory comments for the EOBR NPRM dated March 15, 2007, which is attached for reference.*

  [*Dave Kraft, Senior Manager, Business Development for QUALCOMM Wireless Business Solutions, is the Chairman of the TMC EOBR Task Force.]

II. About QUALCOMM.

QUALCOMM, Incorporated (www.qualcomm.com) is an industry leader in developing and delivering innovative digital wireless communications products and services based on the company's Code Division Multiple Access digital technology. Headquartered in San Diego, California, and with approximately 11,000 employees worldwide, QUALCOMM is included in the S & P 500 Index and is a Fortune 500 Company traded on the NASDAQ Stock Market under the Ticker Symbol, QCOM.

In 1988, QUALCOMM Wireless Business Solutions ("QWBS"), a division of QUALCOMM, was the first company to market a two-way, satellite mobile communications and tracking solution for the transportation industry, the OmniTRACS® mobile communication system. Over 18 years later, QWBS is a global leader in providing information services with over 1,000,000 QUALCOMM mobile units shipped to over 6,000 customers in more than 40 countries on four continents, and over 12.5 million data transactions processed everyday using the QWBS Network Management Center in San Diego, California. Some of the information service systems available from QUALCOMM include the OmniVision™ mobile computing platform, the OmniTRACS® system, the OmniExpress mobile communications system®, the OMNI One system, and the FleetAdvisor® fleet management system. More recently, QUALCOMM developed a § 395.15 compliant HOS solution called QUALCOMM Hours of Service ("HOS") targeted for use by long-haul fleets. The HOS service provides a cost effective § 395.15 system by leveraging the existing

satellite-based mobile communications and positioning systems, which are widely used throughout the transportation-logistics industry. Today, carriers using the OmniTRACS or OmniVision system and HOS service operate throughout the United States and Canada. One benefit of using the HOS service is that it requires no new hardware other than a minor upgrade for some of the older OmniTRACS® system units.

The following is a brief description of the HOS service:

- QUALCOMM hosted and web-based;
- Integrally synchronized with CMV functions;
- Identifies individual drivers, including team drivers;
- Automatically detects the driving time (automatic detection of the beginning of a trip and the end of a trip);
- Automatically detects miles driven from axle revolutions with a sensor recording device or from the engine databus;
- Continuously monitors and collects the CMV and HOS information and transmits it to the host computer so that such information is available to the motor carriers for proactive safety management;
- Automatically collects and records position location of each duty status change;
- Automatically notifies a driver who is approaching or in violation of the HOS rules;
- 24x7 support hot line;
- Automatic response system to request a facsimile paper copy of the full RODS, if desired; and
- Fully redundant network operation centers (San Diego, California and Las Vegas, Nevada) for data storage.

III. QUALCOMM's Comments and Recommendations With Respect to the NPRM.

A. In General

QUALCOMM supports the FMCSA's efforts to improve highway safety and assist motor carriers in complying with the HOS regulations. We are encouraged to see that FMCSA's proposed 395.16 rules for EOBRs adopt performance standards rather than technical specifications so that a variety of technologies can be used to meet the regulatory requirements. This flexibility permits motor carriers to utilize the best-suited technology solutions based on their operational profile and business practices.

QUALCOMM's customers have already invested in technology to enhance productivity, safety, communications and in-transit visibility with their fleets and drivers. Our customers using the HOS application have an easy-to-use means to monitor HOS compliance and maintain RODS. With mobile

communications, our customers also have near real-time visibility of their drivers' current HOS status, which further enables our customers to use the application as a proactive safety management tool. QUALCOMM's goal is to help our customers further leverage their technology investments for use in compliance with any new or revised HOS regulations that may subsequently be adopted by the FMCSA.

B. Qualcomm's Comments on Technical Aspects of the Proposed Rules

While we support and understand the intent of the technical performance requirements in the proposed 395.16 rule, we strongly believe that a number of areas could be improved and/or better defined in order to make the proposed rules effective for their intended purposes. Among the areas that would benefit from better-defined requirements are:

1. The rules should address the use of a secure server as a key component of an EOBR system. When EOBRs are used with a secure server, there are substantial opportunities to improve system performance, HOS compliance monitoring and proactive safety management.

QUALCOMM believes that capabilities of secure server and networking solutions should not only be defined in the rules but that the secure server should be the baseline for many essential system requirements, including for:

1.1 Controlling the security of the system in managing driver IDs, authenticating user access to the system, and ensuring integrity of the data as it is captured, transferred and stored.

1.2 Providing on-demand, secure, and read-only reporting of RODs for roadside inspections using a wider range of technology options, including the use of the Internet and email of data files from an authenticated, secure server source.

1.3 Providing continuous monitoring of system performance to ensure system integrity and near real-time visibility of drivers' current HOS status both to enhance HOS compliance and enable more proactive safety management.

1.4 Providing continuous back-up support if the EOBR becomes non-functional or if the on-board data files are lost.

2. The rules' tolerance standards for clock and mileage accuracy are not in alignment with what is available in affordable technology solutions.

While standards are needed for clock and mileage accuracy, the proposed requirements for two (2) seconds/day clock accuracy and 1% mileage error are far too restrictive, inconsistent with currently available EOBR technology, and will create a multitude of operational issues that inhibit the ability to provide

affordable EOBR solutions. The tolerance standards need to be in conformance with currently available, practical and affordable technology.

2.1 For systems with mobile communications, we recommend that EOBR clock accuracy be calibrated to the mobile communication network center's date/time with an acceptable tolerance for network latency. This approach is effectively tamper-proof and consistently accurate.

2.1.1 Network latency varies depending on the type of network (satellite, packet-switched data, etc.) QUALCOMM recommends determining latency by the *start time* of a data packet *transmission* from the EOBR to the *end time* of the data packet *reception* at the network center. This definition of latency is independent of the link's throughput and the size of the packet. Using this definition of network latency, we believe that 2 seconds/day clock accuracy is unnecessarily stringent.

2.1.2 QUALCOMM further proposes that clock drift tolerance be stated as not to exceed three (3) minutes at any time and that calibration be at a minimum of every three (3) months. EOBRs using mobile communications and/or GPS should further be permitted to recalibrate to the network's clock or GPS time.

2.2 For systems without mobile communications, QUALCOMM recommends vehicle system clock calibration be with an external trusted source to assure date/time source accuracy at least three times a year with clock drift not to exceed 3 minutes per calibration. A record of all clock re-calibrations and extent of adjustment should be maintained with the carriers' electronic HOS records.

2.3 For systems capturing mileage from the vehicle ECM odometer, we recommend that the odometer be maintained consistent with the vehicle manufacturer's specification for odometer re-calibration. We note that SAE standards allow +/- 4% odometer error.

2.4 QUALCOMM does not believe that minute-by-minute GPS position records are necessary when odometer data is being used to determine mileage. The odometer is an obvious and acceptable means of capturing mileage and we see no reason minute-by-minute GPS positions should have to be used as an additional requirement that adds an unnecessary functional requirement and the need for substantial additional memory for data capture.

2.4.1 We do believe, however, that GPS position reports should be required at a change of duty status.

2.4.2 There will be instances where GPS is not available due to blockage with the line-of-sight to the satellite constellation. In those limited cases, drivers should be permitted to manually enter the location data to augment the electronic record rather than be required to revert to manual paper RODS.

2.5 QUALCOMM recommends that FMCSA have the technical requirements regarding tolerance standards for clock and mileage accuracy established and maintained by an appropriate standards body that can assess and keep up-to-date the technical requirements based on what are then state-of-the-art performance capabilities and what is generally available for wider adoption of EOBR technology solutions.

3. Due to the inherent limitations of the solution, FMCSA should re-consider its proposed allowance of systems that capture mileage and driving time data using only GPS readings. QUALCOMM strongly believes that the EOBR rule should continue to require integral synchronization with the vehicle's ECM for capturing driving time and mileage.

QUALCOMM believes that use of GPS positioning only for capturing mileage data and calculating driving time is ineffective, because there will be many instances where a GPS signal will not be available to comply with the proposed minute-by-minute position reports.

3.1 GPS-only systems will not be able to capture position location data if they are not operational (i.e., not powered on).

3.2 Periodically, systems will be out of coverage for an extended period of time due to physical blockage of the antenna from line-of-sight to the GPS satellite constellation.

3.3 Without data synchronization to the vehicle, there is not an acceptable means to ensure that the GPS position reporting is associated with the vehicle, as the only association is between the driver's log-in and the GPS device.

3.4 If the EOBR is not integrally synchronized with the CMV's functions, driving time and distance cannot be accurately determined by specific CMV sensors and, as a result, the integrity of the data may be compromised.

3.5 Due to the foregoing limitations, QUALCOMM does not believe that a GPS positioning only system with or without minute-by-minute position recording is a feasible EOBR solution for capturing reliable RODS. However, if a handheld system can be developed that has robust back-end controls, then QUALCOMM would support the use of such a system as a feasible EOBR solution.

4. The rules for what a driver's obligation is for responsive action when technical out-of-tolerance conditions occur, is not clearly stated.

The NPRM does not appear to clearly address either the means by when and how out-of-tolerance is to be detected or the immediate required remedy when the system detects out-of-tolerance conditions (e.g., a 1.1% mileage error or an out-of-coverage event from a two minute gap in position reports due to loss of line-of-sight to the GPS satellite constellation).

4.1 Under these circumstances will FMCSA require the driver to prepare manual RODS?

4.2 QUALCOMM strongly believes that in these circumstances driver records should not be put into question because of temporary out-of-coverage events or instances of minor out-of-tolerance performance.

4.3 QUALCOMM recommends that FMCSA have the technical requirements regarding detection of out-of-tolerance conditions and the determination of when out-of-tolerance conditions should be construed as an EOBR failure, requiring the driver to maintain paper RODS, be established and maintained by an appropriate standards body that can assess and keep up-to-date the technical requirements based on what are then state-of-the-art performance capabilities and what is generally available for wider adoption of EOBR technology solutions.

5. The rules' technical requirements for alert thresholds and on-board display information should be more flexible to support wider adoption of EOBRs by motor carriers.

While standards are needed for alert thresholds and display of RODS information, without flexibility in the requirements, these thresholds will lead to unnecessary operational problems and inhibit the use of affordable solutions.

5.1 The rules proposed system performance, integrity monitoring and the related out-of-tolerance conditions requiring audio and visual alerts are overly cumbersome and will cause non-productive alerts for minor exceptions.

5.1.1 For example, loss of mobile communications network coverage or loss of the GPS signal may occur frequently for very short periods of time resulting in corresponding frequent "alerts" that will become "noise" to the driver. Such alerts should not be required when in driving mode; they should be indicated only when the vehicle is stopped or if they affect required data capture (e.g., a border crossing). In these cases, the remedy for any loss of data should be entry of remarks or a record amendment by the driver.

5.1.2 Similarly, QUALCOMM recommends that the audio/visual alert for low available driving time hours should only have to be made at one hour and at 30 minutes preceding driving time limits.

5.2 The rules proposed on-board information display and reporting requirements are not sufficiently flexible and do not account for the use of electronic data transfer.

5.2.1 The information display requirements should be limited to what is absolutely required to be available on the display unit in the vehicle and other information should be allowed to alternatively be made available through electronic data transfer or with the use of transmitted reports from a secure server.

5.2.2 Simple displays of driver information and hours status provide a clear and adequate indication of whether a driver is in compliance or not (similar to what is required in the current rule in § 395.15). Requiring more detailed displays, including that of a grid graph format, are overly burdensome and unnecessary. When and where that information may be needed for an enforcement audit, detailed data and reports can be made available via electronic data transfer.

5.2.3 Many legacy devices that would otherwise support EOBR requirements do not have sufficient capability for the proposed, required, detail displays. Moreover, the future trend is that motor vehicles will have embedded in-dash displays and therefore will not support the proposed "viewable from outside the cab" requirement.

5.2.4 QUALCOMM strongly believes that it is not only feasible but preferable for EOBRs to meet the regulatory requirements by alternatively providing detailed driver log data (with grid graph format, if needed) via the Internet, email or other electronic transfer to inspection sites or enforcement agency mobile systems.

6. Several of the rules' technical and other requirements should reference appropriate industry standards and/or be developed and maintained by appropriate industry standards bodies.

6.1 QUALCOMM recommends that FMCSA apply appropriate industry standards where applicable and support new standards where required to effectively maintain technology requirements in the future. Requirements regarding security technologies and security management recommended practices, equipment operating performance and environmental standards, electronic data transfer technologies and formats for communication of RODS information, and technology-related testing and certification should be established and maintained by an appropriate standards body that can assess and keep up-to-date the technical requirements based on what are then state-of-the-art performance capabilities and what is generally available for wider adoption of EOBR technology solutions.

6.2 QUALCOMM recommends that Society of Automotive Engineers (SAE) standards be referenced as appropriate to vehicle requirements, most notably:

6.2.1. SAE standard J1226 – Electric Speedometer Specification - on Road – in reference to vehicle odometer accuracy.

6.2.2. SAE standard J1455 – Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications – in reference to EOBR environmental requirements.

6.2.3. SAE standard J1708 – Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications – in reference to wired communications link using the vehicle data bus.

6.2.4. SAE standard "J1939 – Recommended Practice for a Serial Control and Communications Vehicle Network – also in reference to wired communications link using the vehicle data bus.

6.2.5. Additionally, FMCSA should consider submitting a standards request with specific performance requirements to SAE subcommittees for J1939 and J1708 standards to address tamper-resistance technical specifications in capturing information from electronic control modules communicating such data over the vehicle data bus network.

6.3. QUALCOMM recommends that the Technology and Maintenance Council (TMC) of the American Trucking Association provide the appropriate EOBR recommended engineering practices for EOBR specific and related technology requirements, most notably:

6.3.1. TMC recommended engineering practice RP 1219T – Guidelines for Electronic On-board Recorders – to provide comprehensive technical requirements for EOBR devices and support systems. This draft RP provides an opportunity to provide a technical specification standard as a companion document to the performance requirements of 395.16. It also enables an approach to ensure that technical specifications are normalized between EOBRs and law enforcement systems, and that future technology changes are addressed on a timely basis without requiring a lengthy rule making process. Through a cooperative effort by TMC, CVSA, and FMCSA in completing RP 1219, the standard would serve to provide the necessary technical specifications and certification criteria for EOBRs which then could be included by reference in 395.16.

6.3.2. TMC recommended engineering practice RP 1210B – Serial Communications Application Program Interface – in reference to device, connection, and protocol guidelines in using the vehicle data bus for electronic data transfers between EOBRs and roadside inspection devices.

6.3.3. Additionally, FMCSA should review TMC RP 1218 – Guidelines for Remote Disablement of Commercial Vehicles as a baseline model of how TMC, NHTSA, and law enforcement have worked cooperatively in defining a standard for secure data communications with vehicle on-board systems.

6.4. QUALCOMM recommends that other standards organizations, such as the International Organization for Standardization (ISO), provide standards for specific technology topics not covered by SAE or TMC. Standards references may also be included in TMC RP 1219 to cover specific requirements related to information security in EOBR systems and the framework for certification.

6.4.1. An international standard that may be considered for EOBR system certification that is more robust than self-certification is ISO/IEC 17050 – Supplier's Declaration of Conformity – Part 1: General

Requirements, and Part 2: Supporting Documentation Requirements. Use of this standard also requires that an entity or independent audit organization is authorized to conduct audits of supplier declarations, and that definitive criteria is established for system testing, supporting documentation, and the audit. It is also advised that an organization be identified and established to serve as a registry of supplier declarations and audited declarations. In a prior discussion, we noted that FMCSA indicated that it was not authorized to perform such an audit function. However, an organization such as TMC may be able to take this on or serve as an agent in managing an independent audit organization with the skills and capacity to perform these system compliance audits. The approach leveraging the ISO 17050 framework provides an opportunity to provide a high level of assurance of EOBR system conformity to the regulation and appropriate industry standards without making a significant investment in establishing, operating, and maintaining independent testing laboratories.

6.4.2 ISO and other standards organizations provide robust security standards for authentication and encryption in electronic data transfer, and for security management of mobile devices and support systems. The NPRM has limited performance requirements related to information security. However, we anticipate additional requirements will be identified and they should be addressed from a standards perspective.

7. The rules' technical requirements for reporting driving time / on-duty thresholds and for record keeping and amendment of RODS should be more flexible to support wider adoption of EOBRs by motor carriers.

7.1 The parameters and thresholds for automatic determination of driving/non-driving time should allow for flexibility in how motor carriers match their system settings with the nature of their operations to more accurately record true driving time. The proposed rules do not address the common operational issue of when "driving time" for a trip should start compared to what is generally recorded by motor carriers today, as "on-duty, not driving," using paper RODS.

7.1.1 For example, vehicles may be moved around a yard to facilitate parking arrangements or once parked, subsequently moved to a loading dock, etc. Generally, these activities are going be logged as "On-Duty, Not Driving" status when using paper RODS.

7.1.2 QUALCOMM recommends that the rules allow for a reasonable range of parameters for establishing when "driving time" starts.

7.1.3 The 15 minute threshold for vehicle stationary status to allow for an automatic change from "Driving" to "On-Duty, Not Driving" is excessive.

7.2 QUALCOMM proposes that duty status changes for "Driving" and "On-Duty, Not Driving" should be:

7.2.1 To "Driving" Status: Vehicle has moved more than one (1) mile (movement is determined from the vehicle's data bus, if available) with "Driving" recorded as of the start time of vehicle movement. If a vehicle moves less than one (1) mile, a five (5) minute stop resets the movement threshold.

7.2.2 To "On-Duty, Not Driving" (from "Driving" status): Vehicle has stopped for more than five (5) minutes (with the stop determined as zero (0) MPH from the vehicle's data bus, if available) or if "Engine/Ignition Off" is detected. The time recorded for the change to "On-Duty, Not Driving" is recorded as of the start time of the 5 minute interval.

7.3 The rules addressing log review, amendment, and submittal processes by the driver and for the back-office support system should be more flexible to support auditable amendments and corrections to support accuracy in RODS using EOBRs.

7.3.1 For example, drivers should have some flexibility in how they conduct a daily log review and certify their records. Drivers should be able to amend records up to the time of certification, including "claiming" any driving time that may have occurred but not been recorded due to their failure to log on their ID prior to the start of driving.

7.3.2 Drivers should be allowed to review and accept or repudiate any back office amendments.

7.4 The rules should address and permit EOBRs to allow for portability of electronic driver/co-driver logs when matched with each driver's RODS (including mixed records that have both manual and automated entries).

7.4.1 For example, if a driver transfers to another vehicle, the rules should permit the transfer of the driver's electronic records to reflect that two (or more) vehicles have been driven. If a driver has manual RODS for some portion of the 7-day period, the system should allow (or require) entry of records as amendments for all manual paper RODS activity to assure that the electronic records are complete going forward.

8. The rules' requirements that the EOBR and EOBR support systems should be self-certified by the manufacturer is the correct approach.

8.1 QUALCOMM believes that the manufacturer self-certification approach is correct. EOBRs are complex and are often one application in a unique system that is part of a broader suite of fleet management and telematics applications. The self-certification approach is consistent with the requirements in § 395.15 and should be continued.

IV. This Section Contains QUALCOMM's Comments to Specific Sections of the Proposed § 395.16 Requirements.

Section (a) Applicability. *This section applies to electronic on-board recording devices (EOBRs) used to record the driver's hours of service as specified by part 395. For commercial motor vehicles manufactured after [INSERT DATE 2 YEARS AFTER PUBLICATION OF FINAL RULE], any electronic device installed in a CMV by a manufacturer or motor carrier to record hours of service must meet the requirements of this section.*

Comment: QUALCOMM agrees. A transition period of at least two years is necessary.

Section (b) Information to be recorded. An EOBR must record the following information:

(1) Name of driver and any co-driver(s), and corresponding driver identification information (such as user IDs and passwords, PIN numbers, smart cards, or biometrics).

(2) Duty status.

(3) Date and time.

(4) Location of CMV.

(5) Distance traveled.

(6) Name and USDOT number of motor carrier.

(7) 24-hour period starting time (e.g., midnight, 9:00 a.m., noon, 3:00 p.m.).

(8) The multi-day basis (7 or 8 days) used by the motor carrier to compute cumulative duty hours and driving time.

(9) Hours in each duty status for the 24-hour period, and total hours.

(10) Truck or tractor and trailer number.

(11) Shipping document number(s), or name of shipper and commodity

Comment: The information requirements are consistent with current § 395.15 requirements. However, clarification should be provided for item (10) with regard to information requirements for multiple trailer numbers, and for containers loaded on a trailer chassis should containers be required to carry DOT numbers.

Section (c) Duty status categories. An EOBR must use the following duty statuses*:*

(1) "Off duty" or "OFF", or other identifiable code or character.

(2) "Sleeper berth," or "SB" or other identifiable code or character, to be used only if sleeper berth is used.

(3) "Driving," or "D" or other identifiable code or character.

(4) "On-duty not-driving" or "ON" or other identifiable code or character.

Comment: This is consistent with current requirements in § 395.15.

Section (d) Duty status defaults.

(1) An EOBR must automatically record driving time.

(2) When the CMV is stationary for 15 minutes or more, the EOBR must default to on-duty not-driving, and the driver must enter the proper duty status.

(3) An EOBR must record the results of power-on self-tests and diagnostic error codes.

Comment: It would be useful to have a more detailed guideline for automatic determination of drive start and stop parameters. Situations occur with yard moves and traffic congestion where parameter guidelines to determine start and stop for driving would be useful to minimize back office reconciliation of driving time records.

We recommended the following for automatic determination of driving start and stop:

To Driving (Start): Vehicle moved more than 1 mile with movement determined from the vehicle data bus sensor. Driving status is recorded as the start time of vehicle movement. If a vehicle moves less than 1 mile, a 5 minute stop resets the movement threshold. Consideration should also be made to allow some flexibility in the "driving start" thresholds to allow carriers to apply more realistic settings with normal yard move activity in their operations.

To On-duty, Not Driving (Stop): Vehicle stopped for more than 5 minutes, with stop determined as 0 MPH from the vehicle data bus sensor. The time recorded for the change to on-duty, not driving will be the start time of the 5 minute interval. The "driving stop" situation should alert the driver of duty status change and allow for an override of the default duty status, to include continuation of driving status when stopped in traffic or when operating auxiliary vehicle functions while at the driving controls.

Section (e) Date and time.

*(1) The date and time must be reported on the EOBR output record as specified under paragraph **(f)** of this section and displayed at each change of duty status.*

(2) The date and time must be obtained, transmitted, and recorded in such a way that it cannot be altered by a motor carrier, driver, or third party.

(3) The driver's duty status record must be prepared, maintained, and submitted 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.

(4) The time must be coordinated to UTC and must not drift more than 2 seconds per day. The absolute deviation from the time base coordinated to UTC shall not exceed 10 minutes at any time.

Comment: We agree that date and time recording should be accurate. However, a tolerance of two seconds per day, on a day-by-day basis, is too restrictive. When date/time is synchronized with a mobile communications network or the GPS signal, normal latency may exceed the 2 second tolerance but the date/time data does provide consistent, unalterable accuracy. We recommend for EOBRs that synchronize date and time with a proven, reliable external source be allowed to do so, as this will consistently provide accurate date and time recording in a manner that cannot be altered by the carrier, driver or third party.

For EOBRs that do not synchronize date and time with a trusted external source, we recommend that the requirement specify a calibration period for the internal clock, with accuracy tolerance consistent with calibration period, e.g., EOBR internal clocks must be calibrated at least at three month intervals with clock drift not to exceed three minutes.

Section (f) Location.

(1) Information used to determine the location of the CMV must be derived from a source not subject to alteration by the motor carrier or driver.

(2) The location description for the duty status change must be sufficiently precise to enable enforcement personnel to quickly determine the vehicle's geographic location at each change of duty status on a standard map or road atlas.

(3) When the CMV is in motion, location and time must be recorded at intervals no greater than 1 minute. This recorded information must be capable of being made available in an output file format as specified in Appendix A of this part, but does not need to be displayed on the EOBR's visual output device.

(4) For each change of duty status (e.g., the place and time of reporting for work, starting to drive, on-duty not-driving, and where released from work), the name of the nearest city, town, or village, with State abbreviation, must be recorded.

(5) The EOBR must use location codes derived from satellite or terrestrial sources, or a combination of these. The location codes must correspond, at a minimum, to the Census Bureau 2000 Gazetteer "County Subdivision" data.

Comment: The requirements for "Location" are unrealistic and inconsistent with other HOS rules and therefore need to be revised. Among the issues are the following:

- Satellite position fixes are sometimes not available due to terrain features, urban canyons, tunnels, weather conditions, and other factors. Satellite position fixes are also vulnerable to blocking with metal covering and noisy RF signals, some of which may be intentional but are undetectable and unpreventable. If the satellite position fix is not available when needed, e.g., at change of duty status, then the driver

should enter location and the system should resume recording location history records at the next availability of a satellite position fix.

- Recording position histories at 1 minute intervals should not be required when vehicle motion and mileage is determined through a synchronized, tamper-resistant interface with vehicle sensors. We also recommend against allowing the determination of driving time and mileage solely with the GPS location data, as lack of vehicle synchronization makes this approach vulnerable to not consistently tracking vehicle movement. However, if it is allowed to determine vehicle movement and mileage without an integral synchronization with vehicle sensors, the position history should be at a frequency sufficient to support a ±5% error in the mileage calculation, which is consistent with a realistic expectation of a calibrated odometer (see comments at Section (g) below).
- Position histories should, at a minimum, record location at each change of duty status. This is a significant improvement from 395.15 where location was manually entered and not determined via satellite fix. If carriers choose to apply position history data in lieu of supporting documents subject to the expected new HOS supporting documents final rule, then position history data should also comply the requirements of that rule.
- There are many map sources for determining location names, with many of them proving to be quite accurate and reliable. It is not clear what is meant by "correspond to Census Bureau 2000 Gazetteer "County Subdivision" data" and whether that referenced source is the most up to date. More clarification is needed on this point.

Section (g) Distance traveled.

(1) Distance traveled must use units of miles or kilometers driving during each on-duty driving period and total for each 24-hour period for each driver operating the CMV.

(2) If the EOBR records units of distance in kilometers, it must provide a means to display the equivalent distance in miles.

(3) If the EOBR obtains distance-traveled information from a source internal to the CMV, the information must be accurate to the distance traveled as measured by the CMV's odometer.

(4) If the EOBR obtains distance-traveled information from a source external to the CMV, the information recorded must be accurate to within +I- 1 percent of actual distance traveled over a 24-hour period as measured by the CMV's odometer.

Comment: The requirement for item (4) for mileage accuracy is unrealistic. It is noted also that this requirement is elaborated in Appendix A. Section 3.1.2.of the NPRM to also encompass odometer accuracy to within ±1%. SAE standard "J1226 – electric speedometer specification for on road vehicles" allows ±4%

odometer error. The standard also notes that the design limits should not be construed as absolute under all operating conditions. Is FMCSA now proposing a higher industry standard for odometers? If so, why? Who should now be responsible for assuring odometer accuracy?

It is recommended the mileage determination tolerance apply solely to GPS-based mileage determination, if such an approach is allowed. The tolerance should allow ±5% error for consistency with realistic expectations of odometer results. The requirements of § 395.16 should also address conditions where location history data is incomplete due to limitations in obtaining satellite fixes and the action then required – i.e., at what point should manual RODS be prepared?

Section (h) Review of information by driver.

(1) The EOBR must allow for the driver's review of each day's record before the driver submits the record to the motor carrier.

(2) The driver must review the information contained in the EOBR record and affirmatively note the review before submitting the record to the motor carrier.

(3) The driver may annotate only non-driving-status periods, and may do so only immediately prior to the first driving period of the day and immediately following the last driving period of the day. The driver must electronically confirm his or her intention to make any annotations.

(4) If the driver makes a written entry on a hardcopy output of an EOBR relating to his or her duty status, the entries must be legible and in the driver's own handwriting.

Comment: The requirements should provide more clarity on what is allowed and should focus on achieving completeness and accuracy in driver records. There are many factors to consider in driver and back office review and correction of data in the duty status records that will serve to ensure completeness and accuracy. Driving status information that is automatically determined should not be available to alteration. However, if a driver fails to log-on prior to start of driving, the driver should be allowed to "claim" this record of driving time. The back office should be required to reconcile and assign all driving (vehicle movement) episodes with drivers. All duty status records may require manual entries, e.g., tractor number, trailer number, etc. All manually entered data fields should be available for annotation and correction by the driver and back office personnel (through data reconciliation and validation procedures).

Section (i) Information reporting requirements.

(1) An EOBR must make it possible for authorized Federal, State, or local officials to immediately check the status of a driver's hours of service.

(2) An EOBR must produce, upon demand, a driver's hours-of-service chart using a graph-grid format in either electronic or printed form in the manner

described in 5 395.8 and a digital file in the format described in Appendix A of this part. The chart must show the time and sequence of duty status changes including the driver's starting time at the beginning of each day.

(3) This information may be used in conjunction with handwritten or printed records of duty status for the previous 7 days.

(4) The information displayed on the device must be made accessible to authorized Federal, State, or local safety assurance officials for their review without requiring the official to enter in or upon the CMV. The output record must conform to the file format specified in Appendix A of this part.

(5) The driver must have in his or her possession records of duty status for the previous 7 consecutive days available for inspection while on duty. These records must consist of information stored in and retrievable from the EOBR, handwritten records, other computer-generated records, or any combination of these. Electronic records must be transferable to portable computers used by roadside safety assurance officials and must provide files in the format specified in Appendix A of this part. The communication information interchange methods must comply with the requirements of RS 232, USB 2.0, IEEE 802.1 1(g), and Bluetooth.

(6) Support systems used in conjunction with EOBRs at a driver's home terminal or the motor carrier's principal place of business must be capable of providing authorized Federal, State, or local officials with summaries of an individual driver's hours of service records, including the information specified in $ 395.8(d). The support systems must also provide information concerning on-board system sensor failures and identification of amended and edited data. Support systems must provide a file in the format specified in Appendix A of this part. The system must also be able to produce a copy of files on portable storage media (CD-RW, USB 2.0 drive) upon request of authorized safety assurance officials.

Comment: There is an opportunity to improve the efficacy of roadside inspections with EOBRs using available technology. While the NPRM is in general technology neutral through specification of performance requirements, the technology specifications for information reporting in item (5) are prone to multiple issues. The approach for information reporting should maintain the technology neutral approach by leveraging standards for data interchange that are significantly insulated from technology change while at the same time affording robust security measures.

We recommend two methods for information reporting that are technology neutral for EOBR devices and are expected to have significant longevity in availability. The proposed methods below also lend themselves to effective security measures, and include:

1- Use of the vehicle data bus for a wired data transfer from the EOBR to roadside inspection device. This approach is similar to that used for OBD emissions inspections. The methods and protocols for this connection have already been standardized. These standards will be

maintained as any new requirements or technology is developed for obtaining data via the vehicle's data bus. Additional security standards are required to ensure proper authentication between devices and data transfer security – and it is recommended that security be addressed through industry standards and not the regulation.

Use of USB or a serial port would not be appropriate for a wired data transfer. USB was developed to replace serial ports and their associated problems with pin configurations and software driver requirements. USB standards are also evolving to wireless USB, a form of ultra wideband that will compete with other ultra wideband standards. As we project into the future, it is uncertain how long USB and serial port standards can be supported in EOBRs and law enforcement systems. The USB and serial port configurations are also subject to serious security vulnerabilities and would increase complexity in assuring tamper-resistant systems.

2- Use of the Internet for wireless data transfers from the EOBR (device and/or support system) with the roadside inspection system (device and/or host support system). Many EOBR systems maintain near real-time communications with host support systems where data is securely managed and validated. Virtually all law enforcement conducting roadside inspections have network connectivity where information can be retrieved from a support system (or directly) with Internet file transfers. There are advantages with this approach: a- robust security and authentication capabilities are readily available, and b- information from the server has typically been validated with support system algorithms for completeness and accuracy. While wireless coverage could be an issue in a small number of cases, the option for obtaining data via a wired connection to the vehicle data bus would still exist.

   Use of WLAN and WPAN technologies for peer-to-peer wireless connections are not appropriate. These technologies have significant security vulnerabilities and are prone to connection management issues. WLAN is soon moving from 802.11g to 802.11n, and with 802.11p still in trials for vehicle Intelligent Transportation System applications. The Bluetooth SIG plans annual upgrades to its Bluetooth standards, and is also planning to upgrade to ultra wideband for WiMedia compatibility.

   If we project out 10 or more years, the Internet file data transfer approach is open to any changes and options in wireless communications standards, and has high probability of still working flawlessly. It is unclear what WLAN and WPAN technologies will be supportable in EOBRs and law enforcement systems.

There is also an issue with display requirements in the proposal rule. Displays come in many form factors, with various levels of capabilities, and may include vehicle

in-dash units. Notwithstanding display unit inconsistencies, if information reporting is effectively accomplished as outlined above, why are display unit requirements needed in information reporting? i.e., Why is a grid-graph and other information displays needed and viewable outside the cab? Any display unit requirements for roadside inspection are unnecessary and should be dropped from § 395.16. The consequences of requiring graphical displays and displays viewable from outside the cab is that this excludes some devices and in-dash displays that would otherwise be very capable systems – and since all data is provided electronically, the displays do not add value for roadside inspections.

Section (j) Driver identification.

For the driver to log into the EOBR, the EOBR must require the driver to enter information (such as user IDs and passwords, PIN numbers) that identifies the driver or to provide other information (such as smart cards, biometrics) that identifies the driver.

Comment: The log on procedure and methods identified are effective so long as there is effective security and identity management capabilities in the support system. The NPRM does not address security management and requirements for policies, practices, and audits. This goes beyond the capabilities of the support system, and should include requirements for the carrier and/or 3rd party performing these functions. While many enterprise-level carrier businesses routinely apply industry best practices for security management and administration, it is generally not the norm for small carriers and owner/operators. This is a major omission in the NPRM and should be addressed.

Section (k) Availability of records of duty status.

(1) An EOBR must be capable of producing duty status records for the current day and the previous 7 days from either the information stored in and retrievable from the EOBR or computer-generated records, or any combination of these.

(2) If an EOBR fails, the driver must do the following:

(i) Note the failure of the EOBR.

(ii) Reconstruct the record of duty status for the current day and the previous 7 days, less any days for which the driver has records.

(iii) Continue to prepare a handwritten record of all subsequent duty status until the device is again operational.

Comment: The definition of EOBR failure in item (2) is ambiguous. Does EOBR failure include all sensor failures? There are several "what if" scenarios for minor problems that prevent entries to be made, although the problem can be mitigated with a system reset or manual entry of some information. It would seem that managing all data on the EOBR whenever possible, with

annotations for sensor issues and any additional manual entries, would be preferable to reverting to manual RODS – more clarity is needed on this.

It is also noteworthy that there is no specification of the time required to notify the carrier of an EOBR failure, nor any time requirement for the carrier to resolve the problem. Again, clarity is needed.

Section (l) On-board information.

Each commercial motor vehicle must have onboard the commercial motor vehicle an information packet containing the following items:

(1) An instruction sheet describing how data may be stored and retrieved from the EOBR.

(2) A supply of blank driver's records of duty status graph-grids sufficient to record the driver's duty status and other related information for the duration of the current trip.

Comment: QUALCOMM agrees and supports the providing of instructional material.

Section (m) Submission of driver's record of duty status.

(1) The driver must submit electronically, to the employing motor carrier, each record of the driver's duty status.

(2) For motor carriers not subject to the remedies provisions of part 385 subpart F of this chapter, each record must be submitted within 13 days of its completion.

(3) For motor carriers subject to the remedies provisions of part 385 subpart F of this chapter, each record must be submitted within 3 days of its completion.

(4) The driver must review and verify that all entries are accurate prior to submission to the employing motor carrier.

(5) The submission of the record of duty status certifies that all entries made by the driver are true and correct.

Comment: QUALCOMM agrees.

Section (n) EOBR Display Requirements.

An EOBR must have the capability of displaying all of the following information:

(1) The driver's name and EOBR login ID number on all EOBR records associated with that driver, including records in which the driver serves as a co-driver.

(2) The driver's total hours of driving during each driving period and the current duty day.

(3) The total hours on duty for the current duty day.

(4) Total miles or kilometers of driving during each driving period and the current duty day.

(5) Total hours on duty and driving time for the 7-consecutive-day period, including the current duty day.

(6) Total hours on duty and driving time for the prior 8-consecutive-day period, including the current duty day.

(7) The sequence of duty status for each day, and the time of day and location for each change of duty status, for each driver using the device.

(8) EOBR serial number or other identification, and identification number(s) of vehicle(s) operated that day.

(9) Remarks, including fueling, waypoints, loading and unloading times, unusual situations, or violations.

(10) Acknowledgement of an advisory message or signal concerning HOS limits.

(11) Override of an automated duty status change to driving if using the vehicle for personal conveyance or for yard movement.

(12) Date and time of crossing a State line (for purposes of fuel-tax reporting).

Comment: The requirement of item (10) is problematic as drivers may not acknowledge an advisory message. In such cases, what would then be required? This should not be a requirement.

The requirement of item (12) for state line crossing data is inconsistent with other HOS information requirements and should not be a requirement.

Section (o) Performance of recorders.

A motor carrier that uses EOBRs for recording drivers' records of duty status instead of the handwritten record must ensure the EOBR meets the following requirements in order to address all hours-of-service requirements in effect as of October 24,2005:

(1) The EOBR must permit the driver to enter information into the EOBR only when the commercial motor vehicle is at rest.

(2) The EOBR and associated support systems must, to the maximum extent practicable, be tamper resistant. The EOBR must not permit alteration or erasure of the original information collected concerning the driver's hours of service, or alteration of the source data streams used to provide that information.

(3) The EOBR must be able to perform a power-on self-test, as well as a self-test at any point upon request of an authorized safety assurance official. The EOBR must provide an audible and visible signal as to its functional status. It must record the outcome of the self-test and its functional status as a diagnostic event record in conformance with Appendix A of this part.

(4) The EOBR must provide an audible and visible signal to the driver at least 30 minutes in advance of reaching the driving time limit and the on-duty limit for the 24-hour period.

(5) The EOBR must be able to track total weekly on-duty and driving hours over a 7- or 8-day consecutive period. The EOBR must be able to warn a driver at

least 30 minutes in advance of reaching the weekly duty / driving-hour limitation.

(6) The EOBR must warn the driver via an audible and visible signal that the device has ceased to function.

(7) The EOBR must record a code corresponding to the reason it has ceased to function and the date and time of that event.

(8) The audible signal must be capable of being heard and discerned by the driver when seated in the normal driving position, whether the CMV is in motion or parked with the engine operating. The visual signal must be visible to the driver when the driver is seated in the normal driving position.

(9) The EOBR must be capable of recording separately each driver's duty status when there is a multiple-driver operation.

(10) The EOBR device / system must identify sensor failures and edited and annotated data when downloaded or reproduced in printed form.

(11) The EOBR device / system must identify annotations made to all records, the date and time the annotations were made, and the identity of the person making them.

(12) If a driver or any other person annotates a record in an EOBR or an EOBR support system, the annotation must not overwrite the original contents of the record.

Comment: With regard to item (1), we agree that the driver can only make entries when the vehicle is at rest. However, if a co-driver is also logged on, it should be appropriate for the co-driver to make entries pertaining to the co-driver. Clarification is needed on this point.

Item (2) identifies a requirement for EOBR systems to be tamper-resistant, but this is an incomplete security specification and there do not appear to be any other security requirements in the NPRM. There are significant security vulnerabilities that go beyond tamper-resistance properties of EOBR systems. Security requirements should additionally address:

- Security management, driver identity and log-on administration, system access controls, and security audits as provided by carriers and/or 3rd parties.
- Security issues and authentication requirements with electronic data transfers.
- Procedural and management controls for changes in software, hardware, and data recovery/restoration with EOBR systems.

It is also important to note that security threats will evolve over time and require an on-going effort to ensure that effective protection measures are applied. For this reason, it is recommended that the security requirements be addressed by an industry standards organization and with the regulation providing the performance requirements and not the security specifications.

Item (6) requiring an alert after the EOBR device has failed could be impossible if the EOBR unit has lost power or memory has failed. This should be clarified to indicate an alert is required when sensor failures or EOBR system failures can be detected.

Section (p) Motor Carrier Requirements.

(I) The motor carrier must ensure that the EOBR is calibrated, maintained, and recalibrated in accordance with the manufacturer's specifications; the motor carrier must retain records of these activities.

(2) The motor carrier's drivers and other personnel reviewing and using EOBRs and the information derived from them must be adequately trained regarding the proper operation of the device.

(3) The motor carrier must maintain a second copy (back-up copy) of the electronic hours-of-service files, by month, on a physical device different from that on which the original data are stored.

(4) The motor carrier must review the EOBR records of its drivers for compliance with part 395.

Comment: Requirements for carriers should also address security management for EOBR systems (as noted above) and should provide criteria for when 3rd party services must be used if carriers do not have appropriate resources for security management. The requirements should also address requirements for 3rd party services in providing the security management functions.

Appendix A to Part 395-Electronic On-Board Recorder Performance Specifications

1. Data Elements Dictionary for Electronic On-Board Recorders (EOBRs)

Section 1.1 *To facilitate the electronic transfer of records to roadside inspection personnel and compliance review personnel, and provide the ability of various third-party and proprietary EOBR devices to be interoperable, a consistent electronic file format and record layout for the electronic RODS data to be recorded are necessary. This EOBR data elements dictionary provides a standardized and consistent format for EOBR output data. EOBR Database Concept*

Comment: The data requirements should be revised subject to several of the recommendations made. Additional considerations should also be made to identify controls and associated parameters to ensure data integrity and security with the data transfer.

Section 1.2 *Regardless of the particular electronic file type (such as ASCII or XML) ultimately used for recording the electronic RODS produced by an EOBR, RODS data must be recorded according to a "flat file" database model. A flat file*

is a simple database in which all information is stored in a plain text format with one database "record" per line. Each of these data records is divided into "fields" using delimiters (as in a comma separate-values data file) or based on fixed column positions. Table 1 below presents the general concept of a flat data file consisting of data "fields" (columns) and data "records" (rows).

Table 1: Flat Data File Database Model

FIELDS RECORDS

Comment: The use of XML or other file formats should be considered for Internet file transfers. It is also recommended that the specifications be deferred to an industry standards approach to address any on-going changes in security, technology, or data requirements. The regulation does not seem an appropriate place for managing file specifications.

Section 1.3 *The data elements dictionary describes the data fields component of the above framework. Individual data records must be generated and recorded whenever there is a change in driver duty status, an EOBR diagnostic event (such as power-on/off, self test, etc.), or when one or more data fields of an existing data record are later amended. In the last case, the corrected record must be recorded and noted as "current" in the "Event Status Code" data field, with the original record maintained in its unedited form and noted as "historical" in the "Event Status Code" data field. The EOBR Data Elements*

Dictionary is described in Table 2. The event codes are listed in Table 3.

Table 2: EOBR Data Elements Dictionary

(see NPRM document for table definitions)

Comment: The data dictionary may be better left to an industry standards approach as described in our comments to section 1.2 above.

2. Communications Standards for the Transmittal of Data Files from Electronic On-Board Recorders (EOBRs)

Section 2.1 *EOBRs must produce and store RODS in accordance with the file format specified in this Appendix and must be capable of a one-way transfer of these records through wired and wireless methods to authorized safety officials upon request.*

Comment: If electronic inspections are to be required, than an effective approach is needed that will be insulated from technological change. See the comments above in Section (i) – Information reporting requirements.

Section 2.2 EOBRs must be capable of transferring RODS using one of the following wired standards:

2.2.1 Universal Serial Bus 2.0

2.2.2 RS-232.

Comment: Use of USB or a serial port would not be appropriate. USB was developed to replace serial ports and their associated problems with pin configurations and software driver requirements. USB standards are also evolving to wireless USB, a form or ultra wideband that will compete with other ultra wideband standards. As we project into the future, it is uncertain how long USB and serial port standards can be supported in EOBRs and law enforcement systems. The USB and serial port configurations are also subject to serious security vulnerabilities and would increase complexity in assuring tamper-resistant systems.

For a wired data transfer, we recommend use of the vehicle data bus for data transfer from the EOBR device to roadside inspection device. This approach is similar to that used for OBD emissions inspections. The methods and protocols for this connection have already been standardized. These standards will be maintained as any new requirements or technology is developed for obtaining data via the vehicle's data bus. Additional security standards are required to ensure proper authentication between devices and data transfer security – and it is recommended that security be addressed through industry standards and not the regulation.

Section 2.3 EOBRs must be capable of transferring RODS using one of the following wireless standards :

2.3.1 Institute of Electrical and Electronics Engineers (IEEE) 802.11 g

2.3.2 Bluetooth

Comment: Use of WLAN and WPAN technologies for peer-to-peer wireless connections are not appropriate. These technologies have significant security vulnerabilities and are prone to connection management issues. WLAN is soon moving from 802.11g to 802.11n, and with 802.11p still in trials for vehicle Intelligent Transportation System applications. The Bluetooth SIG plans annual upgrades to its Bluetooth standards, and is also planning to upgrade to ultra wideband for WiMedia compatibility.

For wireless data transfer, we recommend use of the Internet for transfers from the EOBR (device and/or support system) with the roadside inspection system (device and/or host support system). Many EOBR systems maintain near real-time communications with host support systems where data is securely managed and validated. Virtually all law enforcement conducting roadside inspections have network connectivity where information can be retrieved from a support system (or directly) with Internet file transfers. There are advantages with this approach: a- robust security and authentication capabilities are readily available, and b- information from the server has typically been validated with support system algorithms for completeness and accuracy. While wireless coverage could be an issue in a small number of cases, the option for obtaining data via a wired connection to the vehicle data bus would still exist.

3. Certification of EOBRs to Assess Conformity with FMCSA Standards

3.1 The following outcome-based performance requirements must be included in the self-certification testing conducted by EOBR manufacturers:

Section 3.1.1 Location *-*

3.1.1.1 The location description for the duty status change must be sufficiently precise (within 300 meters) to enable enforcement personnel to quickly determine the vehicle's geographic location at each change of duty status on a standard map or road atlas

3.1.1.2 When the CMV is in motion, location and time must be recorded at intervals of 1 minute. This recorded information must be available for an audit of EOBR data, but is not required to be displayed on the EOBR's visual output device.

3.1.1.3 Location codes derived from satellite or terrestrial sources, or a combination thereof must be used. The location codes must correspond, at minimum, to the Census Bureau 2000 Gazetteer "County Subdivision" data.

Comment: As discussed in our comments to Section (f) – Location, there are issues with the requirements as stated in the NPRM. These issues include:

- Recording position histories at 1 minute intervals should not be required when vehicle motion and mileage is determined through a synchronized, tamper-resistant interface with vehicle sensors. We agree that minute-by-minute GPS locations should be used when driving time and mileage are solely determined with the GPS location data, but the requirement for such detailed location histories should not extend to proven reliable systems that obtain mileage from an electronic odometer.
- Position histories should, at a minimum, should only reflect locations at change of duty status. This is a significant improvement from 395.15 where location was manually entered and not determined via satellite fix. If carriers choose to apply position history data in lieu of supporting documents subject to the expected new HOS supporting documents final rule, then position history data should also comply the requirements of that rule.
- There are many map sources for determining location names, with many of them proving to be quite accurate and reliable. It is not clear what is required with "correspond to Census Bureau 2000 Gazetteer "County Subdivision" data" and whether that referenced source is the most up to date. More clarification is needed on this point.

Section 3.1.2 Distance traveled

3.1.2.1 Distance traveled may use units of miles or kilometers driving during each on-duty driving period and total for each 24-hour period for each driver operating the CMV.

3.1.2.2 If the EOBR records units of distance in kilometers, it must provide a means to display the equivalent distance in English units.

3.1.2.3 If the EOBR obtains distance-traveled information from a source internal to the CMV, the information must be +/- 1 percent accurate to an odometer calibrated per 24-hour period.

3.1.2.4 If the EOBR obtains distance-traveled information from a source external to the CMV, the information recorded must be accurate to within +I- 1 percent of actual distance traveled per 24-hour period as measured by a calibrated odometer.

Comment: As discussed in our comments to Section (g) – Distance Traveled, the requirement for mileage accuracy is unrealistic. SAE standard J1226 – electric speedometer specification for on road vehicles allows ± 4% odometer error. The standard also notes that the design limits should not be construed as absolute under all operating conditions.

It is recommended that the mileage determination tolerance apply solely to GPS-based mileage determination. The tolerance should allow ± 5% error for consistency with realistic expectations of odometer results.

Section 3.1.3 Date and time

3.1.3.1 The date and time must be reported on the EOBR output record and display for each change of duty status and at such additional entries as specified under "Location."

3.1.3.2 The date and time must be obtained, transmitted, and recorded in such a way that it cannot be altered by a motor carrier or driver.

3.1.3.3 The time must be coordinated to the Universal Time Clock (UTC) and must not drift more than 60 seconds per month

Comment: As discussed in our comments to Section (e) – Date and Time, we recommend that EOBRs with mobile communications synchronize date and time with a proven reliable external source such as the wireless network or the GPS signal, as this will consistently provide accurate date and time stamps in a manner that cannot be altered by the carrier, driver or third party.

For EOBRs that do not synchronize date and time with a trusted external source, we recommend that the requirement specify a calibration period for the internal clock, with accuracy tolerance consistent with calibration period, e.g., EOBR internal clocks must be calibrated at least at three month intervals with clock drift not to exceed three minutes.

Section 3.1.4 File format and communication protocols:

The EOBR must produce and transfer a RODS file in the format and communication methods specified in sections 1 .O and 2.0 of this Appendix.

Comment: We recommend that the file transfer formats and communication methods are not specified in the regulation, but rather are left to an industry

standards organization that assure on-going updates when changes are necessitated by evolution in information requirements, device technology, communications technology, and security requirements.

Section 3.1 .5 Environment

3.1.5.1 Temperature - The EOBR must be able to operate in temperatures ranging from -20 degrees F to 120 degrees F.

3.1.5.2 Vibration and shock - The EOBR must meet industry standards for vibration stability and for preventing electrical shocks to device operators.

Comment: We recommend that environmental requirements defer to industry standards for comparable equipment and not be specified in the regulation. Specifically, SAE standard J1455 – Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications should be referenced.

Section 3.2 *The EOBR and EOBR support systems must be certified by the manufacturer as evidence that their design has been sufficiently tested to meet the requirements of 5 395.16 under the conditions in which they would be used.*

3.3 The exterior faceplate of EOBRs must be marked by the manufacturer with the text 'USDOT-EOBR' as evidence that the device has been tested and certified as meeting the performance requirements of 5 395.16.

Comment: We agree with the manufacturer self-certification approach. EOBRs are complex and often unique systems as the automated HOS tracking is often an application in a broader suite of fleet management and telematics applications. The self-certification approach is consistent with 395.15 and should be continued.

The use of a faceplate is a weak requirement. We recommend that device authentication standards are used and managed to assure that only certified systems are being used.

4. Example of Grid Generated from EOBR Data

Section 4.1 *The following picture shows an acceptable format for grid versions of logs generated by EOBR data.*

[INSERT GRAPHIC #1 HERE]

Comment: The requirement for a grid-graph display is unnecessary and should be eliminated. Complete information for roadside inspection is available through wired and wireless electronic data transfer.

Also, since the format specification does not address requirements for display size, character resolution, scrolling and navigation, it is doubtful how useable this display would be.

V. **Conclusion**.

In sum, QUALCOMM is in favor of the proposed § 395.16 rules adopting performance standards for EOBRs rather than technical specifications. This allows motor carriers the flexibility of selecting from a variety of different technologies to meet the regulatory requirements established by the FMCSA. However, we believe that a number of changes are needed to the technical performance requirements set forth in the NPRM to further improve the stated goals of safety and HOS compliance. In addition, such changes to some of the tolerance standards are necessary to bring them into conformity with currently available, practical and affordable technology in the industry.

TMC EOBR Task Force
Technical Policy Advisory for the EOBR NPRM
March 15, 2007

Introduction

This Technical Policy Advisory report has been prepared by a working group of the TMC S.12 EOBR Task Force. The working group members have developed the comments and recommendations, with their input based on a wide range of industry experience and the body of knowledge that was created in preparing a draft recommended engineering practice: TMC RP 1219T – Guidelines for Electronic On-board Recorders ("RP 1219T").

This document includes a summary of comments that reflect the key areas that must be addressed for a more effective and workable rule for EOBRs. The working group has also prepared detailed comments and recommendations for each sub-section requirement in the 395.16 NPRM.

The working group was formed on an open and voluntary basis at the EOBR Task Force meeting conducted with the TMC 2007 Annual Meeting. The working group has met in a series of closed session conference calls to provide comments in less than six weeks (from the initial meeting in Tampa) in order to provide timely input to ATA as it prepares its comments to FMCSA on this matter.

Summary of Comments

EOBRs not synchronized with the vehicle for mileage data capture should not be allowed.

- The EOBR Task Force has concluded that lack of a synchronized link between the EOBR and vehicle for movement detection and mileage capture is in general too vulnerable to manipulation, particularly when the driver powers off the device and then drives.
- If FMCSA or others can define requirements for effective controls to prevent vulnerabilities, then this approach should be considered – but the proposed rule does not provide such controls (nor could the EOBR Task Force identify such controls in developing RP 1219T).
- If EOBRs are allowed without vehicle synchronization for odometer data such that mileage is calculated only with GPS position data, then the minute-by-minute location history should only be required for purposes of auditing GPS-based mileage accuracy.

EOBR capabilities to support roadside inspection should be simplified with electronic inspections and leverage more long-term viable technology capabilities.

- Graphical displays (for grid-graphs) and display units viewable outside the cab should not be required if electronic data transfer is available for roadside inspection. The NPRM requirements for displays, as now stated, would eliminate legacy text based display units as well as next generation in-dash displays from what would otherwise be very capable systems.
- Wired electronic data transfer should be made via the vehicle's data bus similar to OBD emissions inspections versus USB or serial connections that may become outdated or more difficult to tamper-proof. This approach could also reference TMC RP 1210 – Serial Communications Application Program Interface for additional device, connection, and protocol guidelines in using the vehicle data bus. RP 1210, first issued in 1997, defines a communication standard between the on-vehicle data bus and generic PC application software programs. An authentication approach per the security requirements is also needed.

- Wireless electronic data transfers should include Internet transfers from authenticated secure servers or vehicle systems. Bluetooth and 802.11 are not recommended as these communication methods are prone to connection management and security issues as well as changes in the technical standards.

  The wireless communications approach could also reference the guidelines provided in TMC RP 1216 – Vehicle-to-Office Data Communications Standard for available approaches for vehicle communications. RP 1216, adopted in 2004, brings efficiencies to the industry since it puts aside any proprietary communications protocols and allows for wireless communications – via radio frequency, infrared, satellite, cellular, or WLAN – between a trucking company's back office and its fleet.

EOBR security requirements need broader specifications.

- "Tamper-resistant to the maximum extent practical" is only a partial security requirement as some security vulnerabilities are outside the control of the EOBR system. The security requirements also need to address:
  - Carrier and/or 3rd party policies and procedures for identity management, security administration of access controls, and security audits;
  - Vulnerabilities and authentication in electronic data transfer; and
  - Controls for EOBR access with changes in software, hardware, and data recovery/restoration.

Location tracking history data should be consistent with other HOS rules.

- Location reports should be created at each change in duty status consistent with manual RODS.
- If EOBRs are to be used in meeting the proposed requirements for electronic supporting documents, requirements would also include: "regular time and CMV location position histories sufficient to verify adequately a driver's on-duty driving activities" or other requirements as specified in the forthcoming HOS supporting documents final rule.
- There should not be a requirement for minute-by-minute location histories. (Note exception for EOBRS not synchronized with the vehicle as discussed above.)

EOBR supplier self-certification is advised.

- The EOBR Task Force has explored a potential approach for a "strong self-certification" with requirements for supplier declaration of conformity that is subject to standardized documentation requirements and audit, with a recognized registry of conforming systems. This strong self-certification approach is consistent with ISO/IEC 17050 Conformity assessment -- Supplier's declaration of conformity -- Part 1: General, and -- Part 2: Supporting documentation requirements. However, this approach also requires an authority (government or industry entity) to audit supporting materials of such declarations and to maintain a registry, and such an authority does not currently exist.

Mileage accuracy should be consistent with industry odometer standards. (Not ± 1%)

- SAE standard J1226 – ELECTRIC SPEEDOMETER SPECIFICATION—ON ROAD allows ± 4% odometer error. The standard also notes that the design limits should not be construed as absolute under all operating conditions.
- Odometers should be maintained and calibrated consistent other HOS rules as well as with manufacturer specifications.
- Odometer accuracy is outside the control of the EOBR supplier and excessive calibration requirements will create operational and economic issues for carriers.

EOBR internal clock accuracy needs to be realistic and the requirement needs to address how it is managed.

- RP 1219T recommends clock drift be checked with calibration at least every 3 months. At each calibration, an adjustment should be made to correct for any clock drift from standard UTC time. Clocks that are determined to drift more than an average of one minute per month must be repaired or replaced.
- EOBRs with mobile communications and/or GPS may recalibrate with or use calibrated network or GPS time on a continuous basis.
- Clock resets and recalibration adjustments must be made only by a trained technician. If adjustments exceed the allowable threshold, a record of sensor failure must be made.

Data capture and data integrity requirements need better definition and improved usability.

- Driver and back office records amendment ("annotation") process needs to be more thoroughly defined and practical for the most common use cases to ensure completeness and accuracy by drivers in submitting their electronic logs. It also needs to address amendments made with the back office support system. RP 1219T outlines a recommend process that better ensures data accuracy and accountability.
- Automated recording of duty status changes and effective recording of overrides need more specificity to address yard moves and stopped in traffic scenarios.

Other miscellaneous suggested changes . . .

- Clarification of data requirements for multiple trailers and intermodal chasses and containers.
- More specificity in performance requirement for driver reporting and carrier correction of EOBR system and sensor failures.
- Eliminate the requirement for a driver's input to acknowledge warning of HOS limits. This requirement is unnecessary and is ambiguous if the driver does not acknowledge the warning.
- Eliminate the requirement for automated recording of state line crossing events. This is unnecessary and inconsistent with other HOS rules.

Detailed Comments

The comments below identify issues and provide recommendations relative to the detailed requirements of the proposed 395.16 rule. References to alternative approaches as defined in RP 1219T are provided where applicable.

395.16 Requirements	**Comments / Issues**
(a) Applicability. This section applies to electronic on-board recording devices (EOBRs) used to record the driver's hours of service as specified by part 395. For commercial motor vehicles manufactured after [INSERT DATE 2 YEARS AFTER PUBLICATION OF FINAL RULE], any electronic device installed in a CMV by a manufacturer or motor carrier to record hours of service must meet the requirements of this section.	"FMCSA proposes to allow AOBRDs voluntarily installed in CMVs manufactured up to 2 years after the effective date of a final rule to be used for the remainder of the service life of the CMVs in which they are installed." It is important to keep this provision to avoid disincentives for continuing adoption of EOBRs.
(b) Information to be recorded. An EOBR must record the following information: (1) Name of driver and any co-driver(s), and corresponding driver identification information (such as user IDs and passwords, PIN numbers, smart cards, or biometrics). (2) Duty status. (3) Date and time. (4) Location of CMV. (5) Distance traveled. (6) Name and USDOT number of motor carrier. (7) 24-hour period starting time (e.g., midnight, 9:00 a.m., noon, 3:00 p.m.). (8) The multi-day basis (7 or 8 days) used by the motor carrier to compute cumulative duty hours and driving time. (9) Hours in each duty status for the 24-hour period, and total hours. (10) Truck or tractor and trailer number. (11) Shipping document number(s), or name of shipper and commodity	(10) Clarifications are needed. If multiple trailers, are all trailer numbers needed? Also, need clarity on requirements related to intermodal chassis and containers, and whether container number is needed as well as chassis number – based on new proposed rule: "49 CFR Parts 385, 386, et al. Requirements for Intermodal Equipment Providers and Motor Carriers and Drivers Operating Intermodal Equipment; Proposed Rule"

395.16 Requirements	**Comments / Issues**
(c) Duty status categories. An EOBR must use the following duty statuses: (1) "Off duty" or "OFF", or other identifiable code or character. (2) "Sleeper berth," or "SB" or other identifiable code or character, to be used only if sleeper berth is used. (3) "Driving," or "D" or other identifiable code or character. (4) "On-duty not-driving" or "ON" or other identifiable code or character.	There is potential for inconsistency in duty status codes if other "identifiable codes" are used (such as in identified in Appendix A). Recommend consistent codes (i.e., OFF, SB, D, ON) only which was the consensus in developing RP 1219T.
(d) Duty status defaults. (1) An EOBR must automatically record driving time. (2) When the CMV is stationary for 15 minutes or more, the EOBR must default to on-duty not-driving, and the driver must enter the proper duty status. (3) An EOBR must record the results of power-on self-tests and diagnostic error codes.	The system should be required to alert the driver of each automatic change in duty status (e.g., from "D" to "ON") to confirm that the correct duty status is applied. The driver should be allowed to override the automatic duty status change (e.g., to keep driving status when stopped in traffic or when performing auxiliary functions while at the vehicle controls, as well as to indicate "ON" with yard moves). An override to automatic duty status change must add log records of such overrides (data to include location), and the parameters for automatic duty status change must be reset as the override is entered (with multiple overrides then possible for long traffic delays or extended periods of yard moves. 395.16 (d) is not specific for "automatically recording of driving time. – Threshold for distance of movement should be allowed based on carrier specifics to cover yard movement (if yard moves are considered on-duty not driving – to be clarified). – The 15 minute threshold for stationary status (no longer driving) seems excessive and this needs to specify that the time stamp for duty status change is at the start of threshold timing. A recommended approach in RP 1219T defines duty status changes as: "To Driving: Vehicle moved more than 1 mile (movement determined from data bus if available) and driving status recorded as the start time of vehicle movement. Note: If a

395.16 Requirements	Comments / Issues
	vehicle moves less than 1 mile, a 5 minute stop resets the movement threshold. To On-duty, Not Driving (from Driving status): Vehicle stopped for more than 5 minutes (stop determined as 0 MPH from data bus if available) or if engine off is detected. The time recorded for the change to on-duty, not driving will be the start time of the 5 minute interval." Other approaches to managing "yard moves" may be considered. 395.16 (n)(11) covers display requirements for driver override for yard moves and personal conveyance, but no method is specified for how and when this may be input.
(e) Date and time. (1) The date and time must be reported on the EOBR output record as specified under paragraph **(f)** of this section and displayed at each change of duty status. (2) The date and time must be obtained, transmitted, and recorded in such a way that it cannot be altered by a motor carrier, driver, or third party. (3) The driver's duty status record must be prepared, maintained, and submitted 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. (4) The time must be coordinated to UTC and must not drift more than 2 seconds per day. The absolute deviation from the time base coordinated to UTC shall not exceed 10 minutes at any time.	(4) The requirement "time must be coordinated to UTC and must not drift more than 2 seconds per day" appears to be overkill for a clock accuracy performance requirement. There is also some ambiguity in this requirement: Frequency of clock calibration or audit? Action if out of tolerance? Impact on prior records? If manual RODS are even partly used – what are the clock requirements? There do not appear to any consequences if a clock is found to be out of calibration, but it would seem reasonable to require records to be maintained of clock calibration events and adjustments made. RP 1219T recommends clock drift be checked with calibration at least every 3 months. At each calibration, an adjustment should be made to correct for any clock drift from standard UTC time. Clocks that are determined to drift more than an average of one minute per month must be repaired or replaced. EOBRs with mobile communications and/or GPS may recalibrate with or use calibrated network or GPS time on a continuous basis. Clock resets and recalibration adjustments must be made only by a trained technician. If adjustments exceeding the allowable threshold, a record of sensor failure must be made.

395.16 Requirements	**Comments / Issues**
(f) Location. (1) Information used to determine the location of the CMV must be derived from a source not subject to alteration by the motor carrier or driver. (2) The location description for the duty status change must be sufficiently precise to enable enforcement personnel to quickly determine the vehicle's geographic location at each change of duty status on a standard map or road atlas. (3) When the CMV is in motion, location and time must be recorded at intervals no greater than 1 minute. This recorded information must be capable of being made available in an output file format as specified in Appendix A of this part, but does not need to be displayed on the EOBR's visual output device. (4) For each change of duty status (e.g., the place and time of reporting for work, starting to drive, on-duty not-driving, and where released from work), the name of the nearest city, town, or village, with State abbreviation, must be recorded. (5) The EOBR must use location codes derived from satellite or terrestrial sources, or a combination of these. The location codes must correspond, at a minimum, to the Census Bureau 2000 Gazetteer "County Subdivision" data.	(1) GPS is not tamper-proof. There are several factors that may occur naturally* to prevent an accurate GPS reading. Then there are intentional acts such as shielding the antenna with metal or using a noisy RF transmitter to corrupt the signal. If the GPS signal is not available when required, what is the remedy? Use of manual RODS does not appear to be appropriate. Rather, drivers should allowed to manually enter location data for the electronic records (with a notation of manual location data) when GPS is not available. * Reference: Oregon Department of Transportation: TECHNOLOGY DEVELOPMENT AND SYSTEM INTEGRATION FOR A VEHICLE MILES TRAVELED BASED REVENUE COLLECTION SYSTEM PROTOTYPE Final Report see: http://www.oregon.gov/ODOT/HWY/OIPP/docs/2004FinalReport.pdf "Inaccuracies are caused by a combination of initial signal acquisition time and a loss of the GPS signal while driving." "Forested and Mountainous 75% accurate/available Urban Area (Portland) 94% accurate/available" ". . . test of the fixed wireless reader (antenna) was covered with a piece of aluminum foil . . . was completely effective in blocking the signal." (3) Minute-by-minute location recording is a new information requirement for HOS accountability. There are fundamental problems with this: a- If the purpose is provide an effective audit of mileage accuracy for EOBRs using GPS data for mileage where the device is not synchronized with the vehicle ECM odometer, then do not the not synchronized with vehicle approach. Systems not integrally synchronized with the vehicle are prone to inaccuracies due to devices not being powered on. This scenario effectively enables the driver to control when the system is used to automate data capture and therefore the system cannot be considered any more reliable than paper RODS. The result is detrimental to the credibility of EOBR systems. If FMCSA adds requirements for controls to prevent the

395.16 Requirements	Comments / Issues
	vulnerabilities with "untethered" EOBRs, then the minute-by-minute location tracking should only apply to such systems and the data should only be used to audit mileage accuracy. b- It is reasonable to expect that many drivers will strongly resist the recording of such detail as minute-by-minute position reports in tracking their daily activity. It is then more likely that GPS tampering will occur (in a way that is not easily distinguished from natural GPS signal blockage) to the extent where manual RODS must be used. If such behavior develops, then EOBRs will be seen as very ineffective and unreliable systems. For purposes of driver tracking as an audit of distance traveled, the requirement should be the same as for manual RODS (i.e., at change of duty status), and consistent with the new supporting documents rule where electronic location history records are used in lieu of supporting documents to support driving time . If GPS is not available when needed, then a position report should be created at first availability of the GPS signal. Supporting Documents Rule: Under this proposed rule, FMCSA also would provide partial relief from HOS supporting documents requirements for carriers that voluntarily use EOBRs, provided certain conditions are satisfied. EOBRs meeting the proposed requirements produce regular time and CMV location position histories sufficient to verify adequately a driver's on-duty driving activities. Carriers voluntarily maintaining the time and location data produced by such devices would need to maintain only those additional supporting documents as are necessary to verify on-duty not-driving activities and off-duty status. However, the rule's requirement for position history frequency is not specified, and minute-by-minute would be problematic and should not be required.

395.16 Requirements	Comments / Issues
(g) Distance traveled. (1) Distance traveled must use units of miles or kilometers driving during each on-duty driving period and total for each 24-hour period for each driver operating the CMV. (2) If the EOBR records units of distance in kilometers, it must provide a means to display the equivalent distance in miles. (3) If the EOBR obtains distance-traveled information from a source internal to the CMV, the information must be accurate to the distance traveled as measured by the CMV's odometer. (4) If the EOBR obtains distance-traveled information from a source external to the CMV, the information recorded must be accurate to within *+I-* 1 percent of actual distance traveled over a 24-hour period as measured by the CMV's odometer.	3) Appendix A 3.1.2 "Distance traveled" specifies that odometers must achieve accuracy with less than +/- 1% error . This effectively establishes a new odometer accuracy standard for the industry which raises some questions. …The Society of Automotive Engineers standard is plus or minus 4% in odometer error, and notes that this not absolute as some operating conditions may create a larger error. Why is a higher standard needed? The National Highway Traffic Safety Admin says it doesn't regulate odometer accuracy. How is FMCSA now the authority for odometer accuracy requirements? (4) For systems capturing mileage data from GPS readings and not the ECM, there are risks that such systems may not be operational (i.e., not powered on) or that they may be out of coverage for an extended period. The TMC EOBR Task Force has discussed this issue at length and does not believe such risks can be effectively mitigated. Therefore, it is recommended that such systems should not be allowed under the proposed rule.
(h) Review of information by driver. (1) The EOBR must allow for the driver's review of each day's record before the driver submits the record to the motor carrier. (2) The driver must review the information contained in the EOBR record and affirmatively note the review before submitting the record to the motor carrier. (3) The driver may annotate only non-driving-status periods, and may do so only immediately prior to the first driving period of the day and immediately following the last driving period of the day. The driver must electronically confirm his or her intention to make any annotations. (4) If the driver makes a written entry on a hardcopy output of an EOBR relating to his or her duty status, the entries must be legible and in the driver's own handwriting.	(3) The requirement for "annotations" is ambiguous and incomplete. The draft RP provides a more thorough set of requirements for driver review and submission of records. A recommended approach in RP 1219T includes the following: "EOBR systems will permit driver initiated HOS record amendments prior to "certification" of the HOS record at the end of each 24-hour period as defined by the carrier. Record amendments by the driver will be limited to: Corrections for Previous Entries or Omissions (not Driving Status Records): – Entering on-duty, not driving time prior to access to EOBR system. Examples include: warehouse, dock time, office time. – On-duty, not driving time at an additional (non-related) carrier, such as own CMV or additional non-driving secondary place of employment. – Shipping Documentation – Shipping document number(s) or related information is

395.16 Requirements	Comments / Issues
	missing or incorrect. – Trailer Number – Trailer number is missing or incorrect. – Driver Manual Duty Status Selection – Driver selects an incorrect duty status (example: off duty (OFF) rather than sleeper berth (SB)) – Automated Duty Status: Correction for EOBR automatically places the driver in an incorrect non-driving duty status. This does not permit the amendment of automated driving status. – Records Correction: Update or of location, time and or information requirements to duty status records other than "Driving" status records. Correction when Driver Fails to Log-on Before Driving: – EOBRs will enable assignment of driving time ("Miles Without Hours") for the event when a driver forgets to log onto EOBR at beginning of shift and begins driving. The EOBR on-board unit will detect "engine on" status from the ECM interface and prompt (via audible signal, display screen message, or printed message) that the driver needs to log-on. If the driver fails to log-on, the on-board EOBR unit will continue to perform its required functions for automatic data capture. When the vehicle stops, the EOBR on-board unit will again prompt that the driver needs to log-on. If the driver does log-on, the system will allow the driver to confirm that the immediate prior driving time will be recorded for the driver. If the driver does not accept the driving status update, the EOBR will record a "system error" for the driving status data that is not assignable to the driver (due to no driver logged on). Such system errors will be included among any sensor failure records and attached with driver records for drivers using the vehicle immediately before and after the system error occurred. Note: the carrier is responsible for determining correct assignment of driving time when a driver fails to log-on and driving has occurred, and is responsible to enter an "office amendment" to the HOS records for the appropriate driver.

395.16 Requirements	Comments / Issues
	EOBR systems will permit record amendments by back office/safety management personnel to correct records due to driver errors and omissions (records not amended by the driver), data errors due to sensor failures, EOBR system errors, and/or EOBR system failures. Note: For EOBRs used by owner-operators, the owner operator will perform the functions as identified for safety management personnel. Any record amendments made by the driver or by back office/safety management personnel (or owner-operators) should include remarks describing the reason for the amendment. The record amendments will be maintained in an audit trail by the EOBR system that includes original record data, amendment change to data, identification of person making the amendment, and date/time of the amendment."
(i) Information reporting requirements. (1) An EOBR must make it possible for authorized Federal, State, or local officials to immediately check the status of a driver's hours of service. (2) An EOBR must produce, upon demand, a driver's hours-of-service chart using a graph-grid format in either electronic or printed form in the manner described in *5* 395.8 and a digital file in the format described in Appendix A of this part. The chart must show the time and sequence of duty status changes including the driver's starting time at the beginning of each day. (3) This information may be used in conjunction with handwritten or printed records of duty status for the previous 7 days. (4) The information displayed on the device must be made accessible to authorized Federal, State, or local safety assurance officials for their review without requiring the official to enter in or upon the CMV. The output record must conform to the file format specified in Appendix A of this part. (5) The driver must have in his or her possession records of duty status for the	(2) The requirement for "grid-graph" display enables the legacy compliance inspection process relative to paper RODS, while the "digital file format" approach enables a new electronic inspection process. It is also noteworthy that if EOBRs are effective in recording driver HOS status, then a simple summary of hours by duty rules should suffice for compliance determination. The grid-graph and digital file format serve to enable a more detailed audit of the records to examine for data inconsistencies or to more closely examine any record amendments or sensor issues. A basic question, however, is: why are both display and data transfer capabilities required to support roadside audit of records – why not one or the other? In addition to the cost factor, the practical issues are this: a- The grid graph requires a unit with a graphical display capability that is viewable outside the cab. Many vehicle on-board systems are designed for text messaging and text displays. The graphical display requirement eliminates such devices, and the viewable for outside the cab requirement eliminates in-dash displays from supporting an EOBR application, although both display types may be fully capable in every other respect. Why is this graphical display that is

395.16 Requirements	Comments / Issues
previous 7 consecutive days available for inspection while on duty. These records must consist of information stored in and retrievable from the EOBR, handwritten records, other computer-generated records, or any combination of these. Electronic records must be transferable to portable computers used by roadside safety assurance officials and must provide files in the format specified in Appendix A of this part. The communication information interchange methods must comply with the requirements of RS 232, USB 2.0, IEEE 802.1 1(g), and Bluetooth. (6) Support systems used in conjunction with EOBRs at a driver's home terminal or the motor carrier's principal place of business must be capable of providing authorized Federal, State, or local officials with summaries of an individual driver's hours of service records, including the information specified in $ 395.8(d). The support systems must also provide information concerning on-board system sensor failures and identification of amended and edited data. Support systems must provide a file in the format specified in Appendix A of this part. The system must also be able to produce a copy of files on portable storage media (CD-RW, USB 2.0 drive) upon request of authorized safety assurance officials.	viewable outside the cab needed if the data can be provided electronically? b- There are many approaches to electronic data transfer, and the standards are evolving with new technologies being added. The approach must be viable over the long term and be as insulated as possible from changes in device technology. Recommended, better long term options that are insulated from technology change include: 1- Using a wired connection to obtain data via the vehicle data bus, and 2- Using a network agnostic wireless connection to obtain data via the Internet from the secure server of EOBRs with mobile communications. (5) Device technology is changing rapidly such that USB and RS232 will be displaced by several other options. A better long term approach is wired connection via the vehicle's data bus similar to what is planned for OBD emissions inspections. This interface would also require an authentication process to ensure data transfer between "trusted" devices. TMC RP1210B provides a thorough guideline and specifications for connection of external device (e.g., roadside inspection device) to a vehicle computer via the vehicle's data bus. The process will easily support authentication of devices (exact requirements to be defined). RP 1210B is also maintained on a continuing basis to reflect technology changes and evolution and to address any interoperability issues that may develop. Wireless interchange technology also is changing rapidly and consumer-based standards are not necessarily focused on the needs of the transportation industry. The standards identified, i.e., IEEE 802.11g and Bluetooth are also prone to security issues and no security requirements are specified. Additionally, wireless interchange is in general not secure and is prone to interoperability and connection management issues.

395.16 Requirements	Comments / Issues
	A more viable, long term approach is electronic data transfer via the Internet with authentication of devices/systems and encryption of the data transfer. Driver records may be initiated from a vehicle device or a secure server that maintains mobile communications with the vehicle device. Law enforcement systems may authenticate from a roadside device or a secure server that provides data services to the roadside device. While there may be potential wireless connectivity issues that prevent Internet data transfers, the vehicle data bus data transfer requirement is an effective backup. Wireless communications capabilities for CMVs are also addressed in TMC RP1216 for vehicle to back office communications. This RP address multiple modes of communications (e.g., satellite, WWAN, WLAN, and short range RF) to provide guidelines for best practices with the evolution in communications technology. The provisions of RP 1216 should be considered in for roadside inspection devices.
(j) Driver identification. For the driver to log into the EOBR, the EOBR must require the driver to enter information (such as user IDs and passwords, PIN numbers) that identifies the driver or to provide other information (such as smart cards, biometrics) that identifies the driver.	No guidelines are offered for security (identity) management and administration. Without such controls, systems are vulnerable to drivers with multiple identities. While EOBR systems may provide such functionality to ensure tamper-resistance, the controls require carrier security policies and procedures, division of responsibility, security audits, and personnel training in security management. For the owner/operator and small carrier scenarios where such security practices cannot be expected, guidelines should cover trusted 3rd party requirements for EOBR security administration and audit.
(k) Availability of records of duty status. (1) An EOBR must be capable of producing duty status records for the current day and the previous 7 days from either the information stored in and retrievable from the EOBR or computer-generated records, or any combination of these. (2) If an EOBR fails, the driver must do the	(2) The definition of EOBR failure is ambiguous. If failure includes any and all sensor failures, with manual RODS then prepared for the previous 7 days, then EOBRs will be less effective with a mix of paper and electronic records. EOBRs can effectively capture information and the circumstances when minor sensor failures occur.

395.16 Requirements	**Comments / Issues**
following: (i) Note the failure of the EOBR. (ii) Reconstruct the record of duty status for the current day and the previous 7 days, less any days for which the driver has records. (iii) Continue to prepare a handwritten record of all subsequent duty status until the device is again operational.	A better approach would allow for driver's to fill in missing data for non-critical sensor failure. The data would be "annotated" as such and a record of the sensor failure would be included in the log data. Examples: – Clock error or not available – driver manually enters date/time with each change of duty status. – GPS not available – driver manually enters location. – Intermittent device error (e.g., memory, display, application error) – driver resets device and runs self-tests with device then operational or in "failed" status. – Communications error or not available – driver checks for coverage (continues until coverage is available), and/or resets communication module and runs self tests. – ECM interface error or not available – driver manually enters mileage. A recommended approach in draft RP 1219Tprovides: "Driver must inform carrier of failure within 2 days. Carrier to document failure, note within driver's HOS files of date/time of failure to coincide with manual paper RODS. Carrier to ensure EOBR is repaired or replaced as soon as practically possible, with time to repair no longer than 30 days following sensor failures or EOBR system failure."
(1) On-board information. Each commercial motor vehicle must have onboard the commercial motor vehicle an information packet containing the following items: (1) An instruction sheet describing how data may be stored and retrieved from the EOBR. (2) A supply of blank driver's records of duty status graph-grids sufficient to record the driver's duty status and other related information for the duration of the current trip.	It might be useful to provide more specificity as to content to assure greater consistency and usability of the instruction sheets. Each EOBR manufacturer should be required to send to CVSA in a common format an instruction sheet for distribution.

395.16 Requirements	Comments / Issues
(m) Submission of driver's record of duty status. (1) The driver must submit electronically, to the employing motor carrier, each record of the driver's duty status. (2) For motor carriers not subject to the remedies provisions of part 385 subpart F of this chapter, each record must be submitted within 13 days of its completion. (3) For motor carriers subject to the remedies provisions of part 385 subpart F of this chapter, each record must be submitted within 3 days of its completion. (4) The driver must review and verify that all entries are accurate prior to submission to the employing motor carrier. (5) The submission of the record of duty status certifies that all entries made by the driver are true and correct.	The 13 day submittal rule for carriers not subject to remedies is consistent with the requirement for manual RODS.
(n) EOBR Display Requirements. An EOBR must have the capability of displaying all of the following information: (1) The driver's name and EOBR login ID number on all EOBR records associated with that driver, including records in which the driver serves as a co-driver. (2) The driver's total hours of driving during each driving period and the current duty day. (3) The total hours on duty for the current duty day. (4) Total miles or kilometers of driving during each driving period and the current duty day. (5) Total hours on duty and driving time for the 7-consecutive-day period, including the current duty day. (6) Total hours on duty and driving time for the prior 8-consecutive-day period, including the current duty day. (7) The sequence of duty status for each day, and the time of day and location for each change of duty status, for each driver using the device. (8) EOBR serial number or other identification, and identification number(s)	(10) Driver entry of an acknowledgement could be problematic. What if the driver does not acknowledge?, i.e., what is required and when if no response is made? This should not be required. (12) Why are fuel tax events required? There are patents to consider/reference on the technology for state line crossing. Also, there is the occurrence in a non GPS device to have a quarter mile float with this variance in location reporting and since one of the criteria is State line crossing, a vehicle with this operating characteristic could give false state line crossings due to proximity. This should not be required.

395.16 Requirements	Comments / Issues
of vehicle(s) operated that day. (9) Remarks, including fueling, waypoints, loading and unloading times, unusual situations, or violations. (10) Acknowledgement of an advisory message or signal concerning HOS limits. (11) Override of an automated duty status change to driving if using the vehicle for personal conveyance or for yard movement. (12) Date and time of crossing a State line (for purposes of fuel-tax reporting).	
(0) Performance of recorders. A motor carrier that uses EOBRs for recording drivers' records of duty status instead of the handwritten record must ensure the EOBR meets the following requirements in order to address all hours-of-service requirements in effect as of October 24,2005: (1) The EOBR must permit the driver to enter information into the EOBR only when the commercial motor vehicle is at rest. (2) The EOBR and associated support systems must, to the maximum extent practicable, be tamper resistant. The EOBR must not permit alteration or erasure of the original information collected concerning the driver's hours of service, or alteration of the source data streams used to provide that information. (3) The EOBR must be able to perform a power-on self-test, as well as a self-test at any point upon request of an authorized safety assurance official. The EOBR must provide an audible and visible signal as to its functional status. It must record the outcome of the self-test and its functional status as a diagnostic event record in conformance with Appendix A of this part. (4) The EOBR must provide an audible and visible signal to the driver at least 30 minutes in advance of reaching the driving time limit and the on-duty limit for the 24-hour period. (5) The EOBR must be able to track total weekly on-duty and driving hours over a 7-	(1) Can a co-driver (not driving) enter information while the vehicle is moving? Entry of data on a timely basis should be allowed for co-drivers not driving. (2) "EOBR and associated support systems must, to the maximum extent practicable, be tamper resistant" is an incomplete security specification. Other security matters include: – Carrier security policies and procedures to assure effective security administration, appropriate division of responsibility in managing security and maintaining EOBR systems, and security audits. – Authentication and data protection in electronic data transfers between law enforcement and EOBR systems. – Controlled access and record keeping of all events for EOBR software, hardware, data recovery/restoration, and sensor calibration changes. While security standards may be complex, they are also subject to change as new threats emerge and evolve. A security standards process is needed to assure that security specifications are kept current and effective to address the multitude of issues that may exist. Without more detailed security specifications, security weaknesses could render EOBRs as unreliable. (4)/(5) Recommend that in additional to at least 30 minute alerts that EOBRs provide flexible, configurable alert capabilities for progression and/or preventive warning to improve compliance awareness.

395.16 Requirements	**Comments / Issues**
or 8-day consecutive period. The EOBR must be able to warn a driver at least 30 minutes in advance of reaching the weekly duty / driving-hour limitation. (6) The EOBR must warn the driver via an audible and visible signal that the device has ceased to function. (7) The EOBR must record a code corresponding to the reason it has ceased to function and the date and time of that event. (8) The audible signal must be capable of being heard and discerned by the driver when seated in the normal driving position, whether the CMV is in motion or parked with the engine operating. The visual signal must be visible to the driver when the driver is seated in the normal driving position. (9) The EOBR must be capable of recording separately each driver's duty status when there is a multiple-driver operation. (10) The EOBR device / system must identify sensor failures and edited and annotated data when downloaded or reproduced in printed form. (11) The EOBR device / system must identify annotations made to all records, the date and time the annotations were made, and the identity of the person making them. (12) If a driver or any other person annotates a record in an EOBR or an EOBR support system, the annotation must not overwrite the original contents of the record.	(6) If a device has ceased to function, can it really create an alert or is an external alert system needed? Also, need clarification on whether sensor failures and/or out-of-coverage situations should generate alerts while in driving mode.
(p) Motor Carrier Requirements. (I) The motor carrier must ensure that the EOBR is calibrated, maintained, and recalibrated in accordance with the manufacturer's specifications; the motor carrier must retain records of these activities. (2) The motor carrier's drivers and other personnel reviewing and using EOBRs and the information derived from them must be adequately trained regarding the proper operation of	Generally agreed, but carrier requirements should also include security management and administration of the EOBR system, as well as access management and control of qualified technicians in updates to EOBR software, hardware, and communications capabilities. Requirements should address 3rd party services where applicable.

395.16 Requirements	**Comments / Issues**
the device. (3) The motor carrier must maintain a second copy (back-up copy) of the electronic hours-of-service files, by month, on a physical device different from that on which the original data are stored. (4) The motor carrier must review the EOBR records of its drivers for compliance with part 395.	
Appendix A to Part 395-Electronic On-Board Recorder Performance Specifications	
1. Data Elements Dictionary for Electronic On-Board Recorders (EOBRs)	The data requirements should be revised in accordance with several of the comments made throughout.
1.1 To facilitate the electronic transfer of records to roadside inspection personnel and compliance review personnel, and provide the ability of various third-party and proprietary EOBR devices to be interoperable, a consistent electronic file format and record layout for the electronic RODS data to be recorded are necessary. This EOBR data elements dictionary provides a standardized and consistent format for EOBR output data. EOBR Database Concept **1.2** Regardless of the particular electronic file type (such as ASCII or XML) ultimately used for recording the electronic RODS produced by an EOBR, RODS data must be recorded according to a "flat file" database model. A flat file is a simple database in which all information is stored in a plain text format with one database "record" per line. Each of these data records is divided into "fields" using delimiters (as in a comma separate-values data file) or based on fixed column positions. Table 1 below presents the general concept of a flat data file consisting of data "fields" (columns) and data "records" (rows). Table 1: Flat Data File Database Model FIELDS RECORDS	
1.3 The data elements dictionary describes the data fields component of the above framework. Individual data records must be generated and recorded whenever there is a change in driver	

395.16 Requirements	**Comments / Issues**
duty status, an EOBR diagnostic event (such as power-on/off, self test, etc.), or when one or more data fields of an existing data record are later amended. In the last case, the corrected record must be recorded and noted as "current" in the "Event Status Code" data field, with the original record maintained in its unedited form and noted as "historical" in the "Event Status Code" data field. The EOBR Data Elements Dictionary is described in Table 2. The event codes are listed in Table 3. Table 2: EOBR Data Elements Dictionary (see NPRM document for table definitions)	
2. Communications Standards for the Transmittal of Data Files from Electronic On-Board Recorders (EOBRs)	
2.1 EOBRs must produce and store RODS in accordance with the file format specified in this Appendix and must be capable of a one-way transfer of these records through wired and wireless methods to authorized safety officials upon request.	Security of the data transfer must be considered. There are security threats external to the EOBR in the data transfer process and no security requirements are specified.
2.2 EOBRs must be capable of transferring RODS using one of the following wired standards: 2.2.1 Universal Serial Bus 2.0 2.2.2 RS-232.	These USB and RS232 standards are not recommended as a wired connection to the vehicle's data bus provides a much better long term approach.
2.3 EOBRs must be capable of transferring RODS using one of the following wireless standards : 2.3.1 Institute of Electrical and Electronics Engineers (IEEE) 802.1 1 g 2.3.2 Bluetooth	Wireless connections using 802.11 and Bluetooth are not recommended. This form of wireless connectivity is prone to connection management issues, standards changes, and security vulnerabilities. Use of the Internet via a secure server or the vehicle device's mobile communications provides a much better long term approach with robust, proven security technologies available.
3. Certification of EOBRs to Assess Conformity with FMCSA Standards	
3.1 The following outcome-based performance requirements must be included in the self-certification testing conducted by EOBR manufacturers:	
3.1.1 Location -	3.1.1.2. Minute-by-minute location recording is a new information requirement for HOS

395.16 Requirements	**Comments / Issues**
3.1.1.1 The location description for the duty status change must be sufficiently precise (within 300 meters) to enable enforcement personnel to quickly determine the vehicle's geographic location at each change of duty status on a standard map or road atlas 3.1.1.2 When the CMV is in motion, location and time must be recorded at intervals of 1 minute. This recorded information must be available for an audit of EOBR data, but is not required to be displayed on the EOBR's visual output device. 3.1.1.3 Location codes derived from satellite or terrestrial sources, or a combination thereof must be used. The location codes must correspond, at minimum, to the Census Bureau 2000 Gazetteer "County Subdivision" data.	accountability. As discussed above, location records should be made at change of duty status and in accordance for what is needed for electronic supporting documents. 3.1.1.3. The efficacy of the Census Bureau 2000 Gazetteer "County Subdivision" data needs to be established.
3.1.2 Distance traveled 3.1.2.1 Distance traveled may use units of miles or kilometers driving during each on-duty driving period and total for each 24-hour period for each driver operating the CMV. 3.1.2.2 If the EOBR records units of distance in kilometers, it must provide a means to display the equivalent distance in English units. 3.1.2.3 If the EOBR obtains distance-traveled information from a source internal to the CMV, the information must be +/- 1 percent accurate to an odometer calibrated per 24-hour period. 3.1.2.4 If the EOBR obtains distance-traveled information from a source external to the CMV, the information recorded must be accurate to within +I- 1 percent of actual distance traveled per 24-hour period as measured by a calibrated odometer.	SAE standard J1226 allows ± 4% odometer error and is recommended over the proposed rule ± 1% standard. Given that other common operating condition factors may also affect odometer accuracy, the tolerance should be at least ± 5% if it is specified at all in the regulation. The mileage accuracy tolerance for GPS-based mileage determination (if allowed) should be ± 5% to be consistent with what can reasonably be expected with an electronic odometer. Odometers should be maintained and calibrated consistent with manufacturer specifications. Odometer accuracy is outside the control of the EOBR supplier and excessive calibration requirements will create operational and economic issues for carriers.
3.1.3 Date and time 3.1.3.1 The date and time must be reported on the EOBR output record and display for each change of duty status and at such additional entries as specified under "Location." 3.1.3.2 The date and time must be obtained, transmitted, and recorded in such a way that it cannot be altered by a motor carrier or driver. 3.1.3.3 The time must be coordinated to the Universal Time Clock (UTC) and must not drift more than 60 seconds per month	RP 1219T recommends clock drift not to exceed one minute with calibration at no more than a 3 month interval. EOBRs with mobile communications and/or GPS should recalibrate with or use calibrated network or GPS time on a continuous basis. Clock resets and recalibration adjustments (exceeding the allowable threshold) should be maintained with carrier records and made only by trained technician(s).

395.16 Requirements	**Comments / Issues**
3.1.4 File format and communication protocols: The EOBR must produce and transfer a RODS file in the format and communication methods specified in sections 1 .O and 2.0 of this Appendix.	Agree with a standardized format requirement, however recommend that options be provided, e.g., flat file for wired data transfer and XML or other standardized format for Internet file transfers.
3.1 .5 Environment 3.1.5.1 Temperature - The EOBR must be able to operate in temperatures ranging from -20 degrees F to 120 degrees F. 3.1.5.2 Vibration and shock - The EOBR must meet industry standards for vibration stability and for preventing electrical shocks to device operators.	The environmental factors should be based on industry standards for similar type of equipment.
3.2 The EOBR and EOBR support systems must be certified by the manufacturer as evidence that their design has been sufficiently tested to meet the requirements of 5 395.16 under the conditions in which they would be used.	The EOBR task force has identified requirements for supplier declaration of conformity consistent with ISO 17050 in RP 1219T. However, this approach also requires an authority to audit supporting documentation of such declarations, and such an authority does not currently exist. The EOBR task force has also developed, guidelines for EOBR system testing and documentation requirements for self-certification consistent with what would be required under ISO 17050, to be included as appendices to RP 1219T. It is not believed that such requirements are needed as part of the 396.16 regulation.
3.3 The exterior faceplate of EOBRs must be marked by the manufacturer with the text 'USDOT-EOBR' as evidence that the device has been tested and certified as meeting the performance requirements of 5 395.16.	EOBRs should be capable of providing an electronic authentication that is effective in preventing the use of counterfeit systems – with such authentication provided via a wired or Internet data transfer. There is potential that a label is easily counterfeited.
4. Example of Grid Generated from EOBR Data 4.1 The following picture shows an acceptable format for grid versions of logs generated by EOBR data. [INSERT GRAPHIC #1 HERE]	The grid-graph display should be optional if data transfer capabilities are available. Device display limitations should not be an obstacle to using such devices. Examples of limitations include: – Text based display unit without graphical display capability. – Limited form factor display that may provide a poor presentation or very small presentation of the grid graph. – In-dash display units that are not viewable outside the cab.