

FORD MOTOR COMPANY (FORD) RESPONSE TO PE24-030 PART 1

Request 10

Furnish Ford's assessment of the alleged defect in the subject vehicles, including:

- a. The causal or contributory factor(s)
- b. The failure mechanism(s)
- c. The failure modes(s)
- d. The risk to motor vehicle safety that it poses
- e. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring, or subject component was malfunctioning
- f. The reports included with this inquiry.

Answer

Failure modes in the vehicle include an inverted (i.e., upside down) image orientation, intermittent or persistent loss of image, and/or distorted, blurry, pixelated, "noisy" or "fuzzy" images. A rear-view camera that intermittently displays a blank, distorted, or inverted image while in reverse can reduce or distort the driver's view of what is behind the vehicle, increasing the risk of a crash.

In the event of an inverted image, drivers will observe that camera's display of the field of view behind the vehicle is upside-down when the vehicle is in reverse gear. No Diagnostic Trouble Codes (DTCs) will be set, and no warning message will be provided to the driver.

If the camera image is distorted, blurry, pixelated, "noisy" or "fuzzy", drivers will observe these conditions in the camera's display when the vehicle is in reverse gear. No Diagnostic Trouble Codes (DTCs) will be set, and no warning message will be provided to the driver.

In scenarios where the camera signal is lost, resulting in a permanent or intermittent loss of image, drivers will experience a blank camera display when shifting to reverse gear or while the vehicle is in reverse gear. If the image is lost for 10 seconds, one or more DTCs may set, which will result in a "Camera Not Available" warning message on the camera display.

Ford has evaluated the twenty-three (23) vehicle owner questionnaires ("VOQs") provided with this inquiry. Of the 23 VOQs, nine (9) allege an inverted image, thirteen (13) allege a malfunctioning camera, which can include symptoms of permanent or intermittent loss of image and/or a distorted image, and one (1) was a duplicate. There are twelve (12) reports that indicate the vehicle was diagnosed as requiring a rear-view camera to remedy the concern, three (3) of which are documented in the Ford warranty system with one VIN having an extended service warranty plan. None of the reports allege requiring replacement of any other subject components to remedy the concern. Ford has obtained a camera component from one VOQ customer to aid in root cause analysis and is continuing to pursue additional camera samples from VOQ customers.

Ford has not confirmed the causal factor(s) related to the alleged defect and is still investigating this concern. Ford has acquired, and is currently analyzing, eight cameras that exhibit issues consistent with those described in the reports included with this inquiry. As of

the date of this response, Ford's investigation is focused on several components internal to the camera, including:

- Printed Circuit Board (PCB)
- Microcontroller
- Solder Fractures
- Voltage Regulator

Ford's teardown activity has identified one sample with fractured solder joints between the microcontroller and the PCB. Additionally, the microcontrollers of two different cameras under analysis have been removed and placed on known-to-be good PCBs with the failure mode following the suspect microcontrollers. Other potential causal and/or contributory factors continue to be investigated.

Data analysis has indicated a sharp increase in camera replacements under warranty on the subject vehicles, and in replacements under warranty of other camera models from the same supplier used in Ford Fiesta and Lincoln MKT vehicles, produced after May 2019. This may indicate a supplier quality concern. Ford's investigation into root cause will assist in identifying supplier quality issues and will provide the data required to accurately scope the potentially affected population.

Based on the findings to this point, Ford is confident the causal factor is found within the camera itself. Ford's investigation has not identified any causal or contributory factors in the other subject components of the camera system.