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November 3, 2021

Mr. Otto Matheke, Acting Director
Office of Defects Investigation
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE, Room W45-302
Washington, D.C. 20590

Dear Mr. Matheke:

Subject: PE21-020

The Ford Motor Company (Ford) response to the Agency's September 13, 2021, letter requesting certain information concerning Ford and Lincoln vehicles equipped with Level 2 ADAS technology is attached. Ford understands that there is no alleged defect with respect to any of its vehicles and is providing this information as part of the agency's investigation of another manufacturer's vehicles.

If you have any questions concerning this response, please feel free to contact me.

Sincerely,

[redacted]

Desi Ujkashevic

Attachment

ATTACHMENT
November 3, 2021

FORD MOTOR COMPANY (FORD) RESPONSE TO 21-020

Ford's response to this Preliminary Evaluation peer vehicle information request was prepared pursuant to a diligent search for the information requested. We have made every effort to provide thorough and accurate information, and we would be pleased to meet with Agency personnel to discuss any aspect of this peer vehicle information request.

The scope of Ford's investigation conducted to locate responsive information focused on Ford employees most likely to be knowledgeable about the subject matter of this inquiry and on review of Ford files in which responsive information ordinarily would be expected to be found and to which Ford ordinarily would refer, as more fully described in this response. Ford notes that although electronic information was included within the scope of its search, Ford has not attempted to retrieve from computer storage electronic files that were overwritten or deleted. As the agency is aware, such files generally are unavailable to the computer user even if they still exist and are retrievable through expert means. To the extent that the agency's definition of Ford includes suppliers, contractors and affiliated enterprises for which Ford does not exercise day-to-day operational control, we note that information belonging to such entities ordinarily is not in Ford's possession, custody or control

Ford has construed this request as pertaining to vehicles manufactured for sale in the United States, its protectorates, and territories.

In a September 20,2021, email, Gregory Magno of the agency, updated the information request as follows:

- The Active Park Assist feature falls outside of the intent of the investigation and IR letter as it represents a very short duration and low speed transaction falling outside the parameters of the incidents that prompted the opening of PE21-020.

Ford notes that some of the information being produced pursuant to this inquiry may contain personal information such as customer names, addresses, telephone numbers, and complete Vehicle Identification Numbers (VINs). Ford is producing such personal information in an

unredacted form to facilitate the agency's investigation with the understanding that the agency will not make such personal information available to the public under FOIA Exemption 6, 5 U.S.C. 552(b)(6).

Answers to your specific questions are set forth below. As requested, after each numeric designation, we have set forth verbatim the request for information, followed by our response. Unless otherwise stated, Ford has undertaken to provide responsive documents dated up to and including September 13,2021, the date of your inquiry. Ford has searched within the following offices for responsive documents: Sustainability, Environment and Safety Engineering, Ford Customer Service Division, Marketing and Sales Operations, Purchasing, Quality, Research, Global Core Engineering, Office of the General Counsel, Vehicle Operations, North American Product Development.

Request 1

State, by model and model year, the number of subject vehicles Ford has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by Ford, state the following:

a. Vehicle identification number (VIN);
b. Model;
c. Model Year;
d. Subject component trade / trim name, part number and design version installed as original equipment; including:
   i) Software version;
   ii) Firmware version;
   iii) Hardware version;
e. Date of manufacture;
f. Date warranty coverage commenced;
g. The State in the United States where the vehicle was originally sold or leased (or delivered for sale or lease);
h. Latest known vehicle mileage and commensurate date;
i. Cumulative mileage covered with the subject system engaged; and
j. Date and identities of the most recent software, firmware, and hardware updates.

Provide the table in Microsoft Access 2000, or a compatible format, entitled "PRODUCTION DATA."

Answer 1

Ford records indicate that the approximate total number of subject peer vehicles equipped with Level 2 ADAS capabilities sold in the United States (the 50 states and the District of Columbia) and its protectorates and territories (American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and Virgin Islands) is 1,306,908

The number of subject peer vehicles sold in the United States by model and model year is shown below:

Make	Model	2019 MY	2020 MY	2021 MY	2022 MY
Ford	Edge	58,960	89,684	13,861	19
	Escape		113,474	25,364	7
	Explorer		272,758	182,174	38
	Bronco Sport			88,959	10
	F150			272,991	19
	Mach-E			19,090	7
	Maverick				859
Lincoln	Nautilus	36,455	29,165	11,175	19
	Corsair		27,921	16,611	12
	Aviator		29,043	17,539	694

The requested data for each subject peer vehicle is provided in Appendix A. Note: Ford does not use firmware or equivalent; therefore, item D.II is not included as part of Appendix A.

Ford vehicles and systems do not track or record cumulative mileage covered with the subject system engaged, and date and identities of the most recent software, and hardware updates.
For some VINs, the mileage and commensurate date is not specified in Appendix A because that data is unavailable.

Request 2

State the number of each of the following, received by Ford, or of which Ford are otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles:

a. Consumer complaints,
b. Field reports,
c. Reports involving a subject crash, injury, or fatality
d. Property damage claims;
e. Third-party arbitration proceedings where Ford is or was a party to the arbitration; and
f. Lawsuits, both pending and closed, in which Ford is or was a defendant or codefendant.

For subparts "a" through "f," state the total number of each item (e.g., consumer complaints, field reports, etc.) separately. Multiple incidents involving the same vehicle are to be counted separately. Multiple reports of the same incident are also to be counted separately (i.e., a consumer complaint and a field report involving the same incident in which a crash occurred are to be counted as a crash report, a field report and a consumer complaint).

In addition, for items "e “and "f," provide a summary description of the alleged problem and causal and contributing factors and Ford's assessment of the problem, with a summary of the significant underlying facts and evidence. For items "e" and "f," identify the parties to the action, as well as the caption, court, docket number, and date on which the complaint or other document initiating the action was filed.

Answer 2

For purposes of identifying reports of incidents that may be related to Level 2 ADAS capabilities and any related documents, Ford has gathered "owner reports" and "field reports" maintained by Ford Customer Service Division (FCSD) and claim and lawsuit information maintained by Ford's Office of the General Counsel (OGC).

Descriptions of the FCSD owner and field report systems, the Fleet Test Database systems, and the criteria used to search each of these are provided in Appendix B.

The following categorizations were used in the review of reports located in each of these searches:

Category	Allegation
A1	Allegation of crash or incident caused by Blue Cruise, Lane Centering Assist with Adaptive Cruise Control (LCA+ACC), or Autonomous Vehicles (AV) features.
B1	Allegation of any of the following, Blue Cruise, Lane Centering Assist with Adaptive Cruise Control (LCA+ACC), or Autonomous Vehicles (AV), being perceived as/or randomly turning on or off.
B2	Allegation of any of the following, Blue Cruise, Lane Centering Assist with Adaptive Cruise Control (LCA+ACC), or Autonomous Vehicles (AV), being perceived as/or being inaccurate.
B3	Allegation that any of the following, Blue Cruise, Lane Centering Assist with Adaptive Cruise Control (LCA+ACC), or Autonomous Vehicles (AV), were not available due to hardware failure or software miss programming.
B4	Allegation of an undefined issue with to Blue Cruise, Lane Centering Assist with Adaptive Cruise Control (LCA+ACC), or Autonomous Vehicles (AV).
C	Nonspecific or ambiguous allegations

We are providing copies of reports categorized as "C" as "non-specific or ambiguous allegations" for your review due to the broad scope of the request. Based on our engineering judgment, the information in these reports is insufficient to support a determination that they contain an allegation related to Level 2 ADAS capability.

The following chart summarizes the total of events reviewed by Ford:

Events								
Make	Vehicles	Volume	A1	B1	B2	B3	B4	C
Ford	Edge	162,524	0	6	10	56	29	1
	Escape	138,845	0	1	5	18	75	5
	Explorer	454,970	0	19	41	71	80	2
	Bronco Sport	88,969	0	0	0	3	0	4
	Mach-E	273,029	0	0	1	1	5	2
	Maverick	19,097	0	0	0	0	0	0
	F150	273,010	0	1	0	15	10	9
Lincoln	Nautilus	76,814	0	37	5	12	83	3
	Corsair	44,544	0	1	4	18	11	0
	Aviator	47,276	0	6	14	12	43	17

Owner Reports: Records identified in a search of the FMC360 Owner Relations Systems, as described in Appendix B, were reviewed for relevance, and categorized in accordance with the categories described above. The number and copies of relevant owner reports identified in this search that may relate to the agency's peer investigation are provided in the FMC360 portion of the database contained in Appendix C. The categorization of each report is identified in the "Category" field. Certain vehicles may have experienced more than one incident and have more than one report associated with a VIN. These reports have been counted separately.

Legal Contacts: In Appendix B, Ford is providing a description of Legal Contacts and the activity that is responsible for this information. To the extent that responsive owner reports indicate that they are Legal Contacts, Ford has gathered the related files from the OGC Consumer Litigation team. These non-privileged, responsive legal documents are provided in Appendix D.

Field Reports: Records identified in a search of the Common Quality Indicator System (CQIS) database, as described in Appendix B, were reviewed for relevance and categorized in accordance with the categories described above. The number and copies of relevant field reports identified in this search that may relate to the agency's peer investigation are provided in the CQIS portion of the database contained in Appendix C. The categorization of each report is identified in the "Category" field. Certain vehicles may have experienced more than one incident and have more than one report associated with a VIN. These reports have been counted separately.

VOQ Data: PE21-020 included five (5) Vehicle Owner's Questionnaires (VOQs), two of which were duplicative. Ford searched its FMC360 database for customer contacts, and its CQIS database for field reports regarding the vehicles identified in the VOQs. Ford notes that in some instances, where the VOQ does not contain the VIN or the owner's last name and zip code, it is not possible to query the databases for owner and field reports corresponding to the VOQs. Any reports for a vehicle identified in the VOQs describing claims related to Level 2 ADAS technologies are included in Appendix E

Crash/Injury Incident Claims: For purposes of identifying allegations of accidents or injuries that may have resulted from the use of Level 2 ADAS features, Ford reviewed owner reports, legal contacts, field reports, and VOQ's, and did not identify any responsive crash/injury incident claims. Ford's investigation includes information through September 13, 2021- the date Ford Motor Company received this inquiry. On September [redacted] 2021, a VOQ for an alleged accident relating to a failure on Level 2 ADAS features was filed through the NTHSA VOQ system. Ford records indicate that at the time of the incident, the vehicle was equipped with adaptive cruise control and lane centering assist systems; however, the vehicle was not equipped with BlueCruise software. The incident was reported to the NHTSA Standing General Order (SGO) 2021-01 Incident Reporting Portal. The VOQ information is included in Appendix E.

Claims, Lawsuits, and Arbitrations: For purposes of identifying incidents that may relate to the failure of Level 2 ADAS capabilities, Ford gathered claim and lawsuit information maintained by Ford's OGC. Ford reviewed the reports and did not identify any responsive claims, lawsuits, or arbitrations with allegations of failure of level 2 ADAS capabilities that may cause the vehicle to not operate as intended.

Ford also located other lawsuits, claims, or consumer breach of warranty lawsuits, each of which is ambiguous as to whether it meets the alleged defect criteria. Ford included these lawsuits and claims as "non-specific allegations" for your review due to the broad scope of PE21-020. Based on Ford's engineering judgment, the information provided in these lawsuits and claims is insufficient to support a determination that the described incidents involve to the alleged defect.

Ford is providing the requested detailed information, where available, on the ambiguous lawsuits and claims in our Log of Lawsuits and Claims, in Appendix D.

Request 3

Separately, for each item (complaint, report, claim, notice, or matter) within the scope of your response to Request No. 2, state the following information:

a. Ford's file number or other identifier used;
b. The category of the item, as identified in Request No, 2 (i.e., consumer complaint, field report, etc.);
c. Vehicle owner or fleet name (and fleet contact person), address, and telephone number;
d. Vehicle's VIN;
e. Vehicle's make, model and model year;
f. Vehicle's mileage at time of incident;
g. Software, firmware, and hardware versions in place at the time of the incident, along with vehicle and mileage and date of installation;
h. Incident date;
i. Report or claim date;
j. Whether a crash is alleged;
k. Description of the crash including:
    i) Time of day and local time zone;
    ii) Crash site coordinates (latitude and longitude);
    iii) Listing of involved vehicles, objects and persons;
    iv) Speed and direction of the subject vehicle;
    v) Documented subject vehicle driver impairment.
    vi) Location / orientation of the subject vehicle in relation to other involved vehicles, objects, persons at the time of impact.
    vii) Timing of subject system engagement / disengagement over the 30 second period leading to the subject crash and, if not:
        (1) Description and timing of driver control inputs that may have overridden the subject system;
    viii) Description of the intervention of:
        (1) crash warning or avoidance systems (e.g., AEB, FCW)
        (2) subject system logic intended to detect first responder vehicles / scenes on or off the roadway;
l. Description and timing of the last driver engagement warning prior to the subject crash;

m. Duration (minutes) and distance (miles) of the drive cycle that led to the subject crash;
n. Whether property damage is alleged;
o. Number of alleged injuries, if any; and
p. Number of alleged fatalities, if any.

Provide this information in Microsoft Access 2000, or a compatible format, entitled "REQUEST NUMBER TWO DATA."

Answer 3

Ford is providing owner and field reports in the database contained in Appendix C in response to Request 2. To the extent information sought in Request 3 is available for owner and field reports, it is provided in the database in Appendix C. To the extent information sought in Request 3 is available for lawsuits and claims, it is provided in the Log of Lawsuits and Claims in Appendix D.

Request 4

Produce copies of all documents, telematics reports / data, and data logs related to each item within the scope of Request No. 2. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method FORD used for organizing the documents. Describe in detail the search methods and search criteria used by FORD to identify the items in response to Request No. 2.

In addition, provide a full copy of any expert report that has been produced by FORD or received from another party in a lawsuit, arbitration, or a pre-suit claim regarding the incidents identified in Request Number 2. This includes any reports produced or exchanged for experts designated by any party in such litigation, including FORD, plaintiff(s), or co-defendants. This does not include reports that FORD has never produced to another party, to the extent FORD claims a privilege exists for such a report.

Answer 4

Ford is providing owner and field reports in the database contained in Appendix C in response to Request 2. Copies of complaints, first notices, or FMC360 reports relating to matters shown on the Log of Lawsuits and Claims (Appendix D) are provided in Appendix D2. To the extent information sought in Request 4 is available, it is provided in the referenced appendices.

Request 5

For each trade name / trim level of the subject system available in the subject vehicles, state its name and designation including:

a. Describe the ODD specified to the customer by FORD for the intended use of the system, including but not limited to:
   i. Types of roads, road marking, weather conditions, etc. the system is intended to be used on and the types of roads the system should not be used.
   ii. List the methods and technologies used to prevent subject system usage outside the ODD specified to the customer by FORD; and
   iii. If the subject system can be engaged (or remain engaged) outside of the ODD specified to the customer by FORD, state the reasons for this capability and describe any performance restrictions or modifications to the subject system's operational characteristics in such an environment (e.g. slower maximum speeds or control authority, additional driver warnings, adjustments to the driver engagement system).

b. Describe the subject system's maximum control authority over steering (steering angle (degrees), rate (degrees / sec), lateral acceleration (g)), braking (g), and acceleration (g) functions during routine and crash-imminent operations. Separately include any additional conditions and control authority values that FORD deems appropriate.

c. List and describe the information, system status, alerts, warnings, and graphics communicated by the subject vehicle to its driver during the DDT (e.g., warning lights, instrument panel animations, aural warnings, haptic warnings) during the following subject system operational conditions:

   i. Routine subject system operation.
   ii. Scenarios where the vehicle requires driver intervention (e.g., driver engagement needed, imminent ODD exit, system fault); and
   iii. When the subject vehicle detects that a crash is imminent.

d. Furnish an overview of FORD's approach to the enforcement of driver engagement / attentiveness during the subject system's operation in the subject vehicles. Include a description of all means of detecting (both through direct measurement and inference) / monitoring driver engagement / attentiveness including:
   i. The technological means and related logic (including direct measurement or inference) used to sense driver engagement / attentiveness;
   ii. Minimum contact or detected engagement duration and time between contact / detected engagement required to satisfy the driver engagement / attentiveness logic including changes based on variations in driving conditions such as vehicle speed or presence of a lead vehicle;
   iii. Describe any warning strategies or messaging and timing associated with each system identified above in subpart (ii) (include pictures/videos of all audible & visual warnings/alerts); and
   iv. Describe any escalation or lockout strategies used to address either unresponsive drivers or repeated engagement warnings in any given drive cycle.

e. Describe subject system responses to driver control inputs that could cancel or override one or more of its Level 2 functions. For each driver input, include:
   i. Driver input description and minimum threshold (e.g., minimum steering angle or rate);
   ii. List the Level 2 functions disabled and permitted to continue operation following a driver override;
   iii. Describe / illustrate warnings and messages to the driver concerning the system status following a driver override; and
   iv. Explain which, if any, of the disabled Level 2 functions resume operation on their own after the override input and under what conditions.

f. List the conditions / events / alerts that may prompt an operating subject system to require a "take-over" by the driver. For each such condition, list:

i. Sequence of events and timing for each; and
ii. Intended vehicle behavior in the instance where a driver take-over is not detected.

g. Describe the subject system OEDR capabilities within the ODD specified to the customer by FORD. List the objects and events that the system is designed to detect (e.g., particular vehicle aspects, pedestrians, road signs, drivable space limitations, environmental (weather / road surface / lighting) conditions, path predictions, object classifications). For each item, list:
   i. Subject system behavior;
   ii. Limitations on detection; and
   iii. Subject system interaction with crash avoidance technologies.

Answer 5

Ford has prepared extensive documentation for the trade names Adaptive Cruise Control with Stop-and-Go, Adaptive Cruise Control with Stop-and-Go and Lane Centering, Adaptive Cruise Control with Traffic Jam Assist, BlueCruise and ActiveGlide. A recurring theme for all Ford Level 2 features is Ford's commitment to ensuring clear communication to the driver while systems are active coupled with proactive driver engagement. The systems are design to prevent use of the feature if certain repeated driver actions are detected. Ford systems were developed in congruence with Society of Automotive Engineers and International Organization for Standardization documentation. Further assessments and requirements have been internally developed based on the foundation of industry recommendations as well as academic research. The requested details are confidential business information; therefore, Appendices F, F-1 and F-2 are provided in the Ford confidential submittal and address Request 5 sections a through g. Non-confidential portions of information are available in Appendices F-4, F-5, and F-6.

Request 6

Produce copies of all instructional, service, warranty, marketing, and other documents that relate to, or may relate to, the operation of each trade name / trim level of the subject system in the subject vehicles, that FORD has issued to any customers, dealers, regional or zone offices, field offices, fleet purchasers, or other entities. This includes, but is not limited to, bulletins, advisories, informational documents, training documents, digital messages on a subject vehicle display, or

other documents or communications, except for standard shop manuals. Also, include the latest draft copy of any communication that FORD is planning to issue within the next 120 days.

Answer 6

For purposes of identifying communications to dealers, zone offices, or field offices pertaining, at least in part, Level 2 ADAS capabilities, Ford has reviewed the following FCSD databases and files: The On-Line Automotive Service Information System (OASIS) containing Technical Service Bulletins (TSBs) and Special Service Messages (SSMs); Internal Service Messages (ISMs) contained in CQIS; and Field Review Committee (FRC) files. We assume this request does not seek information related to electronic communications between Ford and its dealers regarding the order, delivery, or payment for replacement parts, so we have not included this type of information in our answer.

A description of Ford's OASIS messages, ISMs, and the Field Review Committee files and the search criteria used are provided in Appendix B.

OASIS Messages: Ford identified a series of SSMs or TSBs that may relate to Level 2 ADAS. Copies of each message is included in Appendix G.

Internal Service Messages: Ford identified four ISMs that may relate to Level 2 ADAS. Copies of each message is included in Appendix G.

Field Review Committee: Ford identified one field service action communication related to Level 2 ADAS – under number 19S02. A copy of this communication is included in Appendix G.

Marketing: The requested documents for each subject peer vehicle is provided in Appendix G. Ford marketing media is designed and developed by several third-party agencies. Ford has provided search documentation that Ford's Tier 1 agency had in its possession.

Request 7

For each trade name / trim level of the subject system available in the subject vehicles, describe all modifications or changes made by, or on behalf of, FORD in the design, material composition, manufacture, quality control, supply, function, or installation of the subject system, from the start of production to date, which relate to, or may relate to driver

engagement / attentiveness and OEDR by the subject system in the subject vehicles. For each such modification or change, provide the following information:

a. The date or approximate date on which the modification or change was incorporated into vehicle production;
b. A detailed description of the modification or change;
c. The reason(s) for the modification or change;
d. The hardware, firmware, and software names and numbers of the original version;
e. The hardware, firmware, and software names and numbers of the modified version;
f. Primary distribution method of related firmware and software updates (over the air or in-person service); and
g. When the modified version / update was made available as a service component.

Also, provide the above information for any modification or change that FORD is aware of which may be incorporated into vehicle production or pushed to subject vehicles in the field within the next 120 days.

Answer 7

Ford is providing a component change log that incorporates all vehicle lines in Appendix H.

Request 8

Describe FORD's strategies for detecting and responding to the presence of first responder / law enforcement vehicles and incident scene management tactics whether in or out of the roadway during subject system operation in the subject vehicles. Include:

a. Incident scene detection (particularly flashing lights, road flares, cones / barrels, reflectorized vests on personnel, vehicles parked at an angle "fend-off" position");
b. Explain the effects of low light conditions on these strategies; and
c. List subject system behaviors (e.g., driver warnings, control interventions).

Answer 8

Ford does not currently employ any unique strategies associated with its Level 2 systems for detecting and responding to the presence of first responder / law enforcement vehicles. All Ford vehicles equipped with Level 2 features are equipped with camera vision and radar sensing with object detecting capabilities. Based on current technology, Ford Level 2 features use a dual approach to take advantage of camera accuracy under clear conditions and radar accuracy under

low visibility conditions (e.g. low light). Ford systems are able to simultaneously process information from both the camera and radar sensors providing accuracy over a broader range of conditions than would be possible with a single sensor type system. The availability of radar output makes the detection of "flashing lights" in low visibility conditions unnecessary. The Ford Level 2 systems detect and classify the aforementioned objects; therefore, unique identification and classification is not required.

a. Ford vehicles utilize front mounted radar and front windshield camera sensor, both inputs are combined and fused to establish object tracks. This tracking function includes measurement and prediction of object motion and physical characteristics (e.g., speed, acceleration, angle, distance, size). Tracked objects are classified into object types and motion status (stationary, moving) to determine eligibility for selection as subject vehicle targets. Other stationary objects (e.g., cones/barrels) may be identified, but not tracked. Additional details for object tracking are provided in Appendix F page 35. Ford systems do not require the identification of objects based on an emitted light source (e.g., reflective lights, road flares and reflective vests).
b. Ford has adopted the use of both camera and radar due to the current low light functional limitations of vision only system. Low light conditions and large contrasts in lighting can affect camera performance as described in Appendix F page 36; however, these conditions do not affect radar performance.
c. Ford Level 2 features do not require unique driver warnings or control interventions specific to first responders or law enforcement vehicles; therefore, the subject system behaviors (e.g., driver warnings, control interventions) for Ford Level 2 features are provided in the response to Request 5 above.

Request 9

Describe any processes, procedures, or policies governing the extent of testing and validation required prior to the release of the subject system or an in-field update to the subject system, including hardware and software components of such systems, identifying, in particular:

a. The extent of field testing or vehicle validation miles required prior to the release of such a system or feature.
b. The extent of any computer simulations or training data sets required to be conducted prior to the release of such a system or feature and the degree to which any such simulations are relied upon for testing and validation in lieu of field testing.

c. The extent to which the processes, procedures, or policies for the testing and validation identified above differ, if at all, for updates to a subject system or feature (e.g., software updates) compared to the first release of the system or feature.
d. The length of time that the processes, procedures, or policies for the testing and validation identified above have been in place; and
e. Any processes, procedures, or policies in place to compare the performance of a subject system or feature in the field after a release with the design intent for the system or feature.

Answer 9

Ford is providing documentation to describe any processes, procedures, or policies governing the testing and validation required prior to the release of the subject system or an in-field update to the subject system, in Appendix I. Appendix I includes, Ford's Design Verification Methods and Corporate Engineering Test Procedures (CETPs) for Adaptive Cruise Control with Stop-and-Go, Lane Centering Assist, and BlueCruise. All information provided in Appendix I should be treated as Confidential. Note that in Appendix I, there are engineering terms that refer to Ford Level 2 features, and these terms refer to the same technology:

- Highway Assist and Active Drive Assist is the equivalent of Blue Cruise and Active Glide.
- Traffic Jam assist is the equivalent of Lane Centering Assist.

Request 10

Describe FORD's processes for identifying and investigating subject crashes in the subject vehicles with the subject system in operation including:

a. Vehicle's Data collection/logging capabilities including vehicle's ability to wirelessly transmit data including:
    i. The conditions in which a vehicle may send wireless data that may relate to a subject crash;
    ii. The methods by which the data are sent (type of wireless system and location of involved components on the subject vehicles);
    iii. A description of the data sent and related alerting within FORD;
    iv. Any limitations on such transmittal (e.g. poor wireless connectivity, etc.);
    v. Countermeasures / alternate retrieval options when transmittal limitations apply;
b. Procedures for investigating customer concerns or safety incidents; and

c. Metrics used to assess safety performance.

Answer 10

To identify subject crashes, Ford is tracking various information channels with the intent of identifying and investigating subject crashes in the subject vehicles with the subject system in operation, daily. Specifically, Ford monitors the following:

- Lawsuits and Claims
  - Complaints, and first notices that are received through mail, email, fax or online submission.
  - OGC has a manual intake process to identify new matters that are potentially reportable for allegations that may be added later to an active case.
- Field Reports
  - Field reports and customer complaints, as explained in Appendix B.
- Media Channels:
  - Media Inquiries
  - Social Media Reporting
  - Ford News (clipsheets)
- Feedback from Company Owned Vehicle drivers and fleet managers.

a. Currently, connected vehicle data received by Ford wirelessly on a routine basis does not contain the information necessary to identify subject crashes in subject vehicles with the subject systems in operation.
   i. Limited data from Ford vehicles with connected vehicle capability, if activated/allowed by the vehicle owner, may be transmitted wirelessly. This data may or may not relate to a subject crash. There are three conditions by which data is transferred: regularly sent each trip, sent based upon a programmed trigger, and one time as requested.
   ii. The vehicle's modem can transmit data over cellular or Wi-Fi networks. The physical location of the modem varies by vehicle model.
   iii. Limited data (e.g., Diagnostic Trouble Codes (DTCs), odometer, fuel level) from Ford vehicles with connected vehicle capability may be transmitted wirelessly. While this data is stored in the cloud for manual inquiry, there are no automated alerts in place. The list of data currently available is provided in Appendix J.

iv. Factors such as poor cellular connection or limited signal strength, lack of Wi-Fi, low battery state of charge, change in shared data vehicle connectivity setting (customer selectable), and/or vehicle not driven may limit the transmittal of data.

v. Traditional investigation methods (e.g., vehicle inspections, Event Data Recorder (EDR) download, crash reconstruction, vehicle scan, DTC download, police reports, driver's accounts etc.) are the primary method used by Ford to retrieve information to support an investigation.

b. In many markets, including the US, the Field Review Committee (FRC) fulfills Ford's legal obligations with respect to potential field concerns by deciding whether a field action is required. The Critical Concern Review Group (CCRG) acts at the direction of the FRC to investigate potential vehicle safety and/or compliance concerns and support the FRC in fulfilling those legal obligations.

The purpose of the CCRG is to conduct reviews, perform data analysis and risk assessments of production or badged vehicles safety and/or compliance related concerns. The scope of the CCRG includes all Ford Motor Company production vehicles and components.

Anyone in Ford Motor Company may report a potential critical production vehicle or component concern, to any Critical Concern Review Group member. Each CCRG member or participant is responsible for informing the CCRG of reports of potentially critical production vehicle safety and/or compliance concerns associated with Ford Motor Company vehicles, components, and related publications, that arise within their activity.

Potential Concern Detection: Numerous data sources are monitored for early detection of potential concerns including, but not limited to:

- GSAR/AWS
- FMC360/GCCT
- GCQIS
- NHTSA VOQ
- Legal Matters
- Connected Vehicle Diagnostic Trouble Codes

Potential concern detection may occur through manual detection by record reading or automated detection using tools such as Quality Early Detection (QED), and Concern Driven Reporting text mining with the utilization of Machine Learning.

Teams company-wide including the Automotive Safety Office (ASO), Trend & Early Warning Support Team (TEWS), etc. monitor data for potential concerns in the field. The TEWS team is primarily responsible within ASO for monitoring field data, identifying potential safety trends and liaising with the Concern Investigations team to communicate potential safety and compliance concerns to CCRG.

After an item has been identified as a concern, it will be included in the CCRG main agenda, for assigning timing objectives and responsibilities for the investigation or evaluation of the item. The investigation/evaluation will address questions of:

- Concern Description: Identify what went wrong, concern components, vehicles and markets affected.
- Root Cause: Identify what caused the concern.
- Concern Investigation: Summarize field data findings and describe any tests and engineering evaluations used in the investigation. If required by the investigation a review of the affected vehicle can be scheduled by the Design Analysis Engineering (DAE) team, which will help review and analyze data such as EDR data or any DTCs stored on the vehicle.
- Containment/Corrective Action: Short term and permanent, describe how these actions will prevent recurrence.
- Assessment of Effect on Vehicle Operation: Describe the symptoms that the vehicle may exhibit as a result of the concern. The description should include the progression of symptoms, the operating or environmental conditions under which the symptoms may occur, and any safety-related consequences. The assessment should not be speculative, but should be based on investigation into field reports, observations, or test results.
- Additionally, for Potential Safety Compliance Related Concerns: Establish the precise requirements of the safety standard or regulation potentially affected, as they relate to the potential safety compliance concern.

- Status reports on the progress of all matters assigned for investigation are to be submitted to the CCRG by the representative from the responsible activity or activities or as designated by the Chair.

c. For vehicles in the field, Ford uses the processes described above to identify and investigate potential safety concerns. Ford does not have a specific set of metrics. Risk is evaluated for each investigation on a case-by-case basis given the available information.

During the development process, Ford components and vehicles are designed and tested to meet all designated requirements, both legal and internal, to comply with the higher quality standards applicable to the market. Level 2 ADAS engineering teams conduct testing as specified in Appendix I, to ensure that the systems work as expected and required, by conducting track tests and real-world drives.

Request 11

Furnish FORD's assessment of the impact of the subject system on the crashes furnished in response to Request 2, including:

a. The causal or contributory factor(s);
b. The failure mechanism(s);
c. The failure mode(s);
d. The risk to motor vehicle safety that they pose.

Answer 11

Ford did not identify any crashes resulting from a Level 2 system usage in the 1.3million+ vehicles on the road in response to Request 2; therefore, Request 11a through d are not applicable. Ford has provided an overall assessment of the subject systems below.

Note: An investigation was opened on October 14, 2021, for a crash allegation NHTSA received on September [redacted] 2021. Currently, Ford is supporting a vehicle inspection. Ford records indicate that at the time of the incident, the vehicle was equipped with adaptive cruise control and lane centering assist systems; however, the vehicle was not equipped with BlueCruise software. At this point there is no additional or conclusive information to provide. The incident was reported to the NHTSA Standing General Order (SGO) 2021-01 Incident Reporting Portal.

Ford Level 2 systems operate with the principle that the driver remains engaged in the driving task while the system is active. Lane Centering Assist and BlueCruise have been fundamentally designed as Level 2 systems. Clear and intentional limits on range of authority emphasize the role of the driver. Ford vehicles are equipped to monitor the driver's engagement and proactively provide necessary warnings when inattentiveness is detected. Ford feature names (Lane Centering Assist & BlueCruise) are consistent with driver assist functions and do not overstate the level of autonomy provided. Additionally, all communication including commercials, brochures, owner's manuals, etc. have consistently highlighted the driver's responsibilities.

When comparing Ford Level 2 functions to that of the subject vehicles NHTSA is investigating in Preliminary Evaluation (PE21-020), Ford vehicles have more conservative limits for: issuing driver alerts, allowable hands off time, steering torque authority, allowable weather conditions, maximum vehicle speed, and modes of operation. Currently, the Ford modes of operation do not include auto lane change, navigation integration, traffic signal integration, or on/off ramp interchange capabilities. Broader limits and additional modes which are available in the Preliminary Evaluation subject vehicles may further reduce the driver role and engagement to the driving task. As technology evolves to add more capabilities, this may require increased driver monitoring and engagement strategies.

Based on the assessment above, Ford believes the differences in Ford Level 2 function, strategy, and implementation, are main contributors to the lack of responsive crashes to Request 2.

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