NHTSA PRELIMINARY EVALUATION 21-020:
AUTO-PILOT AND FIRST RESPONDER INCIDENT SCENE MANAGEMENT

MERCEDES-BENZ
RESPONSE TO INFORMATION REQUEST

NOVEMBER 17, 2021

Mercedes-Benz USA, LLC ("MBUSA") and Mercedes-Benz AG ("MBAG") (sometimes referred to collectively herein as "Mercedes-Benz" or "Respondent") submits this Response to the NHTSA Information Request (IR) dated September 15, 2021 which is associated with PE21-020, pertaining to vehicles manufactured by Tesla Inc (the "Response"). This Response provides narrative descriptions, documents, data, and other materials in response to 10 of 11 multi-part Requests propounded by the IR (Request Nos. 1-6 and 8-11). Mercedes-Benz continues to work diligently to develop responses to the remaining request (Request No. 7) and will complete and submit that further response by the extended due date of December 3, 2021.

Mercedes-Benz has concurrently submitted a Confidentiality Request to NHTSA's Chief Counsel's Office designating Confidential Business included in this Response (including responsive documents).

Mercedes-Benz understands that NHTSA is gathering information in support of the Office of Defects Investigation's ("ODI") comparative analysis among production vehicles sold in the US equipped with SAE automation Level 2 Advanced Driver Assistance Systems ("ADAS"). This Response produces information regarding the Mercedes-Benz's on-road Level 2 system manufactured for use in the U.S., DISTRONIC with Active Steering Assistance.[1]
As discussed below, Mercedes-Benz was one of the first OEMs to offer an adaptive cruise control system ("DISTRONIC") in a production vehicle more than 20 years ago. Since then, the Company has continued to build on that technology and its vehicle safety pioneering tradition by

[1] Mercedes-Benz's Active Parking Assist system is not a Level 2 system and is outside the scope of the IR. With NHTSA's agreement, that distinct and different system is not addressed in this Response.

developing and deploying a number of driver assistance systems. Guided by its "safety first" philosophy and advances in technology, Mercedes-Benz developed an SAE Level 2 ADAS, which it introduced in model year 2014 E & S-Class vehicles. Further generations of technology, development and refinement have led to Mercedes-Benz's current Level 2 system, "DISTRONIC with Active Steering Assist."

That system, like a number of other Mercedes-Benz driver assistance systems and features, is designed and intended to *assist* the driver and mitigate some safety risks. In all situations, the driver remains fully responsible for all driving tasks and must not rely on a DISTRONIC with Active Steering Assist (a Level 2 system) to drive or assume control of the vehicle. As discussed below, such assistance systems have limitations and necessarily require the driver to be engaged, alert, attentive and responsive at all times during operation of the vehicle. As NHTSA summarized in the IR, "[t]he human driver must remain fully and continuously engaged in the (Level 2) driving task." Mercedes-Benz expressly and repeatedly makes as clear as possible to purchasers and operators of its vehicles with Level 1 and Level 2 capable systems that those systems are designed to assist and support the driver and to help mitigate safety risks, but they are not a substitute for the driver. At all times, the driver is fully responsible for the "Dynamic Driving Task," i.e., all essential vehicle driving functions and tasks.

PRELIMINARY MATTERS

Because Mercedes-Benz **[** [Redacted] **]** there are few "Subject Crashes" to report. This Response does include crashes in which a driver or passenger

alleges the Subject System was engaged, regardless of whether Mercedes-Benz has determined if the allegation is accurate or credible.[2]

[[Redacted]

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Prior to responding to the Specific Requests included in the IR, Mercedes-Benz notes that it considers the definition of "document" in the IR to be overly broad, vague, and ambiguous, and to exceed the scope of records that might reasonably be expected to bear relevant information. Respondent has searched for and produced responsive information in written, electronic, digital, and printed forms, as well as images and other forms in which such information might reasonably be expected to be recorded.

Mercedes-Benz's Response to the IR is based on searches of locations currently in the company's custody and control, where documents determined to be responsive to the IR would normally be found, and in consultation with current personnel knowledgeable about the

[2] Mercedes-Benz has liberally interpreted the term "Subject Crash" to include a vehicle with a "Subject System" involved in a collision during which that system was *alleged* to have been engaged. **[** [Redacted]

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information requested. While Mercedes-Benz has conducted a reasonable and diligent search for responsive information, it would be nearly impossible for Mercedes-Benz to identify, collect, and produce "all" information and documents responsive to the IR.

Similarly, the definition of "Mercedes Benz" as a respondent is extraordinarily broad, and meeting its literal terms and scope would not be possible. Simply identifying, locating and querying all of the entities and people captured in the scope of that definition would be extremely difficult. The scope of Mercedes-Benz's search, while broad and intended to identify and gather relevant information from the places it is reasonably likely to be found, did not include, nor could it reasonably include:

> all of its past and present officers and employees, whether assigned to its principal offices or any of its field or other locations, including all of its divisions, subsidiaries (whether or not incorporated) and affiliated enterprises and all of their headquarters, regional, zone and other offices and their employees, and all agents, contractors, consultants, attorneys and law firms and other persons engaged directly or indirectly (e.g., employee of a consultant) by or under the control of Mercedes-Benz USA, LLC (including all business units and persons previously referred to), who are or, in or after January 1st, 2011 were involved in any way with any of the following related to the subject system in the subject vehicles:

a. Design, engineering, analysis, modification or production (e.g. quality control);
b. Testing, assessment or evaluation;
c. Consideration, or recognition of potential or actual defects, reporting, record-keeping and information management, (e.g., complaints, field reports, warranty information, part sales), analysis, claims, or lawsuits; or
d. Communication to, from or intended for zone representatives, fleets, dealers, or other field locations, including but not limited to people who have the capacity to obtain information from dealers.

The definition of "Subject System" is also exceptionally broad.[3] Except where otherwise noted, Mercedes-Benz responds to the Requests with respect to the only Level 2-capable system it sells in the United States: "DISTRONIC with Active Steering Assist." As explained below, that system sometimes uses different trade names in different vehicle models and trims. This Response addresses the Requests with respect to that system in all vehicles in its US product line, regardless of trade name. Mercedes-Benz believes this definition of Subject System reasonably addresses NHTSA's purpose and objectives in the IR without requiring extraordinary additional time and resources necessary to develop peripheral information. If there are instances in which NHTSA believes this approach is not sufficient or additional information may be necessary, Mercedes-Benz would be willing to work with the agency to identify and develop additional information.

[3] Taken literally, a response covering all documents and information regarding any "software, hardware, data, and any other related systems on or off the vehicle that contributes to the conferral of any Level 2 capabilities on any Mercedes-Benz vehicle" since 2011, including every modification to any covered item "since the start of production" could not be completed in any reasonable period of time.

SPECIFIC RESPONSES

Request No. 1:

State, by model and model year, the number of Subject Vehicles Mercedes-Benz has manufactured for sale or lease or operation in the United States. Separately, for each Subject Vehicle manufactured to date by Mercedes-Benz, 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 2010, or a compatible format, entitled "PRODUCTION DATA."

RESPONSE TO REQUEST NO. 1:

Mercedes-Benz has provided the requested information along with other documents submitted as part of this Response, in *Mercedes-Benz IR Response Documents (PE21-20) – Response 1 Materials*, "CONFID. – PRODUCTION DATA.xlsx."

In response to Request No. 1, documents produced as part of this Response provide the total number of vehicles equipped with Level 2-capable ADAS (which Mercedes-Benz refers to as “DISTRONIC with Steering Assist”) that have been manufactured for use in the United States and its territories. The total number of such “Subject Vehicles” manufactured up to October 8, 2021 is **[**[Redact**]** vehicles, starting with model year 2014. The vehicle population includes internal Mercedes-Benz option codes 23P, P20, and 266 for Driver Assistance Packages.

[[Redacted]

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Request No. 2:

State the number of each of the following, received by Mercedes-Benz or of which Mercedes-Benz is otherwise aware, which relate to, or may relate to the Subject System 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 Mercedes-Benz is or was a party to the arbitration – and**
f. **Lawsuits, both pending and closed, in which Mercedes-Benz 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 Mercedes-Benz 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.

RESPONSE TO REQUEST NO. 2:

The following counts may overstate the total number of discrete events because the same event may be reported in multiple data sources, and the Request instructs that "multiple reports of the same incident are . . . to be counted separately."

a. Number of Consumer Complaints: **[ ]**

b. Field Reports: **[ ]**

c. Reports involving a subject crash, injury or fatality: **[ ]**. There were **[ ]** subject crashes involving a fatality.

d. Property damage claims: **[ ]**

e. Third-party arbitration proceedings where Mercedes-Benz is or was a party to the arbitration: **[ ]**

f. Lawsuits, both pending and closed, in which Mercedes-Benz is or was a defendant or codefendant: **[ ]**

Information sources and search methods and criteria and the last date the information was gathered are provided in the Response to Request No. 4

Request No. 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. Mercedes-Benz'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), street address, email address and telephone number;**
- **d. Vehicle's VIN;**
- **e. Vehicle's 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; e-Call**
  - **ii) Crash site coordinates (latitude and longitude); e-Call**
  - **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 2010, or a compatible format, entitled "REQUEST NUMBER TWO DATA."

RESPONSE TO REQUEST NO. 3:

Mercedes-Benz has provided the requested information, to the extent it is available, in *Mercedes-Benz IR Response Documents (PE21-20) – Response 3 Materials*, "CONFID. -- REQUEST NUMBER TWO DATA.xlsx."

Where responsive data is available for Request Nos. 3.k.v and 3.k.vii, it is referenced in *Mercedes-Benz IR Response Documents (PE21-20) – Response 3 Materials*, "CONFID. -- REQUEST NUMBER TWO DATA.xlsx " and included in *Mercedes-Benz IR Response Documents (PE21-20) – Response 4 Materials* for each referenced matter.

[[Redacted]

[Redacted]

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The information responsive to this request and the last date the information was gathered are provided in the Response to Request No. 4.

Request No. 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 Mercedes-Benz used for organizing the documents. Describe in detail the search methods and search criteria used by Mercedes-Benz 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 Mercedes-Benz 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 Mercedes-Benz, plaintiff(s), or co-defendants. This does not include reports that Mercedes-Benz has never produced to another party, to the extent Mercedes-Benz claims a privilege exists for such a report.

RESPONSE TO REQUEST NO. 4:

Responsive information is set forth in Customer Assistance Center (CAC) case reports and summaries and in Field Reports in the spreadsheet entitled *Mercedes-Benz IR Response Documents (PE21-20) – Response 3 Materials*, "CONFID. -- REQUEST NUMBER TWO DATA.xlsx," with separate tabs for "C1C," "Compass," and "PTSS" (in columns "AF-AG," "AL," and "AB" respectively), and additional responsive information sorted by case is included in the folder titled "Response 4 Materials."

"C1C" and "Compass" are databases used to document customer interactions with Mercedes-Benz Customer Assistance Center. Cases are created for various customer claims and contacts, including tow requests, vehicle questions, and customer claims and complaints, among others.

"PTSS" – Product Technical Support System is an internal platform used for communications between authorized Mercedes-Benz dealers and the Product Technical Support team at MBUSA regarding technical assistance inquiries.

Search methods and criteria used by Mercedes-Benz to identify the items included in the Response to Request No. 2 are as follows:

Request No. 2.a The legacy "C1C" database and current "Compass" database were searched through October 8, 2021 for applicable models and Model Years (MY2014 – MY 2021). The data was queried using the keyword "crash" in the case description, or for at least one of the detail codes listed below. A broad list of detail codes was used to open the search parameters as wide as reasonably possible to capture all potentially applicable cases. Mercedes-Benz used such a "wide net" of codes to select potentially responsive claims and incidents because of the variability of potential issues, among the persons reporting and describing the issue (customer, dealer, etc.), and the customer assistance agents receiving the communication and describing event or issue.

[

[Redacted]

[Redacted]

[Redacted]

]

The data and records generated by that search were compared against the *Mercedes-Benz IR Response Documents (PE21-20) – Response 1 Materials,* "PRODUCTION DATA.xlsx" for matching VINs. The resulting data set was reviewed manually and double-checked using keyword searches including the following key words: **[** [Redacted] **]** This resulted in the final case counts reported in the Response to Request No. 2.

In 2019, the MBUSA CAC switched from C1C to the Compass database and some C1C reports were transferred to the new Compass system. Some Compass reports lack responsive technical data or other information, largely due to customer non-response. This includes some claims regarding crashes whose allegations qualify them as "Subject Crashes."

Request No. 2.b This Response provides summaries of Field Reports in "CONFID. -- REQUEST NUMBER TWO DATA.xlsx" in *Mercedes-Benz IR Response Documents (PE21-20) – Response 3 Materials*. To identify responsive information, Respondent searched its Product Technical Support System ("PTSS") was searched for the following keywords: **[** [Redacte **]** The search results were then filtered by "Customer Complaint" and another keyword search. The resulting data was matched against the "CONFID. -- PRODUCTION DATA.xlsx" in *Mercedes-Benz IR Response Documents (PE21-20) – Response 1 Materials* and all matched VINs were retained. Cases involving vehicles without Level 2 automation capability were removed from the list. Each remaining case was reviewed manually to produce the final case count.

Vehicle owner information was not used as a search term because owner information is dynamic, particularly over the 10-year period and seven vehicle model years covered by the IR.

Request No. 2.c Mercedes-Benz followed the same search methods described above for Request No. 2.a. The resulting cases were reviewed manually to determine if a "subject crash" was alleged. Those cases were retained for further analysis. For the cases reported in Request No. 2.a, TREAD "Injuries" and "Fatality" data was sorted for anything greater than 0. This process was completed for both C1C and Compass and then summed for the final case count.

Request No. 2.d Mercedes-Benz followed the same search methods described above for Request No. 2.a. For the cases reported in Request No. 2.a, TREAD "Property Damage" data was used to sort and produce the final case count.

Request No. 2.e **[** [Redacted] **]** database for all product liability suits, retaining all matters defined as litigated or that were not assigned a category. Search results were compared against the "CONFID. -- PRODUCTION DATA.xlsx" in *Mercedes-Benz IR Response Documents (PE21-20) – Response 1 Materials* and Respondent removed matters whose VINs indicated the vehicle involved did not have Level 2 capability. The **[** [Redacted] **]** for adherence to the NHTSA criteria. The **[** [Redacted] **]** system for the requested NHTSA data. Where no documents existed in the **[** [Redac **]**, Mercedes-Benz searched the C1C folder. Where no documents existed in **[** [Redac **]** or the C1C folder, the relevant **[** [Redacted] **]** provided their files concerning the matter. Any of the resulting records that were listed as involving "arbitration" were included in the final case

count. “CONFID. -- REQUEST NUMBER TWO DATA.xlsx” in *Mercedes-Benz IR Response Documents (PE21-20) – Response 3 Materials* and some individual cases included in the final case count were further reviewed with **[** [Redacted] **]** for a final verification check.

Request No. 2.f Mercedes-Benz followed the same search methods described above for Request No. 2.e. In the final step, any records listed as “litigation” (instead of “arbitration”) were used to produce the final case count. “CONFID. -- REQUEST NUMBER TWO DATA.xlsx” in *Mercedes-Benz IR Response Documents (PE21-20) – Response 3 Materials* and some of the **[** [Redacted] **]** for a final verification check.

Mercedes-Benz last gathered information responsive to this Request on October 8, 2021.

Request No. 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 Mercedes-Benz 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 on which 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 Mercedes-Benz; and**
   iii) **If the Subject System can be engaged (or remain engaged) outside of the ODD specified to the customer by Mercedes-Benz, 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 Mercedes-Benz 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 Mercedes-Benz'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 Mercedes-Benz. 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.

RESPONSE TO REQUEST NO. 5:

Over the course of nearly 25 years, Mercedes-Benz has developed its state-of-the-art DISTRONIC system. The Distronic system that Mercedes-Benz introduced in 1998 was designed as an advanced cruise control system for Mercedes-Benz passenger cars. The Company introduced DISTRONIC Plus in 2006, an iteration that included further assistance features for the driver.[4]

This Response focuses on Mercedes-Benz DISTRONIC systems with Active Steering Assist, two systems that together can control both steering and braking/accelerating simultaneously under certain circumstances. Today, this is the only SAE Level-2- capable system offered in Mercedes-Benz vehicles sold in the United States. The combined systems with Level 2 capabilities are also sometimes also referred to together as the Mercedes-Benz Driver Assistance Package. DISTRONIC carries out vehicle braking/accelerating in the longitudinal direction and Active Steering Assist supports vehicle movement in a transverse direction. The full trade name and trim level of the system is "DISTRONIC Plus" (Code 233) in combination with the "Active Steering Assist" (Code 266). The combination of the two assistance systems is

[4] DISTRONIC Plus included further driver assistance features, such as Traffic Sign Assist, Active Speed Limit Assist, Lane Keep Assist and Cross-Wind Assist. These functions were managed by accelerating or braking the vehicle without any control of the steering system.

also offered in Mercedes-Benz vehicles under the trade name “Driver Assistance Package” (Code 23P). Each of those Level 2-capable systems, regardless of trade name, is included as a Subject System covered by this Response.

Mercedes-Benz has rolled out the Level-2 capable driving assistance DISTRONIC with Active Steering Assist in three different generations. Beginning in MY 2014, the first Level-2 capable generation “4.0” was offered in Mercedes-Benz passenger cars in the US market. Today, two further generations “4.5 and 5.0” are offered in Mercedes-Benz vehicles sold in the US. Unless otherwise noted, the remainder of this Response refers to and describes the current generation of DISTRONIC with Active Steering Assist.

[[Redacted]

Figure 1

Figure 2

[Redacted]

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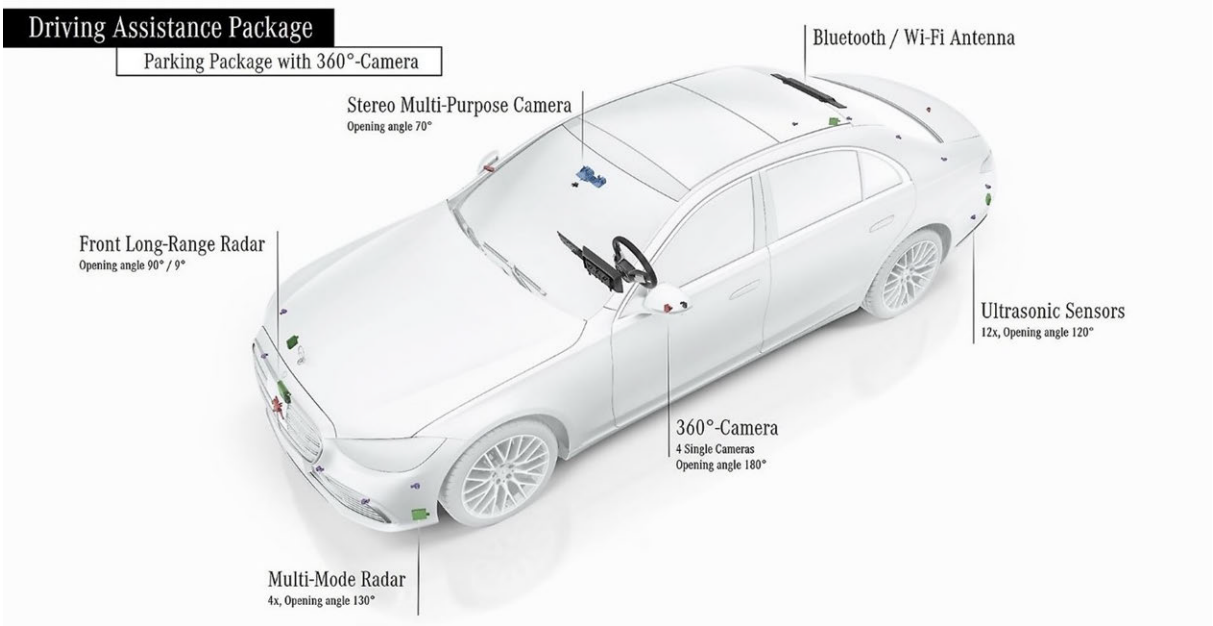

[[Redacted]

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[[Redacted]

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a) The ODD specified to customer by Mercedes-Benz for intended use of the system

The primary resource for customers regarding the functionality of their vehicles is the Operator's Manual issued with every vehicle. For the Subject Vehicles, the excerpts from the Operator's Manual describing the ODD for each system are produced as part of this Response in documents entitled "ModelYear<Range> Model" and can be found in *Mercedes-Benz IR*

Response Documents (PE21-20) – Response 5 Materials – Operating Manuals. Where the systems are the same in different models, the file title designates which models are in scope. Thus, documents produced with this Response cover the applicable models and model years in which DISTRONIC with Active Steering Assist was offered, excluding duplicates when the same system was deployed in successive model years in the same model

DISTRONIC maintains a set speed in free-flowing traffic. If the system detects vehicles in front of a Subject Vehicle, a pre-set distance is maintained until the vehicle comes to a halt (or the system is deactivated). The vehicle accelerates or brakes depending on the distance to the next vehicle ahead and the set speed. The driver sets the speed and distance from the next vehicle ahead using controls on the steering wheel. The DISTRONIC function is available at vehicles speeds over 15 mph (20 km/h).

When a subject vehicle has braked to a standstill, the DISTRONIC system can automatically resume forward motion when the vehicle ahead of it drives away within 30 seconds of the stop. *See also infra* 5.d (more detailed description). If a safety-critical situation is detected when the vehicle begins to move forward (such as a pedestrian in the vehicle path), vehicle acceleration is suspended and the system issues visual and acoustic warnings, alerting the driver to control the vehicle. A green vehicle symbol flashes cyclically in the instrument cluster to signal when DISTRONIC may be re-engaged.

The DISTRONIC system is only a driver ***assistance*** function – at all times, the driver retains full responsibility for driving the vehicle and must be able to take appropriate driving actions over at any time.

The Active Steering Assist system helps to keep a vehicle in the center of the lane using moderate steering interventions (available up to a speed of 130 mph (210 km/h)). Depending on the vehicle speed, Active Steering Assist uses the vehicles ahead and lane markings as a reference. Again, the system is designed only to assist the driver, and full driver attention is required at all times. If detection of lane markings or traffic ahead is impaired, Active Steering Assist switches to passive mode.

At lower speeds, Active Steering Assist can use the surrounding traffic as a reference. If necessary, Active Steering Assist can also provide assistance when the vehicle veers away from the center of the lane.

Drivers are required to keep their hands on the steering wheel at all times (*see* Response to Request No. 5.d) and be prepared at all times to correct the course of the vehicle and keep it in the appropriate lane. The system may switch from active to passive mode or *vice versa,* based on driver inputs, the surrounding conditions, and other factors detailed in the Operator's Manual.

i) Types of roads, road marking, weather conditions, etc. the system is intended to be used on and the types of roads on which the system should not be used;

DISTRONIC is intended to be used on interstates, highways and secondary roads in all weather and lighting conditions where the radar system is not impaired. The system can be activated at speeds over 15 mph. In newer generations the system remains engaged and able to resume operation for up to 30 seconds after DISTRONIC has braked the vehicle to a stop.

DISTRONIC functions may be impaired in certain conditions and situations, including inclement weather conditions (e.g., snow, rain, fog, heavy spray, glare of direct sunlight or

greatly varying ambient light); windshield dirt, fog, damage, or material blocking the camera's view; radar sensors are dirty or covered; in parking garages or on roads with steep uphill or downhill gradients; and approaching narrow vehicles (e.g., bicycles or motorcycles).

DISTRONIC is not designed to assist the driver when changing lanes; or to react to pedestrians, animals, bicycles or stationary vehicles; in complex traffic conditions; or to oncoming vehicles and crossing traffic. The DISTRONIC system may neither give warnings nor intervene in such situations. As with any Level 2 system, the driver must always be aware of driving and traffic conditions carefully and react accordingly.

Active Steering Assist has limited steering torque for lateral guidance, as it is designed as a cooperative system to assist the driver in steering. Active Steering Assist is intended to be used on the straight and gently curving portions of interstates, highways, and secondary of roads that have clear, visible lane markings (in all weather and lighting conditions) and the stereo camera is not obstructed or impaired. The system may be impaired or may not function in the following instances: poor visibility (e.g.: due to snow, rain, fog, heavy spray, greatly varying ambient light or strong shadows on the road); glare (e.g.: from oncoming traffic, direct sunlight or reflection); insufficient road illumination; windshield that is dirty, fogged up, damaged or covered in the vicinity of the camera (e.g.: by a sticker); unclear lane markings, or markings change quickly (e.g.: in a constructions area or at intersections); the lane markings are worn out, dark or covered (e.g.: by dirt or snow and ice); if the distance to the next vehicle ahead is too short or lane markings cannot be detected; the road is narrow or winding; or there are obstacles in the lane. Active Steering Assist does not provide assistance on very tight curves; when crossing

intersections; at roundabout or toll plazas; when actively changing lane without using the turn signal; or when tire pressure is low.

ii) Methods used to prevent Subject System usage outside the ODD

DISTRONIC with Active Steering Assist system does not operate when it lacks the necessary inputs and parameters, which effectively ensures appropriate usage. For example, if clear lane markings become unavailable (or are unavailable at the outset), the system deactivates and notifies the driver via the instrument cluster. When turns are tighter than the system allows, the system also deactivates and notifies the driver. If a sensor (e.g. camera or radar) is blocked, the system is not available, and an instrument cluster signal alerts the driver.[5]

iii) Subject System engagement outside of the ODD

The system will not engage (or remain engaged) outside the ODD specified to the customer and detailed in the Operator's Manual. The Subject System is designed as a driver assistance system to aid the driver, who is responsible for the full driving task at all times. Mercedes-Benz's Subject System is an SAE Level 2 System—it is not self-driving, it is not Level 3,4, or 5, and it is not an "autopilot." As Mercedes-Benz expressly and repeatedly advises customers, DISTRONIC with Active Steering Assist aids the driver in performing driving tasks when engaged and appropriate, but the full driving task remains the driver's responsibility at all times.

[5] The system also can be suspended by the driver depressing the accelerator pedal. Similarly, the system will be disengaged by the application of the brake pedal (*See* Response to 5.e).

b) The subject system's maximum control authority

- **[** [Redacted]

]

c) List and describe the information, system status, alerts, warnings, and graphics communicated by the subject vehicle to its driver during the DDT:

The relevant operator's manuals describe such communications. Some relevant excerpts from the operator's manual for a Mercedes-Benz vehicle equipped with DISTRONIC with Active Steering Assist are reproduced below. The following subsections provide additional descriptions of such information and descriptions.

- **DISTRONIC**

Display messages	Possible causes/consequences and ▶ Solutions
 Suspended	* If you depress the accelerator pedal beyond the setting of Active Distance Assist DISTRONIC, the system will switch to passive mode (→ page 218).
 - - - mph	* Active Distance Assist DISTRONIC cannot be activated as not all activation conditions are fulfilled. ▶ Comply with the activation conditions of Active Distance Assist DISTRONIC (→ page 220).
 Off	* Active Distance Assist DISTRONIC was deactivated. If a warning tone also sounds, Active Distance Assist DISTRONIC has deactivated automatically (→ page 220).
Active Distance Assist Currently Unavailable See Operator's Manual	* Active Distance Assist DISTRONIC is temporarily unavailable. The ambient conditions are outside the system limits (→ page 218). As soon as the ambient conditions are within the system limits, the system will become available again. ▶ Drive on or ▶ If the display message does not disappear, stop the vehicle in accordance with the traffic conditions and restart the vehicle.
Active Distance Assist Inoperative	* Active Distance Assist DISTRONIC is malfunctioning. Other driving systems and driving safety systems may also be malfunctioning. ▶ Drive on or ▶ Stop the vehicle in accordance with the traffic conditions and restart the vehicle. ▶ If the display message does not disappear: consult a qualified specialist workshop.
Active Distance Assist Now Available	* Active Distance Assist DISTRONIC is operational again. ▶ Switch on Active Distance Assist DISTRONIC (→ page 220).

- **Active Steering Assist**

Display messages	Possible causes/consequences and ▶ Solutions
Active Steering Assist Currently Unavailable See Operator's Manual	* Active Steering Assist is temporarily unavailable. The ambient conditions are outside the system limits (→ page 225). As soon as the ambient conditions are within the system limits, the system will become available again. ▶ Drive on ▶ Check the tire pressure if necessary.
Active Steering Assist Inoperative	* Active Steering Assist is malfunctioning. Active Distance Assist DISTRONIC remains available. ▶ Drive on or ▶ Stop the vehicle in accordance with the traffic conditions and restart the vehicle. ▶ If the display message does not disappear: consult a qualified specialist workshop.
	* Active Steering Assist has reached the system limits (→ page 225). You have not steered independently for a considerable period of time. ▶ Take over the steering and drive on in accordance with the traffic conditions.
Active Steering Assist Currently Unavailable Due to Multiple Emergency Stops	* Active Steering Assist is temporarily unavailable due to multiple emergency stops. ▶ Take over the steering and stop in accordance with the traffic conditions. ▶ Switch the ignition off and switch it back on. Active Steering Assist is available once more.
 Beginning Emergency Stop	* Your hands are not on the steering wheel. The Active Steering Assist will initiate an emergency stop (→ page 225). ▶ Put your hands on the steering wheel. Information on canceling an emergency stop (→ page 227).

i) Information, status, alerts, warnings and graphics communicated during routine subject system operation

- **DISTRONIC**

When DISTRONIC is activated, the driver is notified of the status of the system by a symbol that lights up and stays illuminated (“permanently displayed”) as long as DISTRONIC is activated. A white symbol indicates that DISTRONIC is selected and a specified distance has been set. A green illuminated icon indicates that DISTRONIC is selected, a specified distance is set and a vehicle is detected.

Permanent status display

- (white): Active Distance Assist DISTRONIC selected, specified distance set
- (green): Active Distance Assist DISTRONIC active, specified distance set and vehicle detected

The stored speed is permanently displayed and highlighted on the speedometer. When DISTRONIC is not in operation, the status display is grayed out. If the speed of the vehicle immediately ahead or vehicle speed adjusted by the system (e.g. because of a curve) is less than the stored speed due to the route event ahead, the segments in the speedometer light up. When the set specified distance is increased or decreased,  the display briefly appears in the permanently status display. On high-speed major roads, the green vehicle symbol is displayed cyclically when the vehicle is ready to pull away. If the driver depresses the accelerator pedal beyond the speed setting of the DISTRONIC, the system switches to passive mode, and a "Suspended" message appears on the driver display.

- **Active Steering Assist**

When the Active Steering Assist is activated, the driver is informed about the status of the system via a symbolism that lights up permanently in the display.

Permanent status display on the driver display

- **Gray:** activated and passive
- **Green:** activated and active
- **Red, flashing:** prompt to the driver to actively confirm or transition from active to passive status, system limit detected

A gray steering wheel symbol means that the system is activated and passive. A steering wheel icon displayed in green indicates that the system is activated and active. However, the

driver must expect a change from active to passive mode or vice versa at any time. If the symbol flashes red, the customer is warned that the assistance system will switch from the active status to the passive status due to system limits. During the transition from active to passive status, the steering wheel icon is shown as enlarged and flashing. Once the system is passive, the steering wheel icon is shown in gray on the driver display. The red flashing symbol also means that the driver must actively confirm that the person is still ready to drive. The red symbol will also light up accordingly, if the system detects through a steering input torque monitoring or via the capacitive steering wheel (depending on the system / steering wheel generation) that the driver has not steered the vehicle for a considerable period of time or has removed their hands from the steering wheel. In addition a display message appears on the display.

(Display may differ depending on system generation)

If there is still no steering interaction from the driver or the driver does not confirm the message by pressing a specific confirmation button on the steering wheel, a warning tome sounds in addition to the visual warning. If the driver does not respond to this warning for a longer period of time, an emergency stop is initiated. *See* Response to Request 5.d, *supra*. (referencing warning cascade)

ii) Scenarios where vehicle requires "driver intervention"

The Subject System is designed and intended only to assist the driver in performing the dynamic driving task. The driver is always fully responsible for the driving task and must remain engaged at all times. The term "driver intervention" could be misleading to the extent it suggests the driver cedes driving responsibility or control to the System and must "intervene" to resume control. Circumstances in which the system alerts the driver that action is necessary to supplement assistance limits are described below.

- **DISTRONIC**

DISTRONIC brakes the vehicle with up to 50% of the possible deceleration defined in 5.b. If the system detects that this deceleration is not sufficient to avoid collision with an object ahead, DISTRONIC alerts the driver with a visual and acoustic warning. This alerts the driver to apply increased brake pressure or take evasive action to avoid a collision.

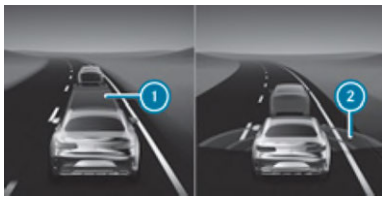
- **Active Steering Assist**

 While driving, a permanent status display is shown on the drivers display. A red, flashing symbol prompts the driver to actively confirm or transition from active to passive status because a system limit has been detected. The Active Steering Assist has a limited steering torque for lateral guidance. As described above, in some cases the steering intervention is not sufficient to keep the vehicle in the lane.

iii)When the subject vehicle detects that a crash is imminent.

Active Brake Assist is a safety assistance system comprised of the following functions: collision warning; autonomous braking; situation-dependent braking assistance.

Active Brake Assist can help to minimize the risk of collision with vehicles, cyclists or pedestrians or to mitigate the effects of any such collisions. If Active Brake Assist detects a risk of collision, a warning tone sounds and the distance warning lamp illuminates. In the Assistance menu (instrument cluster menu that displays information regarding safety assistance systems) red radar waves (2) appear in front of the vehicle to alert the driver to a risk of collision,



If the driver does not react to the warning, autonomous braking is initiated in critical situations. If the possible collision is more imminent, Active Brake Assist initiates autonomous braking directly. In this case, the warning lamp and warning tone coincide with the braking application. If the driver applies the service brake in a critical situation or during autonomous braking assistance, Active Brake Assist increases brake pressure up to maximum full-stop braking if necessary. When autonomous braking or situation-dependent braking assistance occurs, pop up (1) appears in the driver display (below) and automatically goes out after a short time.

If the autonomous braking function or situation-dependent braking assistance is triggered, additional preventive measures for occupant protection (PRE-SAFE®) may also be initiated. Active Brake Assist is only an aid. The driver is responsible for maintaining a sufficiently safe distance to the vehicle in front, vehicle speed and for braking in good time. The driver must always pay careful attention to the traffic situation; The driver must not rely on Active Brake Assist alone, and must always be prepared to brake and swerve if necessary.

Is Brake Assist is deactivated, 

appears in the driver display. If the system is unavailable or its functions are restricted,  appears.

The collision warning function issues a warning in the following situations: If, at speeds over 4 MPH, the vehicle approaches critically close to a vehicle, cyclist or pedestrian, the vehicle issues an intermittent warning tone and the distance warning lamp lights up in the driver display.

d) Overview of Mercedes-Benz's approach to the enforcement of driver engagement / attentiveness during the subject system's operation in the subject vehicles

i) The technological means and related logic used to sense driver engagement

Prior to MY 2021, driver engagement was measured by monitoring the torque on the steering. When driving on straight roads with little steering necessary, driver engagement responses could be activated unnecessarily, leading to customer inconvenience. The new steering wheel introduced in the E-Class (213 platform) in MY 2021 has a capacitive hands-off-detection

system. The system uses two sensor surfaces, installed inside the steering wheel. These capacitive sensors are able to detect the change of capacity when a hand holds the steering wheel. With this new technology active driver steering is not required in order to register driver engagement, making it more convenient when driving on straight stretches of road.

ii) Minimum contact or detected engagement duration and time between contact / detected engagement required to satisfy the driver engagement logic

Minimum duration varies with different software versions. In the currently deployed software version, durations and logic are based on the ECE-standard (UN ECE R79 Cat. B1), which is the world's most stringent standard. While the current version is described here, the response to Request No. 7 will describe differences from prior software versions. The warning strategy is described at 5.d.iii). The exception to this is when the vehicle is traveling on a highway in slow-moving traffic (below 35 mph). In that situation, Active Stop-and-Go Assist supports the driver through the traffic.

<u>Function of Active Stop-and-Go Assist</u>

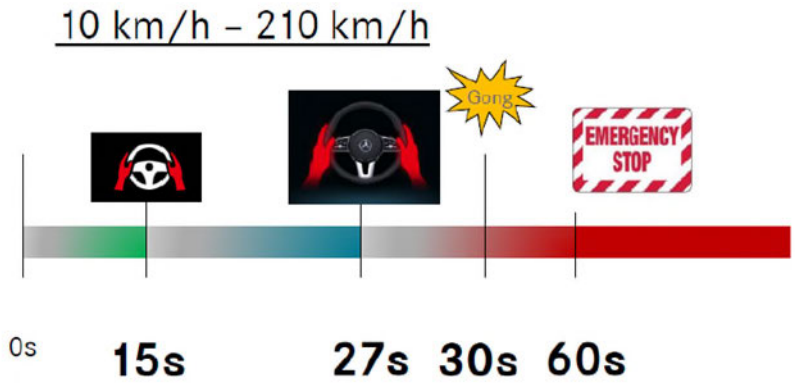
Active Stop-and-Go Assist helps the driver when in traffic jams on multi-lane roads with separate roadways by automatically accelerating the vehicles from a standstill after a full stop that lasted no longer than 60 seconds and with moderate steering maneuvers. It orients itself using the vehicle in front and lane markings. Active Stop-and-Go Assist automatically maintains a safe distance from the vehicle in front and vehicles cutting in. Active Stop-and-Go Assist requires the driver to keep his/her hands on the steering wheel at all times so that the driver is able to act at any time to correct the course of the vehicle and keep it in the appropriate lane.

Active Stop-and-Go Assist activates automatically when all of the following conditions are met: in a traffic jam on a freeway or high-speed major road; DISTRONIC with Active Steering Assist is activated; and the vehicle is moving no faster than 35 mph (60 km/h).

When Active Stop-and-Go Assist is active the  status display appears in the driver display. The system limitations of DISTRONIC and Active Steering Assist apply to Active Stop-and-Go Assist.

iii) Describe any warning strategies or messaging and timing associated with each system identified above in subpart (ii)

A warning strategy applies from 6 mph (10 km/h) up to a maximum speed of 130 mph. Whenever the system detects that the driver has not been engaged for 15 seconds a symbol appears to notify the driver to engage. If 12 more seconds elapse without driver engagement, a warning message illuminates in the instrument cluster (and heads up display, if equipped), alerting the driver that engagement is required. That warning remains visible until driver engagement has been detected. After another 3 seconds, a noise (“Gong”) sounds to further draw driver attention. If no customer engagement is being detected for additional 30 seconds, the Active Emergency Stop Assist (described in iv) is triggered.



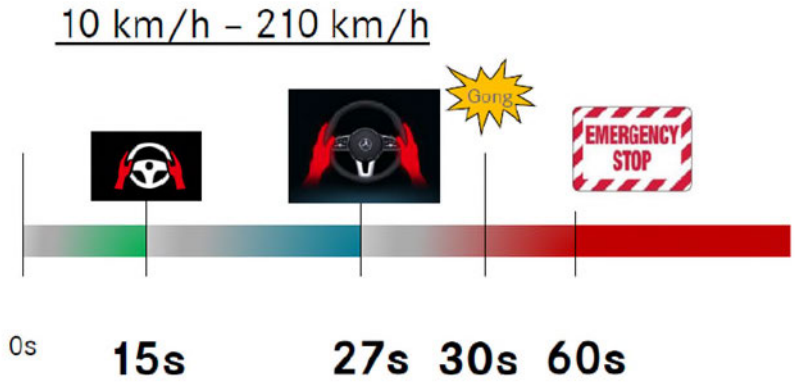
The sequence shown and described above is valid for the current software version, while the previous software version made the customer aware after 30 seconds using the Active Steering Assist icon; after 60 seconds it prompted the message in the instrument cluster including the "Gong;" and it initiated the Active Emergency Stop Assist after 90 seconds.

Furthermore, as shown below while Active Stop-and-Go Assist is active, the warning cascade is changed as followed:

iv) Describe warning strategies or messaging and timing associated with each system identified above in subpart (ii)

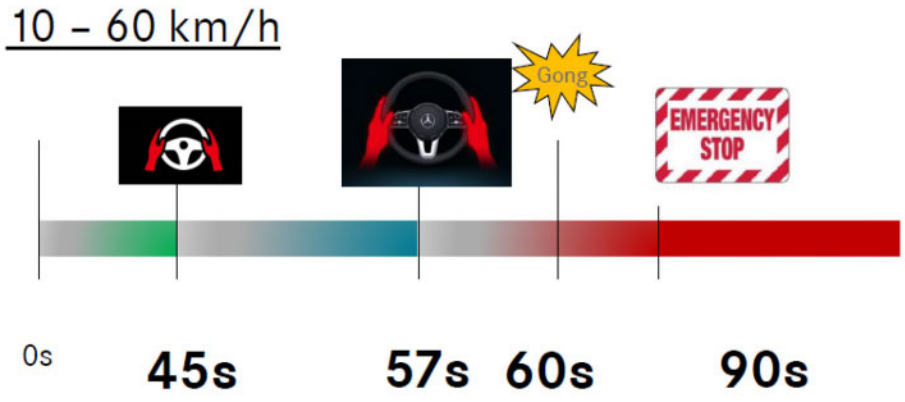
The warning strategy is valid from 6 mph (10 km/h) up to a maximum speed of 130 mph. Whenever it is detected that the driver has not been engaged for 15 seconds the symbol making the driver aware of the status of the Active Steering Assist will notify the driver to engage. After 12 more seconds without driver engagement a warning message will be made visible in the instrument cluster (and heads up display, if equipped), showing the driver that engagement is required and will remain visible until driver engagement has been detected. Additionally after 3

seconds a noise (“Gong”) will draw further driver attention to the system. If no driver engagement is detected for an additional 30 seconds, the Active Emergency Stop Assist is triggered.



The described sequence is illustrated above. Previous software versions progressively alerted the driver after 30 seconds using the Active Steering Assist icon, activated the message in the instrument cluster and the “Gong” after 60 seconds, and initiated Active Emergency Stop Assist after 90 seconds.

When Active Stop-and-Go Assist is active, the warning cascade changes as follows:



v) Describe any escalation or lockout strategies used to address either unresponsive drivers or repeated engagement warnings in any given drive cycle.

As described above, if the driver does not react to warnings for a significant period, an emergency stop is initiated by the Active Emergency Stop Assist system.

Active Emergency Stop Assist brakes the vehicle to a safe stop when it determines that the driver is not properly controlling the vehicle (based on criteria described above). If the situation allows, Active Emergency Stop Assist performs a lane change to the rightmost regular driving lane.

Active Emergency Stop Assist monitors to determine if the driver takes his hands off the steering wheel and at the same time does not act on the pedals. The permissible duration of such driver inactivity is specific to the driving situation. If during that time interval no driver activity is detected, Active Emergency Stop Assist brakes the vehicle to a stop. While decelerating the vehicle, Active Emergency Stop Assist keeps the vehicle in its lane. If the situation allows, the system executes a single lane change to the rightmost regular driving lane. Visible and audible warnings, belt tensioning as well as brake judder are all activated to alert the driver to re-engage. After the vehicle has stopped, Active Emergency Stop Assist activates gear P and the parking brake, triggers an emergency call and unlocks the car for access by emergency personnel.

e) Subject System responses to driver inputs that cancel/override Level 2 functions:

i) Driver input description and minimum threshold

DISTRONIC

- Automatically switches to passive mode (described below at Response 5.e.ii) whenever the driver presses the accelerator pedal.

- Automatically turns off when the driver applies the brake.

Active Steering Assist

- Can be overruled by driver steering action. The system is designed so that it does not continuously try to counteract a steering override by the driver and will re-engage automatically when that override is stopped.

ii) Level 2 functions disabled and permitted to continue following a driver override

DISTRONIC

- While the system is passive it does not accelerate or decelerate the vehicle.
- If the system is turned off, the system is not available until turned on again.

Active Steering Assist

- If the driver steers in the same direction as the system, the system supports the driver in steering.
- If the driver steers in the opposite direction of the system, the system will not apply any force to counter the oversteering action by the driver.

iii) Describe / illustrate warnings and messages to the driver concerning system status following a driver override

DISTRONIC

- Instrument cluster indicators notify driver that the system has switched to passive mode or has been turned off.

Display messages	Possible causes/consequences and ▶ Solutions
 Suspended	* If you depress the accelerator pedal beyond the setting of Active Distance Assist DISTRONIC, the system will switch to passive mode (⟶ page 218).
 Off	* Active Distance Assist DISTRONIC was deactivated. If a warning tone also sounds, Active Distance Assist DISTRONIC has deactivated automatically (⟶ page 220).

Active Steering Assist

For driver convenience the driver is not notified when the system suppresses steering forces due to driver override. As long as the Active Steering Assist icon stays green, it will reengage automatically after the driver ends the override.

iv) Explain which, if any, of the disabled Level 2 functions resume operation on their own after the override input and under what conditions.

DISTRONIC

- After responding to driver override, the system will resume regular operation after the driver stops applying the accelerator pedal. The driver is notified by an instrument cluster indicator that the system has resumed driving assistance.

- Because the driver elected not to turn the assistance function off, but only decided to accelerate the vehicle for a limited period, the system continues to operate in passive mode.

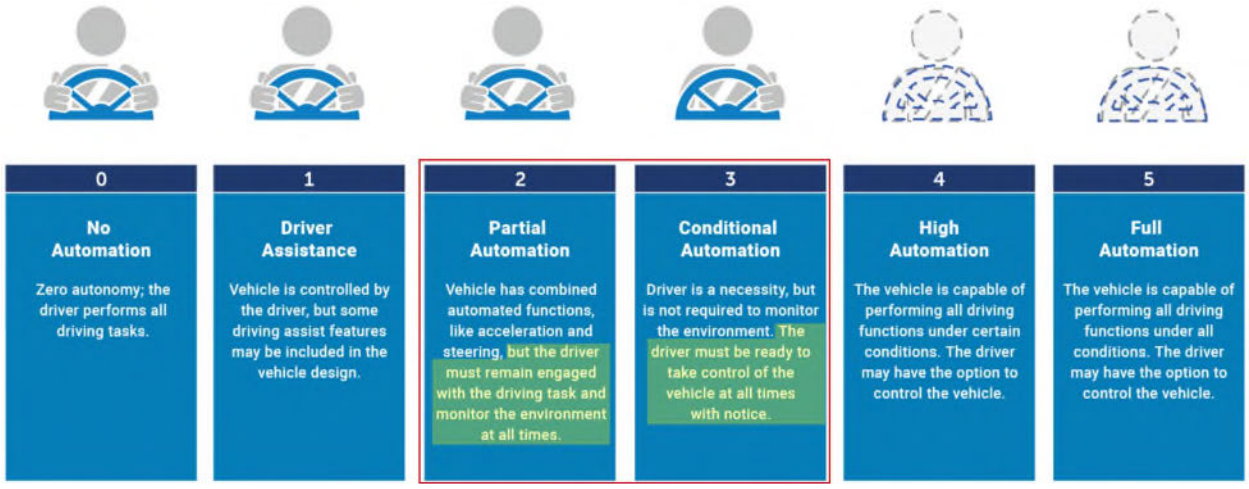
Active Steering Assist

- When in passive mode the system will resume regular operation whenever the driver stops steering in a different direction from the system. In this case the system continues in supporting the driver in steering the vehicle. The customer is made aware of the system being active in the instrument cluster.
- Active Steering Assist is designed to allow the driver to easily override the system at any time.

f) List the conditions / events / alerts that may prompt an operating Subject System to require a "take-over" by the driver.

This response references conditions and/or events that lead to a warning to the driver while using the Subject System. Mercedes Benz clarifies that because the driver of a vehicle of a Level 2 vehicle never transfers driving control to that system, there is no need for a "take-over"—the driver is to remain engaged and fully responsible for the Dynamic Driving Task at all times.

As the following NHTSA graphic of the SAE automation levels illustrates, driver "take-over" scenarios may arise when a vehicle is equipped with a Level 3 or higher automation system, which does control some (or all) of the dynamic driving task under certain conditions. When operating a vehicle with a Level 3 system activated, the driver must be ready to intervene to take back control of the vehicle. The Subject System is a Level-2 system that is never responsible for full control of the vehicle.



However, individual system functions deployed in Mercedes-Benz vehicles in the US today might generally or colloquially described as sometimes requiring a "take over" by the driver. These functions are described in detail in preceding subsections 5.a through 5.e of this Response. To avoid duplication, those responses are not repeated here.

g. Subject System OEDR capabilities within the ODD specified to the customer

The following section describes object and event detection and the system response for the Subject System (the DISTRONIC with Active Steering Assist). Specific operating domains for which the assistance systems are designed and their limitations are summarized below. Other relevant system capabilities, limitations, and attributes are discussed in preceding sections of this Response to Request 5, and in the applicable Operator's Manuals (copies produced in response to Request No. 6).

i) Subject System behavior

The Driver Assistance Package fits Mercedes-Benz vehicles with a variety of sensors, including cameras, radar and ultrasound to monitor the vehicle environment and provide inputs to the driver assistance systems. Additionally, the Subject Vehicles' assistance and safety systems use data from maps, navigation inputs, and Live Traffic Information to assess routes and traffic in real time. All information is intelligently networked and synthesized. Combined, the systems in the package feature an increased scope of functions compared with individual or standard systems. What a driver gains in terms of comfort and convenience is significant—the systems reduce strain on the driver. For example, the systems assist in braking and accelerating. Both are adjusted by just the right amount, based on traffic conditions, vehicle position, and relevant dynamic factors, while taking into account curves, roundabouts, intersections, toll booths and other roadway features. When the driver makes a turn, leaves a high-speed road or expressway or approaches the end of a tailback (identified by Live Traffic Information), the Subject System can adjust vehicle speed automatically. The system also automatically observes detected speed limits. Gentle steering interventions help to keep the vehicle in its lane.

ii) Limitations on detection

As explained in the Operators' Manual, the system may be impaired or may not function in the following conditions: poor visibility (e.g., due to snow, rain, fog, heavy spray, greatly varying ambient light or strong shadows on the road); glare (e.g., from oncoming traffic, direct sunlight or reflections; insufficient road illumination); the windshield is dirty, fogged up, damaged or obstructed in the vicinity of the camera (e.g., by a sticker); absent or unclear lane

markings, a rapid change in lane markings (e.g., in a construction area or at intersections); lane markings are worn away, dark or obscured (e.g., by dirt or snow, ice); if the distance to the next vehicle ahead is too short and the lane markings cannot be detected; the road is narrow and/or winding; or there are unusual objects in the lane.

iii) Subject System interaction with crash avoidance technologies.

The increase in motor vehicle safety associated with the Subject System and other Mercedes-Benz crash avoidance systems is significant in situations where there is a risk of collision. Depending on the situation, the systems respond to pedestrians, cyclists, vehicles moving in and crossing the direction of travel, and oncoming traffic when making a turn. The systems provide three-stage protection, starting with visual and audible warnings.

Examples of further safety benefits provided in conjunction with crash avoidance systems include:

- If the driver's braking response is not sufficient to prevent an imminent collision, the systems increase brake pressure.
- If the driver fails to brake at all, autonomous brake actuation follows up to full brake application (as described in the response to Request No. 8).
- If a driver unintentionally leaves a lane or gets dangerously close to the edge of the roadway, one-sided brake application initiates a course correction – potentially avoiding an impending collision with oncoming or parallel traffic. This protects vehicle occupants and other road users – particularly those in the driver's blind spot.
- Mercedes-Benz crash avoidance systems warn approaching drivers of a potential rear impact collision by rapidly blinking rear hazard warning lights of a subject vehicle at risk of being rear-ended. At the same time, reversible belt tensioners are activated in an anticipatory manner. If the vehicle threatened with rear impact is stationary, it is immobilized by the brakes. This both reduces forward roll to reduce the forces acting on the passengers in a collision, and reduces the risk of secondary accidents.

- Certain emergencies are also addressed if (when Active Steering Assistance is operating) a driver is no longer able to carry out the driving tasks (perhaps for health reason). After a warning, the system causes the vehicle to brake, initially gently and then increasingly firmly until it comes to a stop. The hazard warning lights are then switched on (as described in 5d). A connection to the Mercedes-Benz emergency call center is automatically established and the vehicle is unlocked for the first responder access.

When the DISTRONIC system detects that the deceleration the system can provide is insufficient to avoid a crash, the system informs the driver with an optical and acoustic warning to the driver that the required braking force exceeds the system's abilities. This warning allows the driver to apply more brake force to avoid a collision. As soon as the Active Brake Assist (described in Response to Request 8) detects a possible crash, it initiates crash avoidance measures. *See* Response to Request No. 8.

Mercedes-Benz last gathered information responsive to this Request on November 12, 2021.

Request No. 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 Mercedes-Benz 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, with the exception of standard shop manuals. Also, include the latest draft copy of any communication that Mercedes-Benz is planning to issue within the next 120 days.

RESPONSE TO REQUEST NO. 6:

Mercedes-Benz has produced responsive documents and materials (including videos) in *Mercedes-Benz IR Response Documents (PE21-20) – Response 6 Materials* in response to this request. Subfolders separate this information into the following subcategories having content regarding the Subject System:

- "LIs" which contains technical bulletins
- "Marketing Materials" in the form of:
    - Brochures offered to customers, dealers, and the general public. Files have been organized by model year "MY" and model (*e.g.* E-Class).
    - Video assets released from calendar year 2013 until the present (including those planned for release within the next 120 days) are provided in .mp4 format.
- "Training Documents" **[** [Redacted]

]

Mercedes-Benz last gathered information responsive to this Request on November 11, 2021.

Request No. 7:

With NHTSA's permission, Mercedes-Benz will complete its Response to Request No. 7, and produce responsive information on or before December 3, 2021.

Request No. 8:

Describe Mercedes-Benz's strategies for detecting and responding to the presence of first responder / law enforcement vehicles and incident scene management tactics

RESPONSE TO REQUEST NO. 8:

[[Redacted]

[Redacted]

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Request No. 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.**

RESPONSE TO REQUEST NO. 9:

[

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

]

Request No. 10:

Describe Mercedes-Benz'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 Mercedes-Benz;

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.

RESPONSE TO REQUEST NO. 10:

[[Redacted]

[Redacted]

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A [Redacted]

[6] [[Redacted]

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[Redacted]

[Redacted]

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Request No. 11:

Furnish Mercedes-Benz'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.

RESPONSE TO REQUEST NO. 11:

[[Redacted]

[Redacted]

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