LKK Auto Consultants Pte Ltd
Company Registration No. 199607198R
51 UBI AVE 1, #01-25 PAYA UBI INDUSTRIAL PARK, SINGAPORE 408933 TEL : (065) 62563561 FAX : (065) 67414108

Your Ref: MTS2022D0000625 15th February 2022
Our Ref : CI/III22001252/P

**M/s India International Insurance Pte. Ltd.**
64 Cecil Street #04, #05
IOB Building
Singapore 049711

**TECHNICAL INVESTIGATION REPORT OF WARRANTY CLAIM INVOLVING THE INSURED VEHICLE SDK 1212T ON 9th February 2022**

1. We refer to your letter dated 9th February 2022 and the instructions therein.

2. Our analysis, comments and opinions with respect to the cause of abnormalities to the insured vehicle SDK 1212T (herein referred to as **"Insured Vehicle"**) are set out below.

**Inspection of the Insured Vehicle**

3. The Insured Vehicle was physically inspected on 13th January 2022 at the premises of AutoSprint Pte Ltd located at 24 Leng Kee Rd, #07-01, Singapore 159096

4. A physical inspection was carried out to the Insured Vehicle where the following general information was recorded:-

| | |
|---|---|
| Vehicle Registration No. | : SDK 1212T |
| Make / Model | : MERCEDES BENZ S500L |
| Chassis No | : W1K2231632A015015 |
| Year of Registration | : JUNE 2021 |
| Mileage | : 12,303KM |

5. The complaint on the Insured Vehicle was noted be an error and warning message light regarding the electronic Advanced Driver Assistance Systems (ADAS) for the steering rack and pinion system. There is a recommendation by the workshop to replace the steering rack and pinion assembly. The vehicle was observed to be unaffected by any signs of accident.

6. Prior to our inspection, the workshop had informed us that they had already conducted check of the components and the electrical systems of the steering rack and pinion system and visually all components was intact without any damage and however, the issue was still present during our inspection of the Insured Vehicle. See photos 1 – 9 below.


**Photo 1** shows the mileage of the Insured Vehicle recorded at the time inspection at 12,303KM


**Photo 2** shows the general view of the front portion of the Insured Vehicle at the time of our inspection. The Insured Vehicle is observed to be unaffected by any signs of accident.

**Photo 3** shows the general view of the engine portion of the Insured Vehicle at the time of our inspection. The engine compartment is observed to be unaffected by any signs of accident.

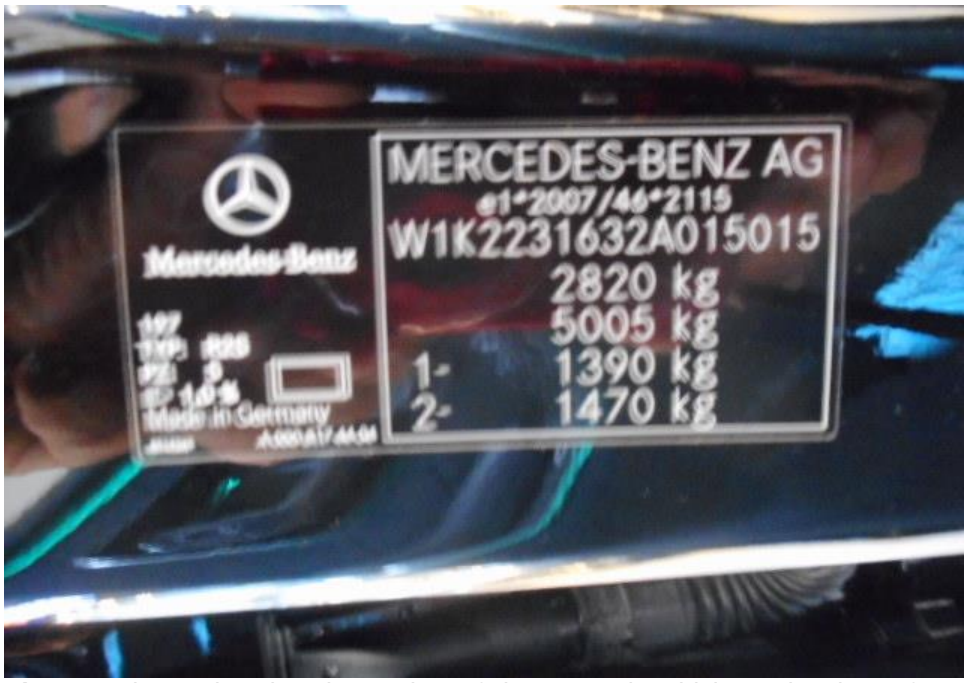


**Photo 4** shows the chassis number of the Insured Vehicle at the time of our inspection.

**Photo 5** shows the general view of the engine underside portion of the Insured Vehicle at the time of our inspection. The engine underside compartment is observed to be unaffected and by any signs of accident.

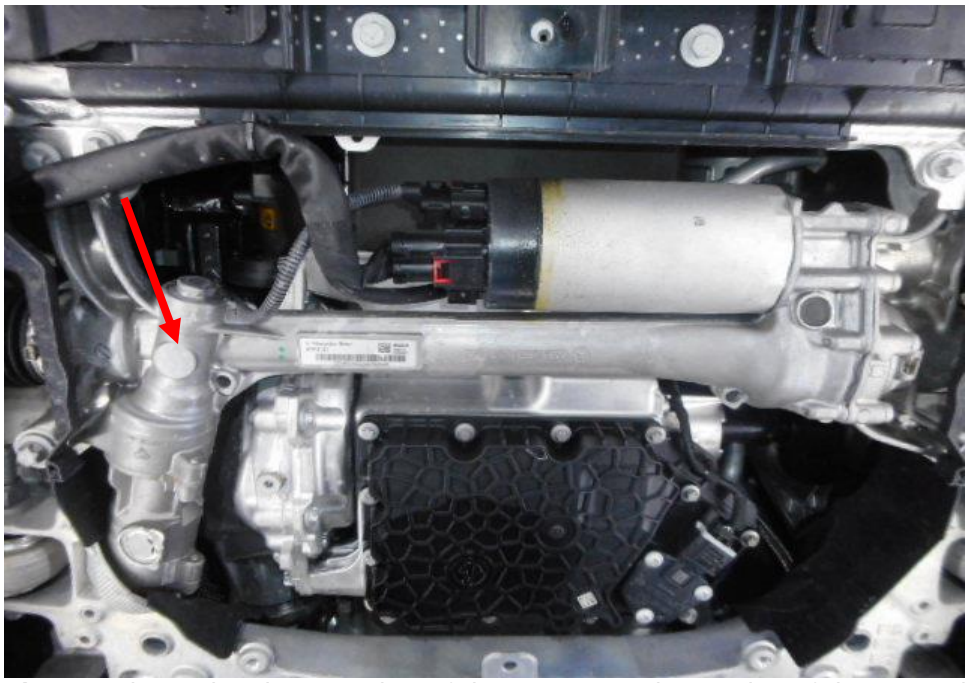

**Photo 6** shows the close up view of the power steering portion of the Insured Vehicle at the time of our inspection. The Electronic Power Steering unit and its steering rack and pinion component is observed to be unaffected and by any signs of accident.

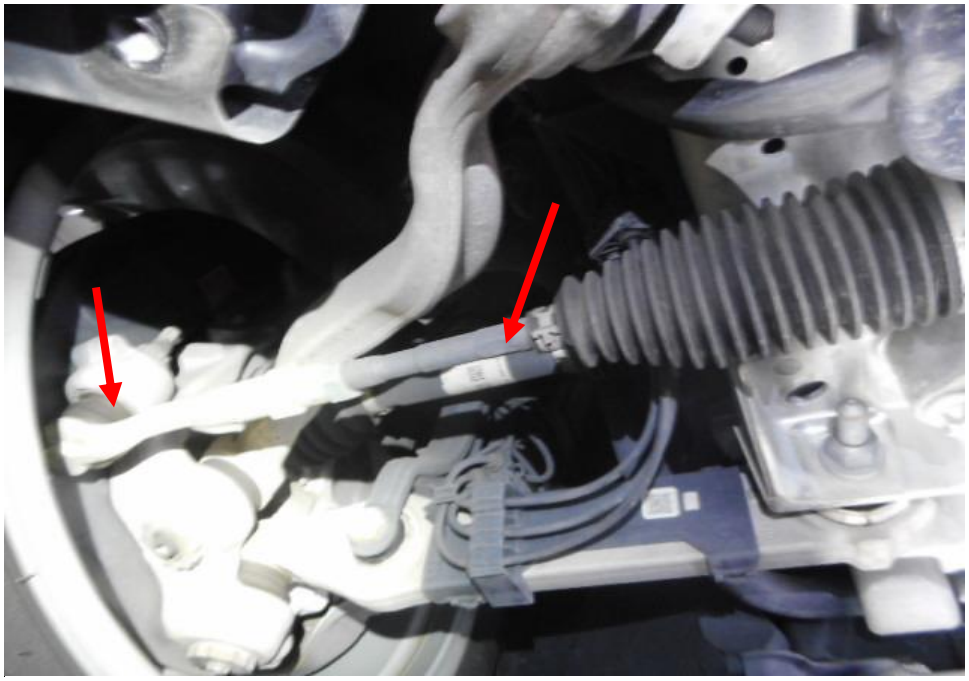

**Photo 7** shows the close up view of the front left wheel of the Insured Vehicle at the time of our inspection. The steering tie rod (arrowed) is observed to be unaffected and by any signs of accident.

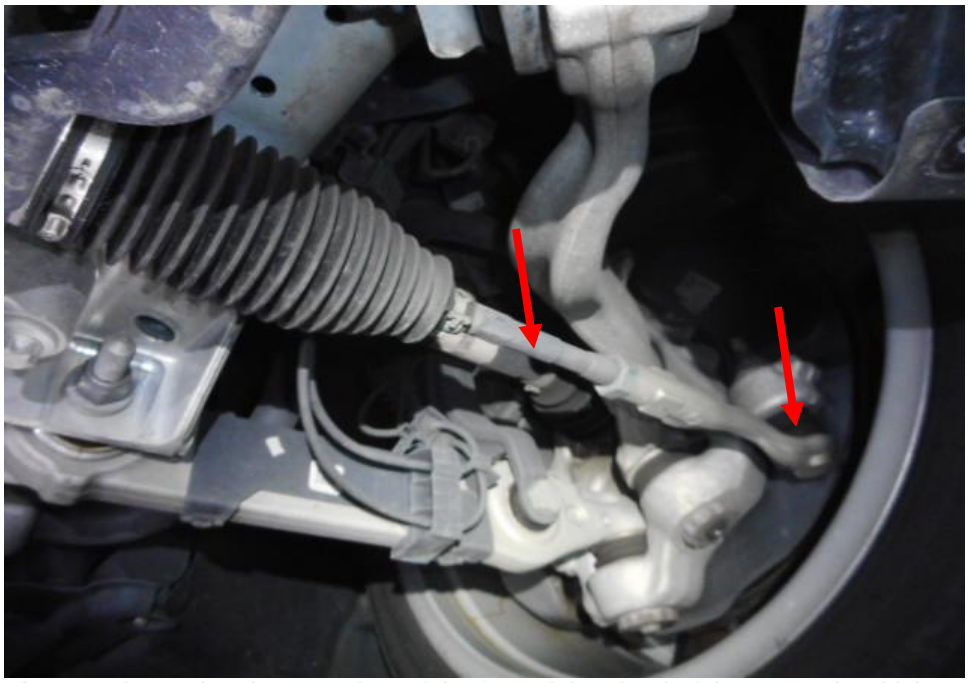

**Photo 8** shows the close up view of the front right wheel of the Insured Vehicle at the time of our inspection. The steering tie rod (arrowed) is observed to be unaffected and by any signs of accident.

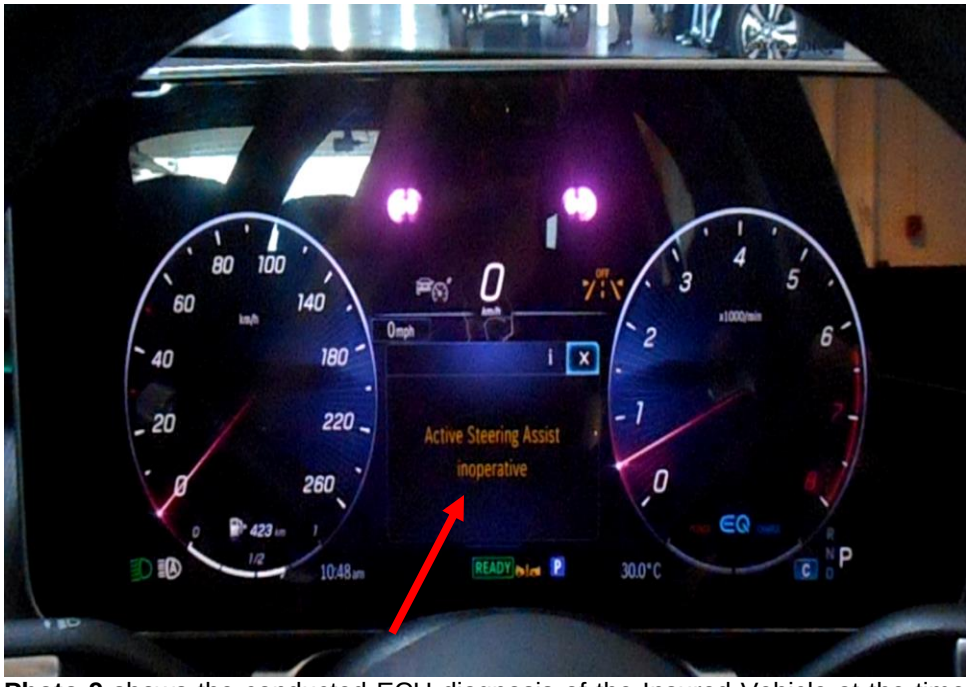


**Photo 9** shows the conducted ECU diagnosis of the Insured Vehicle at the time of our inspection. There was an electronic error (arrowed) on the Electronic Power Steering of the Insured Vehicle.

XENTRY Mercedes-Benz

| Event | Text | | Status |
|---|---|---|---|
| | Name | First occurrence | Last occurrence |
| | Outside temperature | > 25°C | > 25°C |
| | Brake pedal position | Brake pedal OPERATED | Brake pedal OPERATED |
| | Status of engine operation | No engine start request | No engine start request |
| | Ignition signal | Ignition ON | Ignition ON |
| | Temperature of printed circuit board | 44.00°C | 44.00°C |
| | Status of drivetrain | Drivetrain OPERATIONAL | Drivetrain OPERATIONAL |
| | Supply voltage of control module | 12.50V | 12.50V |
| | Vehicle speed | Vehicle stationary | Vehicle stationary |
| | Appl_Slot_Index (Development data) | 10 | 10 |
| | Aurix_Die_Temperature (Development data) | No | No |
| | Ethernet_Switch_Temp_Flag (Development data) | No | No |
| | PCB_Sensor_DRAM (Development data) | No | No |
| | PCB_Temperature1 (Development data) | 44.00°C | 44.00°C |
| | PMIC_Thermal_Shutdown (Development data) | No | No |
| | Supply_Voltage1 (Development data) | 12.50V | 12.50V |
| | Frequency counter | --- | 1 |
| | Main odometer reading | 2112km | 2112km |
| | Number of ignition cycles since the last occurrence of the fault | --- | 0 |
| | Operating time | 655986ms | 655986ms |

S=STORED, A+S=CURRENT and STORED

**N68 - Electrical power steering (ES)** -F-

| Model | Part number | Supplier | Version |
|---|---|---|---|
| Hardware | 223 901 94 06 | Bosch | 19/30 000 |
| Software | 223 902 35 12 | Bosch | 20/35 009 |
| Boot software | --- | --- | 20/23 000 |
| Diagnosis identifier | 005A04 | Control unit variant | EPS223_Development_R12 |

| Fault | Text | | Status |
|---|---|---|---|
| P063544 | The electric power steering has a malfunction. There is an error in the data memory. | | S |
| | Name | First occurrence | Last occurrence |
| | Battery current | -0.10A | -0.10A |
| | Temperature of printed circuit board | 34.00°C | 34.00°C |
| | Temperature in control unit | -70.00°C | -70.00°C |
| | Steering wheel Torque | 0.00Nm | 0.00Nm |
| | EPS_rack_position | 0.00mm | 0.00mm |
| | EPS_rack_position_offset | 0.00mm | 0.00mm |
| | EPS_rack_speed | 0.00 1/min | 0.00 1/min |
| | Ignition status | Off | Off |
| | Mon_ID | 256 | 256 |
| | Mon_ID_Flag | Mon_ID | Mon_ID |
| | Electric motor Torque | 0.00Nm | 0.00Nm |
| | Temperature of output stage | 32.00°C | 32.00°C |
| | Control unit 'Powertrain' Status | No | No |
| | Reduction Output level | 0.00% | 0.00% |
| | System status (SAR) | 0 | 0 |
| | Steering wheel angle | 0.00° | 0.00° |
| | Steering wheel Rotational speed | 0.00 1/min | 0.00 1/min |
| | Supply voltage | 6.20V | 6.20V |
| | System status | NM_Wait | NM_Wait |
| | Vehicle speed | 0.00km/h | 0.00km/h |
| | Temperature of electric motor | 20.00°C | 20.00°C |
| | Reading of odometer | 429496736.00km | 429496736.00km |
| | Frequency counter | --- | 1 |
| | Main odometer reading | 429496736.00km | 429496736.00km |
| | Number of ignition cycles since the last occurrence of the fault | --- | 0 |
| | Operating time | 0.008s | 0.008s |
| C159100 | Torque sensor 2 of the power steering system has a malfunction. _ | | A+S |
| | Name | First occurrence | Last occurrence |
| | Battery current | 0.00A | -0.10A |
| | Temperature of printed circuit board | 87.00°C | 63.00°C |
| | Temperature in control unit | 92.00°C | 66.00°C |

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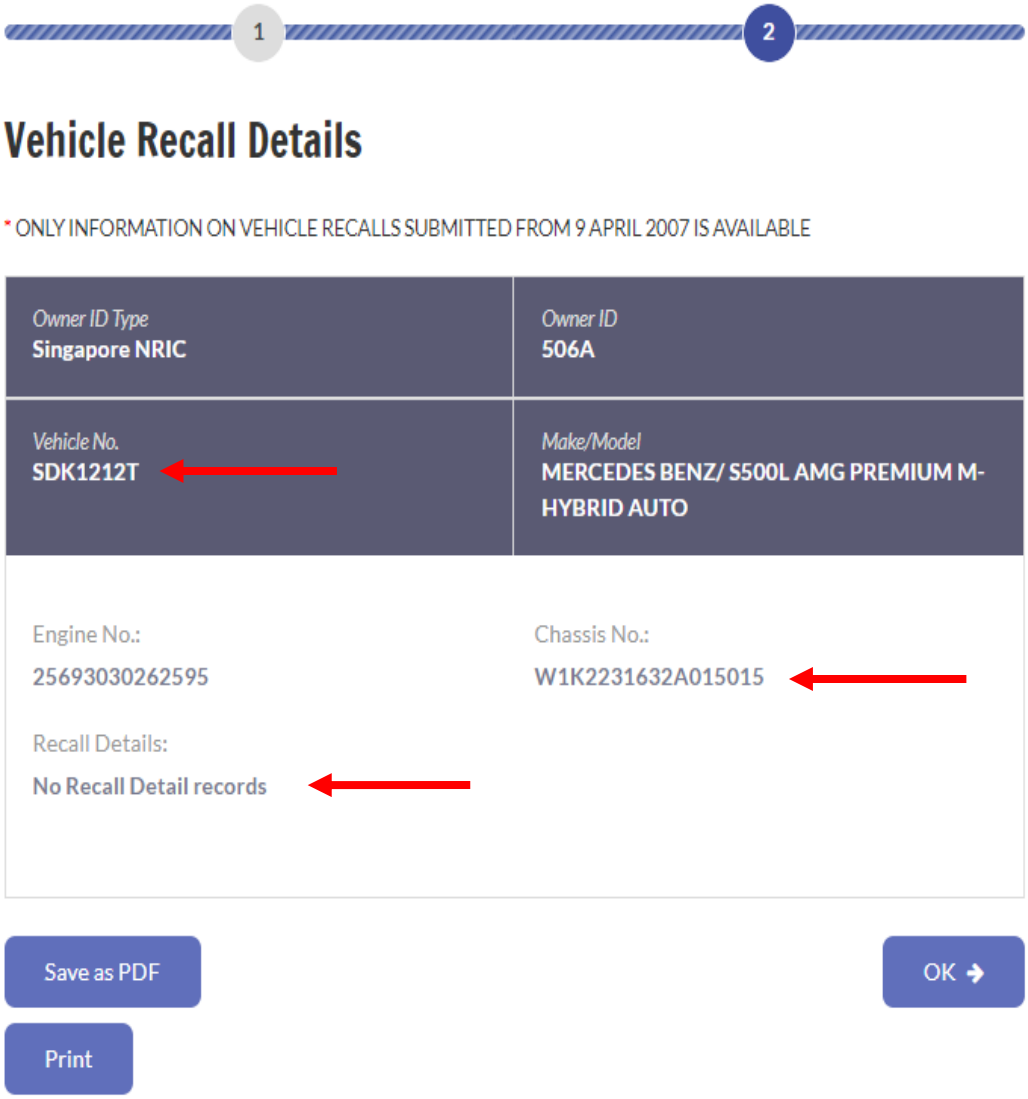
**Photo 10** shows the conducted ECU diagnosis of the Insured Vehicle at the time of our inspection. There was an electronic error (arrowed) on the Electronic Power Steering of the Insured Vehicle.

7. Our checks with both local and international bodies and associations had also revealed that at the time of writing this report, there is no manufacturer recall of similar make and model vehicle as the Insured Vehicle that may possibly be related to abnormalities being originated from the steering system of the Insured Vehicle. See search result from LTA below.



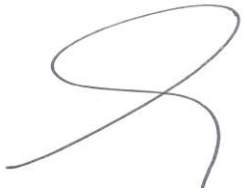

**Recall details.** Shows the vehicle recall results retrieved from LTA's website. There was no recall on the Insured Vehicle at the time of incident.

## Conclusion

8. We did not find any evidence which had suggested that the cause of abnormalities to the Insured Vehicle was due to poor maintenance and/or recurring problem.

9. The recommendation to replace the Power steering rack and pinion assembly at $6,498.55 is justifiable as all the relevant checks has been conducted.

**Sherwin Beh**
*Technical Investigator*



**Ang Bryan Tani**
*AMSOE, AMIRTE, AFF SAE, M.MATAI, AFF.Inst.AEA*
*Senior Technical Investigator*
*Technical Investigation & Reconstructionist (SAE-A)*