

Dell Latitude 5500

Service Manual



Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

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Working on your computer

Safety instructions

Use the following safety guidelines to protect your computer from potential damage and to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that the following conditions exist:

- You have read the safety information that shipped with your computer.
- A component can be replaced or, if purchased separately, installed by performing the removal procedure in reverse order.

⚠ WARNING: Disconnect all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting to the power source.

⚠ WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the [Regulatory Compliance Homepage](#)

⚠ CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

⚠ CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.

⚠ CAUTION: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

⚠ CAUTION: When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

ⓘ NOTE: The color of your computer and certain components may appear differently than shown in this document.

Before working inside your computer

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

- 1 Ensure that you follow the [Safety Instruction](#).
- 2 Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
- 3 Turn off your computer.
- 4 Disconnect all network cables from the computer.

⚠ CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.

- 5 Disconnect your computer and all attached devices from their electrical outlets.
- 6 Press and hold the power button while the computer is unplugged to ground the system board.

ⓘ NOTE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.

Safety precautions

The safety precautions chapter details the primary steps to be taken before performing any disassembly instructions.

Observe the following safety precautions before you perform any installation or break/fix procedures involving disassembly or reassembly:

- Turn off the system and all attached peripherals.
- Disconnect the system and all attached peripherals from AC power.
- Disconnect all network cables, telephone, and telecommunications lines from the system.
- Use an ESD field service kit when working inside any notebook to avoid electrostatic discharge (ESD) damage.
- After removing any system component, carefully place the removed component on an anti-static mat.
- Wear shoes with non-conductive rubber soles to reduce the chance of getting electrocuted.

Standby power

Dell products with standby power must be unplugged before you open the case. Systems that incorporate standby power are essentially powered while turned off. The internal power enables the system to be remotely turned on (wake on LAN) and suspended into a sleep mode and has other advanced power management features.

Unplugging, pressing and holding the power button for 15 seconds should discharge residual power in the system board. notebooks.

Bonding

Bonding is a method for connecting two or more grounding conductors to the same electrical potential. This is done through the use of a field service electrostatic discharge (ESD) kit. When connecting a bonding wire, ensure that it is connected to bare metal and never to a painted or non-metal surface. The wrist strap should be secure and in full contact with your skin, and ensure that you remove all jewelry such as watches, bracelets, or rings prior to bonding yourself and the equipment.

Electrostatic discharge—ESD protection

ESD is a major concern when you handle electronic components, especially sensitive components such as expansion cards, processors, memory DIMMs, and system boards. Very slight charges can damage circuits in ways that may not be obvious, such as intermittent problems or a shortened product life span. As the industry pushes for lower power requirements and increased density, ESD protection is an increasing concern.

Due to the increased density of semiconductors used in recent Dell products, the sensitivity to static damage is now higher than in previous Dell products. For this reason, some previously approved methods of handling parts are no longer applicable.

Two recognized types of ESD damage are catastrophic and intermittent failures.

- **Catastrophic** – Catastrophic failures represent approximately 20 percent of ESD-related failures. The damage causes an immediate and complete loss of device functionality. An example of catastrophic failure is a memory DIMM that has received a static shock and immediately generates a "No POST/No Video" symptom with a beep code emitted for missing or nonfunctional memory.
- **Intermittent** – Intermittent failures represent approximately 80 percent of ESD-related failures. The high rate of intermittent failures means that most of the time when damage occurs, it is not immediately recognizable. The DIMM receives a static shock, but the tracing is merely weakened and does not immediately produce outward symptoms related to the damage. The weakened trace may take weeks or months to melt, and in the meantime may cause degradation of memory integrity, intermittent memory errors, etc.

The more difficult type of damage to recognize and troubleshoot is the intermittent (also called latent or "walking wounded") failure.

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. The use of wireless anti-static straps is no longer allowed; they do not provide adequate protection. Touching the chassis before handling parts does not ensure adequate ESD protection on parts with increased sensitivity to ESD damage.

- Handle all static-sensitive components in a static-safe area. If possible, use anti-static floor pads and workbench pads.
- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the anti-static packing material until you are ready to install the component. Before unwrapping the anti-static packaging, ensure that you discharge static electricity from your body.
- Before transporting a static-sensitive component, place it in an anti-static container or packaging.

ESD field service kit

The unmonitored Field Service kit is the most commonly used service kit. Each Field Service kit includes three main components: anti-static mat, wrist strap, and bonding wire.

Components of an ESD field service kit

The components of an ESD field service kit are:

- **Anti-Static Mat** – The anti-static mat is dissipative and parts can be placed on it during service procedures. When using an anti-static mat, your wrist strap should be snug and the bonding wire should be connected to the mat and to any bare metal on the system being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the mat. ESD-sensitive items are safe in your hand, on the ESD mat, in the system, or inside a bag.
- **Wrist Strap and Bonding Wire** – The wrist strap and bonding wire can be either directly connected between your wrist and bare metal on the hardware if the ESD mat is not required, or connected to the anti-static mat to protect hardware that is temporarily placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the ESD mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, mat, and bonding wire. Never use wireless wrist straps. Always be aware that the internal wires of a wrist strap are prone to damage from normal wear and tear, and must be checked regularly with a wrist strap tester in order to avoid accidental ESD hardware damage. It is recommended to test the wrist strap and bonding wire at least once per week.
- **ESD Wrist Strap Tester** – The wires inside of an ESD strap are prone to damage over time. When using an unmonitored kit, it is a best practice to regularly test the strap prior to each service call, and at a minimum, test once per week. A wrist strap tester is the best method for doing this test. If you do not have your own wrist strap tester, check with your regional office to find out if they have one. To perform the test, plug the wrist-strap's bonding-wire into the tester while it is strapped to your wrist and push the button to test. A green LED is lit if the test is successful; a red LED is lit and an alarm sounds if the test fails.
- **Insulator Elements** – It is critical to keep ESD sensitive devices, such as plastic heat sink casings, away from internal parts that are insulators and often highly charged.
- **Working Environment** – Before deploying the ESD Field Service kit, assess the situation at the customer location. For example, deploying the kit for a server environment is different than for a desktop or portable environment. Servers are typically installed in a rack within a data center; desktops or portables are typically placed on office desks or cubicles. Always look for a large open flat work area that is free of clutter and large enough to deploy the ESD kit with additional space to accommodate the type of system that is being repaired. The workspace should also be free of insulators that can cause an ESD event. On the work area, insulators such as Styrofoam and other plastics should always be moved at least 12 inches or 30 centimeters away from sensitive parts before physically handling any hardware components.
- **ESD Packaging** – All ESD-sensitive devices must be shipped and received in static-safe packaging. Metal, static-shielded bags are preferred. However, you should always return the damaged part using the same ESD bag and packaging that the new part arrived in. The ESD bag should be folded over and taped shut and all the same foam packing material should be used in the original box that the new part arrived in. ESD-sensitive devices should be removed from packaging only at an ESD-protected work surface, and parts should never be placed on top of the ESD bag because only the inside of the bag is shielded. Always place parts in your hand, on the ESD mat, in the system, or inside an anti-static bag.
- **Transporting Sensitive Components** – When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.

ESD protection summary

It is recommended that all field service technicians use the traditional wired ESD grounding wrist strap and protective anti-static mat at all times when servicing Dell products. In addition, it is critical that technicians keep sensitive parts separate from all insulator parts while performing service and that they use anti-static bags for transporting sensitive components.

Transporting sensitive components

When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.

Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

 **CAUTION: Do not lift greater than 50 pounds. Always obtain additional resources or use a mechanical lifting device.**

- 1 Get a firm balanced footing. Keep your feet apart for a stable base, and point your toes out.
- 2 Tighten stomach muscles. Abdominal muscles support your spine when you lift, offsetting the force of the load.
- 3 Lift with your legs, not your back.
- 4 Keep the load close. The closer it is to your spine, the less force it exerts on your back.
- 5 Keep your back upright, whether lifting or setting down the load. Do not add the weight of your body to the load. Avoid twisting your body and back.
- 6 Follow the same techniques in reverse to set the load down.

After working inside your computer

After you complete any replacement procedure, ensure that you connect any external devices, cards, and cables before turning on your computer.

- 1 Connect any telephone or network cables to your computer.

 **CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.**

- 2 Connect your computer and all attached devices to their electrical outlets.
- 3 Turn on your computer.
- 4 If required, verify that the computer works correctly by running **ePSA diagnostics**.

Technology and components

This chapter details the technology and components available in the system.

Topics:

- [USB features](#)
- [USB Type-C](#)
- [HDMI 1.4a](#)
- [Power button LED behavior](#)

USB features

Universal Serial Bus, or USB, was introduced in 1996. It dramatically simplified the connection between host computers and peripheral devices like mice, keyboards, external drives, and printers.

Let's take a quick look on the USB evolution referencing to the table below.

Table 1. USB evolution

Type	Data Transfer Rate	Category	Introduction Year
USB 2.0	480 Mbps	High Speed	2000
USB 3.0/USB 3.1 Gen 1	5 Gbps	Super Speed	2010
USB 3.1 Gen 2	10 Gbps	Super Speed	2013

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

For years, the USB 2.0 has been firmly entrenched as the de facto interface standard in the PC world with about 6 billion devices sold, and yet the need for more speed grows by ever faster computing hardware and ever greater bandwidth demands. The USB 3.0/USB 3.1 Gen 1 finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.1 Gen 1 features are as follows:

- Higher transfer rates (up to 5 Gbps)
- Increased maximum bus power and increased device current draw to better accommodate power-hungry devices
- New power management features
- Full-duplex data transfers and support for new transfer types
- Backward USB 2.0 compatibility
- New connectors and cable

The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.

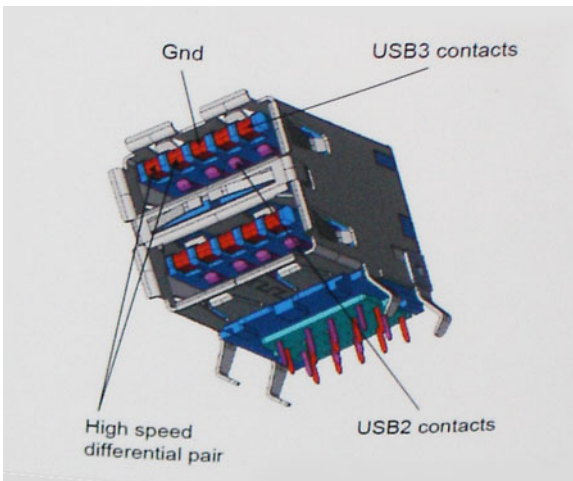


Speed

Currently, there are 3 speed modes defined by the latest USB 3.0/USB 3.1 Gen 1 specification. They are Super-Speed, Hi-Speed and Full-Speed. The new SuperSpeed mode has a transfer rate of 4.8Gbps. While the specification retains Hi-Speed, and Full-Speed USB mode, commonly known as USB 2.0 and 1.1 respectively, the slower modes still operate at 480Mbps and 12Mbps respectively and are kept to maintain backward compatibility.

USB 3.0/USB 3.1 Gen 1 achieves the much higher performance by the technical changes below:

- An additional physical bus that is added in parallel with the existing USB 2.0 bus (refer to the picture below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); USB 3.0/USB 3.1 Gen 1 adds four more for two pairs of differential signals (receive and transmit) for a combined total of eight connections in the connectors and cabling.
- USB 3.0/USB 3.1 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.



With today's ever increasing demands placed on data transfers with high-definition video content, terabyte storage devices, high megapixel count digital cameras etc., USB 2.0 may not be fast enough. Furthermore, no USB 2.0 connection could ever come close to the 480Mbps theoretical maximum throughput, making data transfer at around 320Mbps (40MB/s) — the actual real-world maximum. Similarly, USB 3.0/USB 3.1 Gen 1 connections will never achieve 4.8Gbps. We will likely see a real-world maximum rate of 400MB/s with overheads. At this speed, USB 3.0/USB 3.1 Gen 1 is a 10x improvement over USB 2.0.

Applications

USB 3.0/USB 3.1 Gen 1 opens up the laneways and provides more headroom for devices to deliver a better overall experience. Where USB video was barely tolerable previously (both from a maximum resolution, latency, and video compression perspective), it's easy to imagine that with 5-10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2Gbps throughput. Where 480Mbps was limiting, 5Gbps is more than promising. With its promised 4.8Gbps speed, the standard will find its way into some products that previously weren't USB territory, like external RAID storage systems.

Listed below are some of the available SuperSpeed USB 3.0/USB 3.1 Gen 1 products:

- External Desktop USB 3.0/USB 3.1 Gen 1 Hard Drives
- Portable USB 3.0/USB 3.1 Gen 1 Hard Drives
- USB 3.0/USB 3.1 Gen 1 Drive Docks & Adapters
- USB 3.0/USB 3.1 Gen 1 Flash Drives & Readers
- USB 3.0/USB 3.1 Gen 1 Solid-state Drives

- USB 3.0/USB 3.1 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.0/USB 3.1 Gen 1 Adapter Cards & Hubs

Compatibility

The good news is that USB 3.0/USB 3.1 Gen 1 has been carefully planned from the start to peacefully co-exist with USB 2.0. First of all, while USB 3.0/USB 3.1 Gen 1 specifies new physical connections and thus new cables to take advantage of the higher speed capability of the new protocol, the connector itself remains the same rectangular shape with the four USB 2.0 contacts in the exact same location as before. Five new connections to carry receive and transmitted data independently are present on USB 3.0/USB 3.1 Gen 1 cables and only come into contact when connected to a proper SuperSpeed USB connection.

Windows 8/10 will be bringing native support for USB 3.1 Gen 1 controllers. This is in contrast to previous versions of Windows, which continue to require separate drivers for USB 3.0/USB 3.1 Gen 1 controllers.

Microsoft announced that Windows 7 would have USB 3.1 Gen 1 support, perhaps not on its immediate release, but in a subsequent Service Pack or update. It is not out of the question to think that following a successful release of USB 3.0/USB 3.1 Gen 1 support in Windows 7, SuperSpeed support would trickle down to Vista. Microsoft has confirmed this by stating that most of their partners share the opinion that Vista should also support USB 3.0/USB 3.1 Gen 1.

USB Type-C

USB Type-C is a new, tiny physical connector. The connector itself can support various exciting new USB standards like USB 3.1 and USB power delivery (USB PD).

Alternate Mode

USB Type-C is a new connector standard that is very small. It is about a third the size of an old USB Type-A plug. This is a single connector standard that every device should be able to use. USB Type-C ports can support a variety of different protocols using “alternate modes,” which allows you to have adapters that can output HDMI, VGA, DisplayPort, or other types of connections from that single USB port

USB Power Delivery

The USB PD specification is also closely intertwined with USB Type-C. Currently, smartphones, tablets, and other mobile devices often use a USB connection to charge. A USB 2.0 connection provides up to 2.5 watts of power — that'll charge your phone, but that's about it. A laptop might require up to 60 watts, for example. The USB Power Delivery specification ups this power delivery to 100 watts. It's bi-directional, so a device can either send or receive power. And this power can be transferred at the same time the device is transmitting data across the connection.

This could spell the end of all those proprietary laptop charging cables, with everything charging via a standard USB connection. You could charge your laptop from one of those portable battery packs you charge your smartphones and other portable devices from today. You could plug your laptop into an external display connected to a power cable, and that external display would charge your laptop as you used it as an external display — all via the one little USB Type-C connection. To use this, the device and the cable have to support USB Power Delivery. Just having a USB Type-C connection doesn't necessarily mean they do.

USB Type-C and USB 3.1

USB 3.1 is a new USB standard. USB 3's theoretical bandwidth is 5 Gbps, while USB 3.1's is 10 Gbps. That's double the bandwidth, as fast as a first-generation Thunderbolt connector. USB Type-C isn't the same thing as USB 3.1. USB Type-C is just a connector shape, and the

underlying technology could just be USB 2 or USB 3.0. In fact, Nokia's N1 Android tablet uses a USB Type-C connector, but underneath it's all USB 2.0 — not even USB 3.0. However, these technologies are closely related.

Thunderbolt over USB Type-C

Thunderbolt is a hardware interface that combines data, video, audio, and power in a single connection. Thunderbolt combines PCI Express (PCIe) and DisplayPort (DP) into one serial signal, and additionally provides DC power, all in one cable. Thunderbolt 1 and Thunderbolt 2 use the same connector as miniDP (DisplayPort) to connect to peripherals, while Thunderbolt 3 uses a USB Type-C connector.

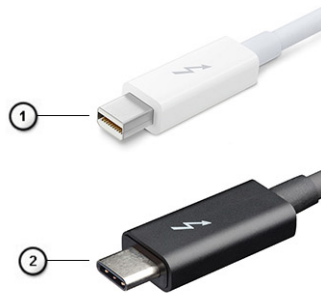


Figure 1. Thunderbolt 1 and Thunderbolt 3

- 1 Thunderbolt 1 and Thunderbolt 2 (using a miniDP connector)
- 2 Thunderbolt 3 (using a USB Type-C connector)

Thunderbolt 3 over USB Type-C

Thunderbolt 3 brings Thunderbolt to USB Type-C at speeds up to 40 Gbps, creating one compact port that does it all - delivering the fastest, most versatile connection to any dock, display or data device like an external hard drive. Thunderbolt 3 uses a USB Type-C connector/port to connect to supported peripherals.

- 1 Thunderbolt 3 uses USB Type-C connector and cables - It is compact and reversible
- 2 Thunderbolt 3 supports speed up to 40 Gbps
- 3 DisplayPort 1.2 – compatible with existing DisplayPort monitors, devices and cables
- 4 USB Power Delivery - Up to 130W on supported computers

Key Features of Thunderbolt 3 over USB Type-C

- 1 Thunderbolt, USB, DisplayPort and power on USB Type-C on a single cable (features vary between different products)
- 2 USB Type-C connector and cables which are compact and reversible
- 3 Supports Thunderbolt Networking (*varies between different products)
- 4 Supports up to 4K displays
- 5 Up to 40 Gbps

NOTE: Data transfer speed may vary between different devices.

Thunderbolt Icons

Protocol	USB Type-A	USB Type-C	Notes
Thunderbolt	Not Applicable		Will use industry standard icon regardless of port style (i.e., mDP or USB Type-C)
Thunderbolt w/ Power Delivery	Not Applicable		Up to 130 Watts via USB Type-C

Figure 2. Thunderbolt Iconography Variations

HDMI 1.4a

This topic explains the HDMI 1.4a and its features along with the advantages.

HDMI (High-Definition Multimedia Interface) is an industry-supported, uncompressed, all-digital audio/video interface. HDMI provides an interface between any compatible digital audio/video source, such as a DVD player, or A/V receiver and a compatible digital audio and/or video monitor, such as a digital TV (DTV). The intended applications for HDMI TVs, and DVD players. The primary advantage is cable reduction and content protection provisions. HDMI supports standard, enhanced, or high-definition video, plus multichannel digital audio on a single cable.

HDMI 1.4a Features

- **HDMI Ethernet Channel** - Adds high-speed networking to an HDMI link, allowing users to take full advantage of their IP-enabled devices without a separate Ethernet cable
- **Audio Return Channel** - Allows an HDMI-connected TV with a built-in tuner to send audio data "upstream" to a surround audio system, eliminating the need for a separate audio cable
- **3D** - Defines input/output protocols for major 3D video formats, paving the way for true 3D gaming and 3D home theater applications
- **Content Type** - Real-time signaling of content types between display and source devices, enabling a TV to optimize picture settings based on content type
- **Additional Color Spaces** - Adds support for additional color models used in digital photography and computer graphics
- **4K Support** - Enables video resolutions far beyond 1080p, supporting next-generation displays that will rival the Digital Cinema systems used in many commercial movie theaters
- **HDMI Micro Connector** - A new, smaller connector for phones and other portable devices, supporting video resolutions up to 1080p
- **Automotive Connection System** - New cables and connectors for automotive video systems, designed to meet the unique demands of the motoring environment while delivering true HD quality

Advantages of HDMI

- Quality HDMI transfers uncompressed digital audio and video for the highest, crispest image quality.
- Low -cost HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner
- Audio HDMI supports multiple audio formats from standard stereo to multichannel surround sound
- HDMI combines video and multichannel audio into a single cable, eliminating the cost, complexity, and confusion of multiple cables currently used in A/V systems
- HDMI supports communication between the video source (such as a DVD player) and the DTV, enabling new functionality

Power button LED behavior

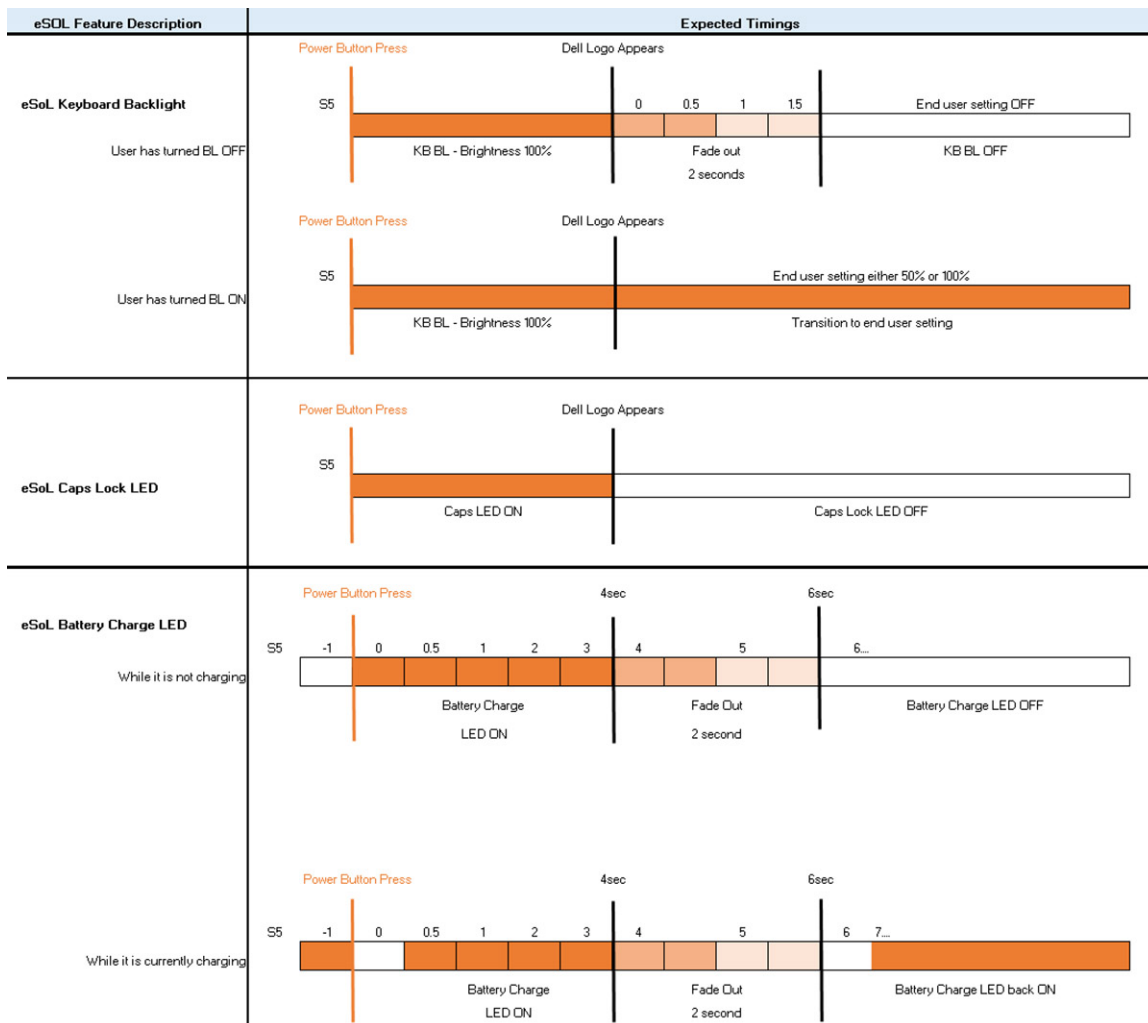
On certain Dell Latitude systems, the power button LED is used to provide an indication of the system status, and as a result the power button illuminates when pressed. The systems with the optional power button/fingerprint reader will have no LED under the power button and hence will apply the available LED's in the system to provide an indication of the system status.

Power button LED behavior without Fingerprint reader

- System is ON (S0) = LED illuminates solid white.
- System in Sleep/Standby (S3, S0ix) = LED is off
- System is Off/Hibernating (S4/S5) = LED is off

Power On and LED behavior with Fingerprint reader

- Pressing the power button for a duration between 50 msec to 2 sec turns on the device.
- Power button does not register additional presses until the SOL (Sign-Of-Life) has been provided to the user.
- System LED's illuminates upon pressing the power button.
- All the available LED's (Keyboard backlit/ Keyboard caps lock LED/ Battery Charge LED) illuminates and displays specified behavior.
- The auditory tone is Off by default. It can be enabled in the BIOS setup.
- Safeguards do not time out if the device gets hung during the logon process.
- Dell logo: Turns on within 2 secs after pressing the power button.
- Full boot: Within 22 secs after pressing the power button.
- Below is the example timelines:



Power button with fingerprint reader will have no LED and will leverage the available LED's in the system to provide indication of the system status

- **Power Adapter LED:**
 - The LED on Power adapter connector illuminates white when power is supplied from electrical outlet.
- **Battery Indicator LED:**
 - If the computer is connected to an electrical outlet, the battery light operates as follows:
 - 1 Solid white -the battery is charging. When the charge is complete the LED turns off.
 - If the computer is running on a battery, the battery light operates as follows:
 - 1 Off -the battery is adequately charged (or the computer is turned off).
 - 2 Solid amber -the battery charge is critically low. A low battery state is approximately 30 minutes or less of battery life remaining.
- **Camera LED**
 - White LED activates when camera is on.
- **Mic Mute LED:**
 - When activated (muted), the mic mute LED on the F4 Key should illuminate WHITE.
- **RJ45 LEDs:**
 -

Table 2. LED on either side of RJ45 port

Link speed indicator (LHS)	Activity indicator (RHS)
Green	Amber

Disassembly and reassembly

MicroSD card

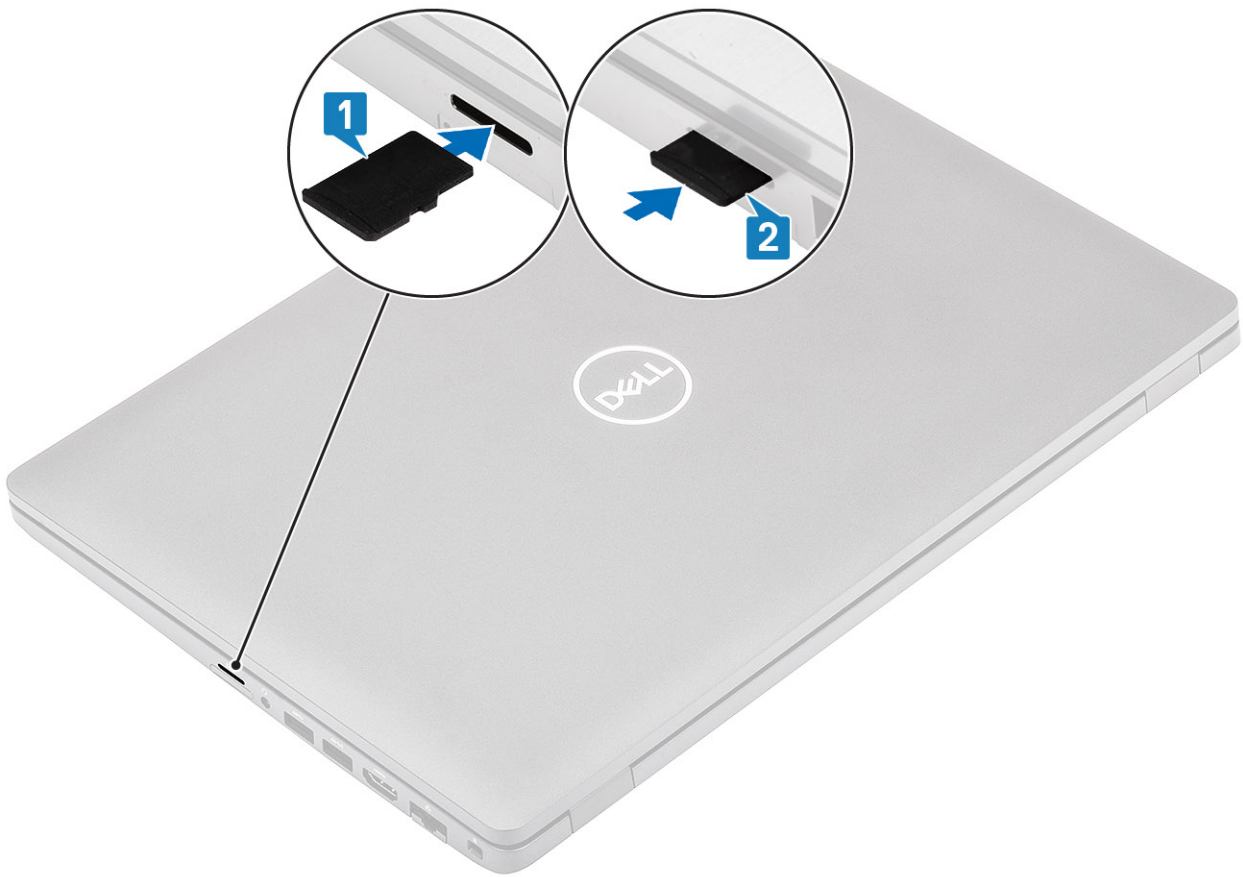
Removing the microSD card

- 1 Follow the procedure in [Before working inside your computer.](#)
- 1 Push the microSD card to release it from the computer [1].
- 2 Slide the microSD card out of the computer [2].



Installing the microSD card

- 1 Align the microSD card to its slot on the computer [1].
- 2 Slide the microSD card into the slot until it clicks into place [2].

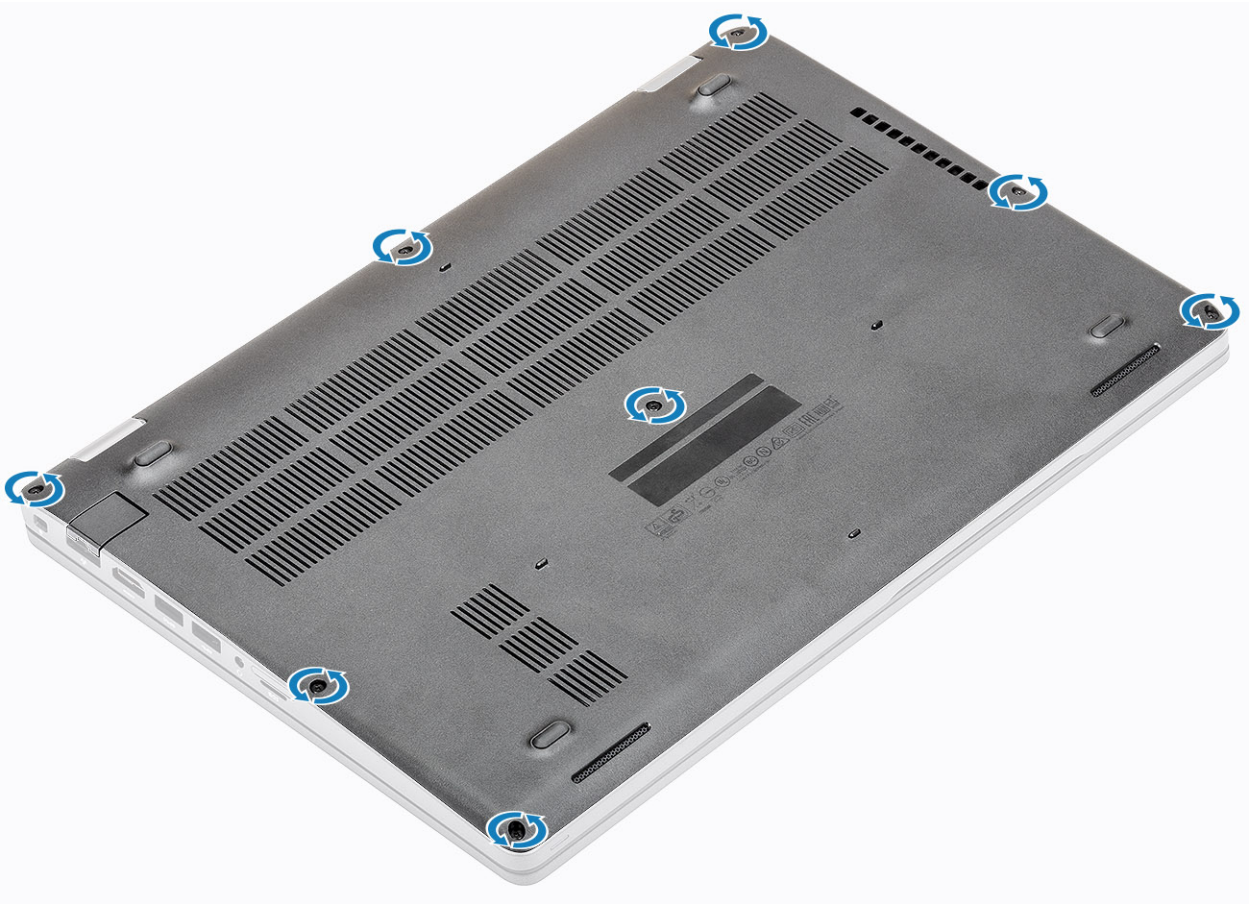


- 3 Follow the procedures in [After working inside your computer](#).

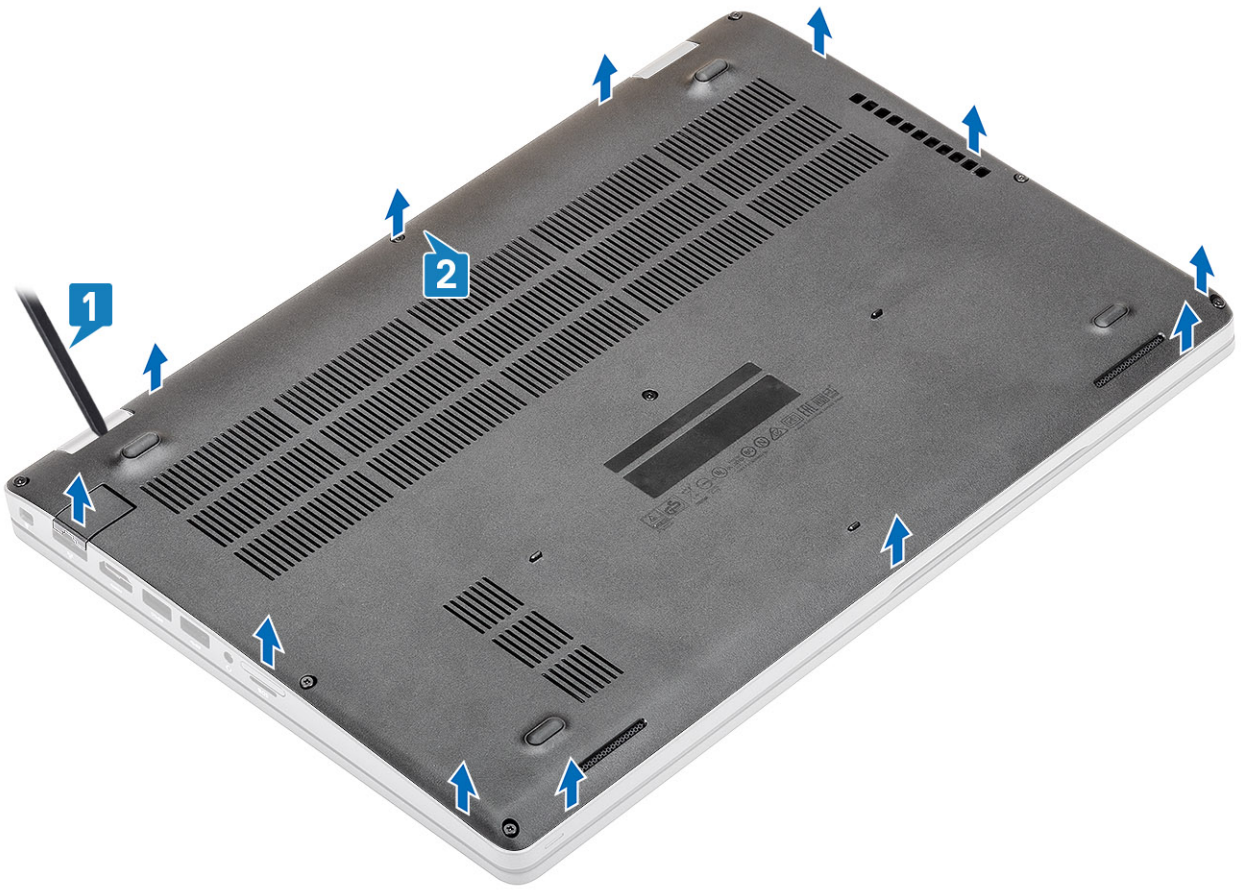
Base cover

Removing the base cover

- 1 Follow the procedure in [before working inside your computer](#)
- 2 Remove the [microSD card](#).
- 1 Loosen the eight captive screws [1].



- 2 Using a plastic scribe [1], pry the base cover from the top-left corner and continue to work on the sides to open the base cover [2].



- 3 Lift and remove the base cover away from the computer.

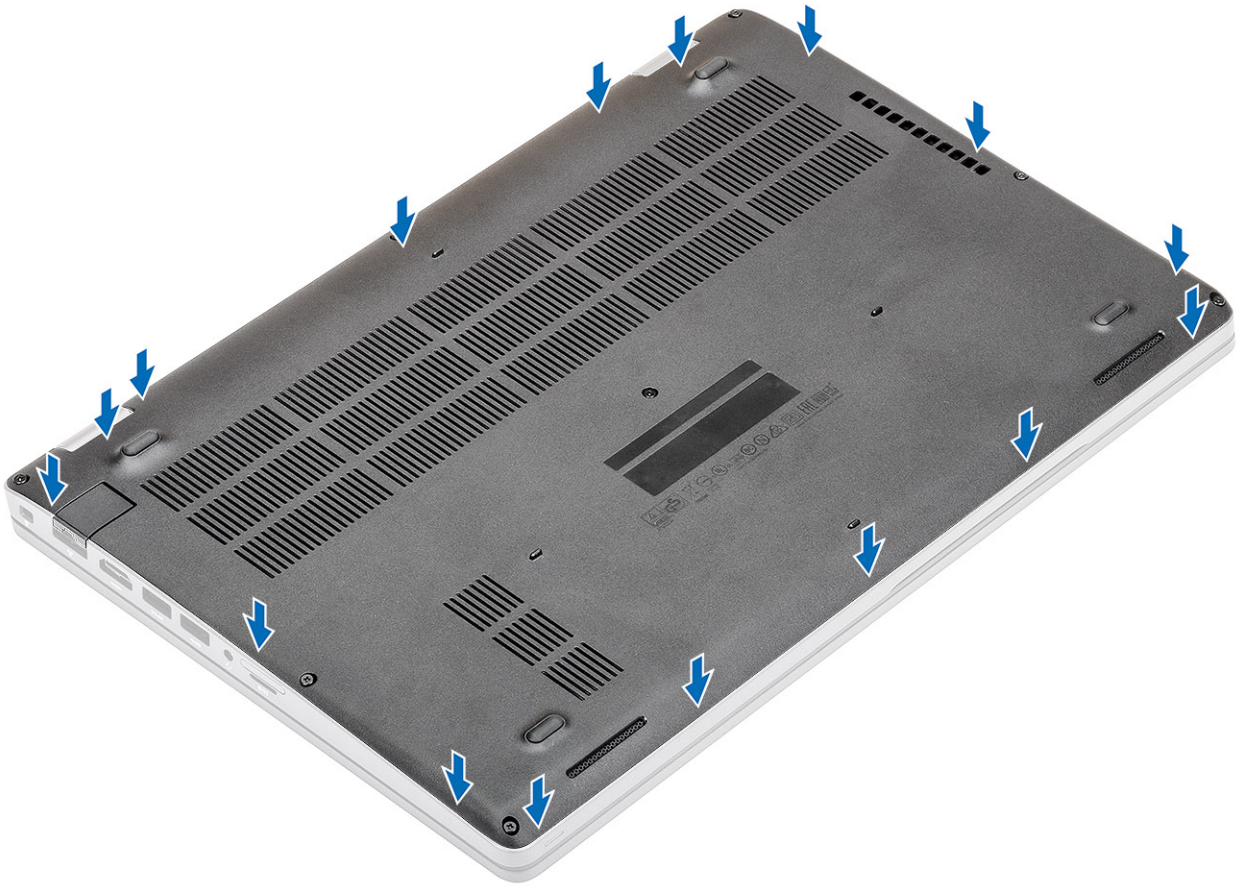


Installing the base cover

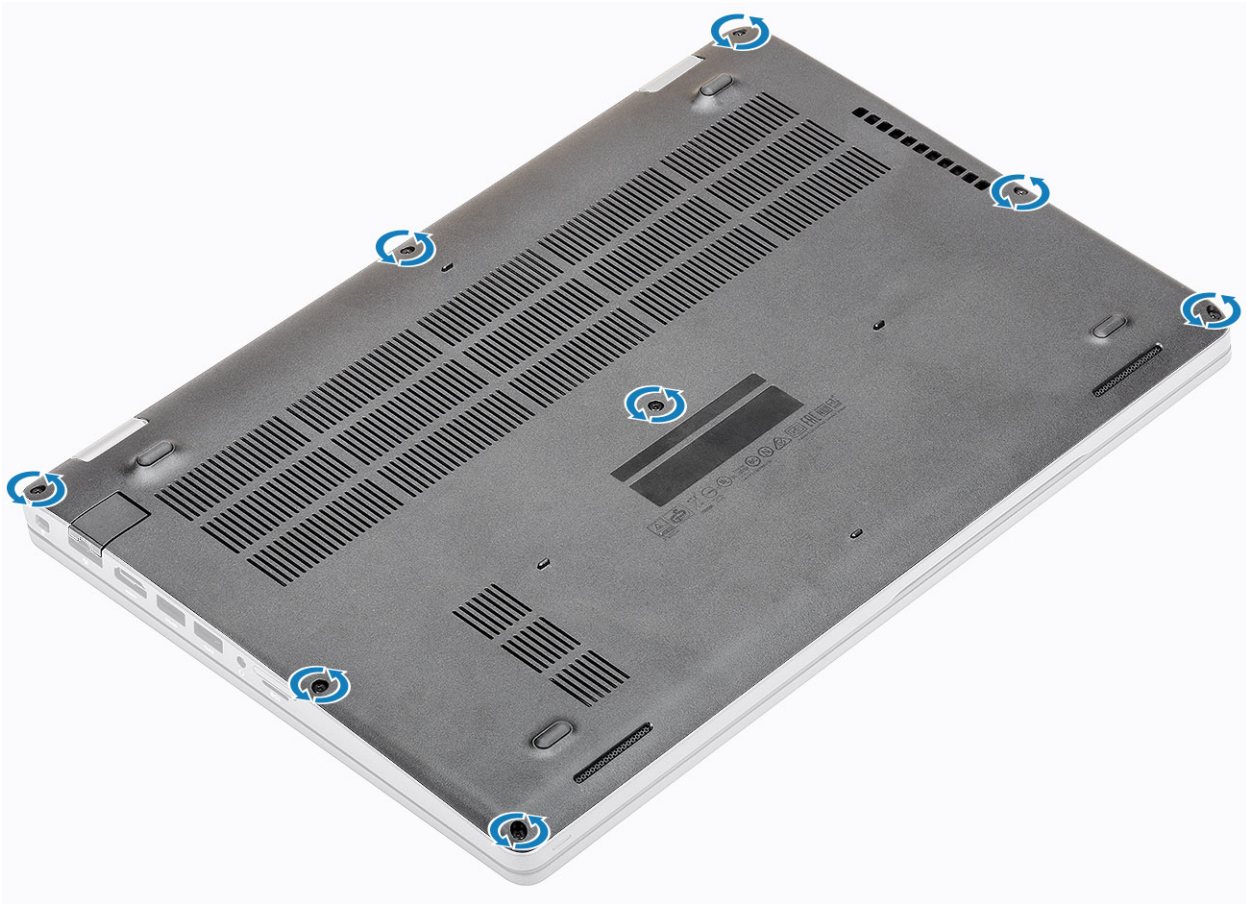
- 1 Align and place the base cover on the computer.



- 2 Press the edges and sides of the base cover until it snaps into place.



- 3 Tighten the eight captive screws to secure the base cover to the computer.



- 1 Replace the [microSD card](#).
- 2 Follow the procedure in [after working inside your computer](#).

Battery

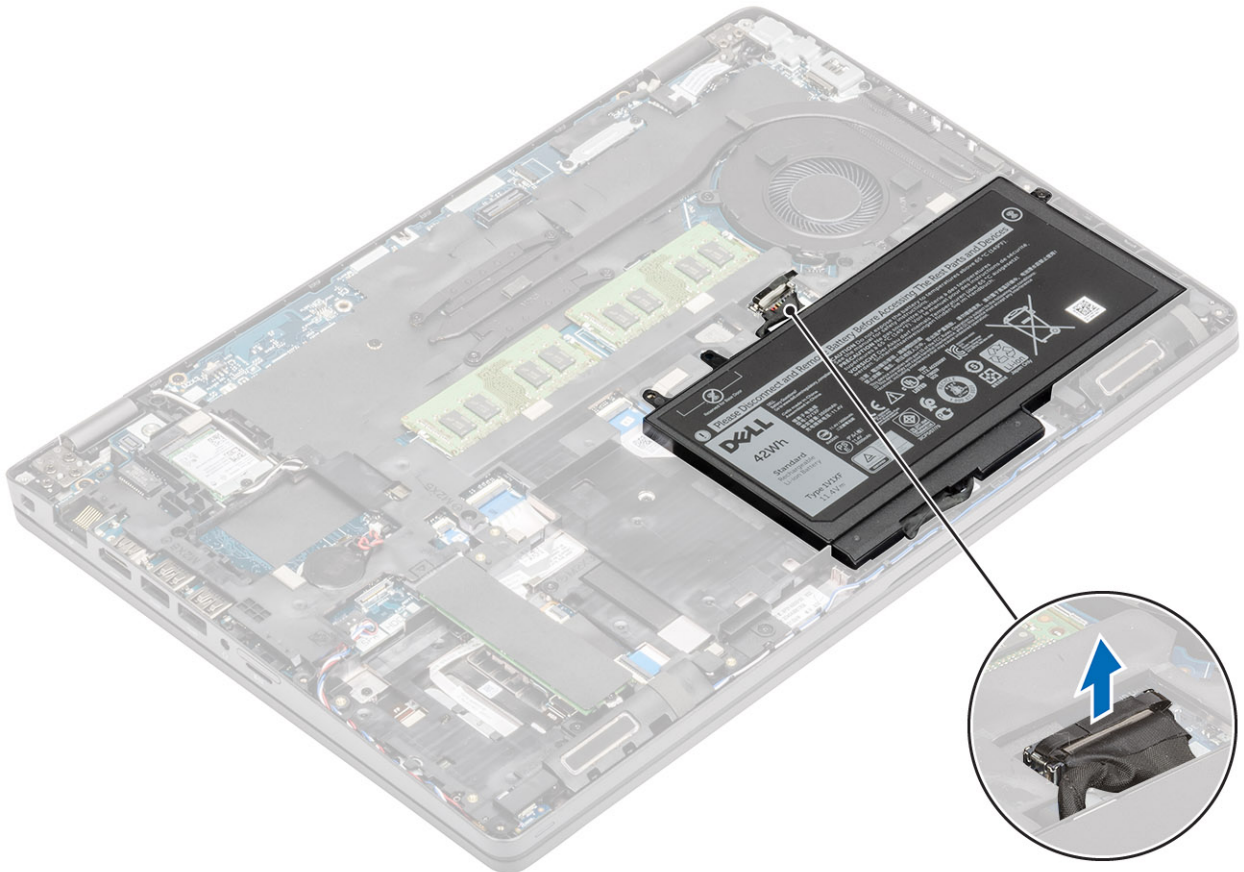
Lithium-ion battery precautions

⚠ CAUTION:

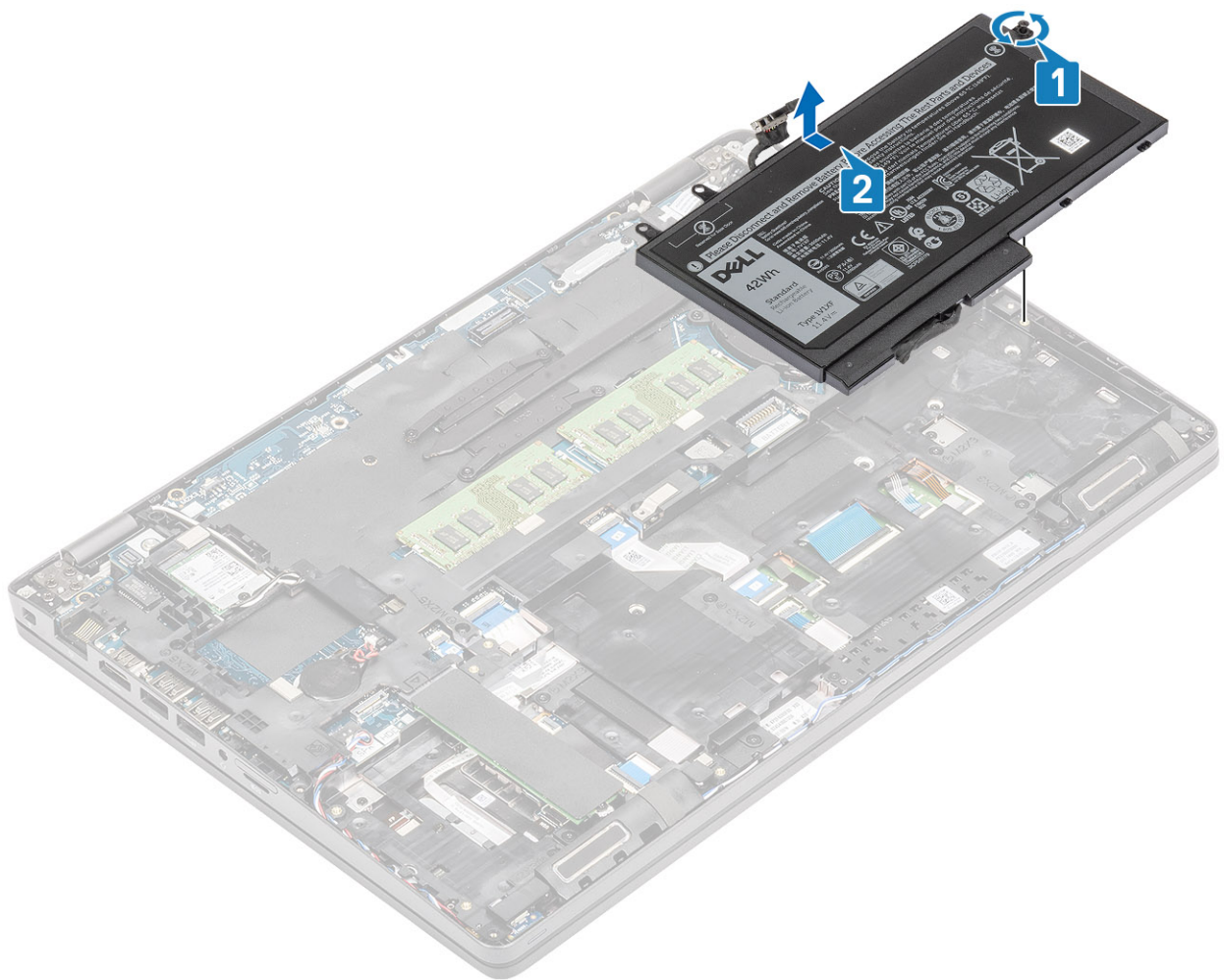
- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery as much as possible before removing it from the system. This can be done by disconnecting the AC adapter from the system to allow the battery to drain.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any kind to pry on or against the battery.
- If a battery gets stuck in a device as a result of swelling, do not try to free it as puncturing, bending, or crushing a Lithium-ion battery can be dangerous. In such an instance, the entire system should be replaced. Contact <https://www.dell.com/support> for assistance and further instructions.
- Always purchase genuine batteries from <https://www.dell.com> or authorized Dell partners and re-sellers.

Removing the battery

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 1 Disconnect the battery cable from the connector on the system board.

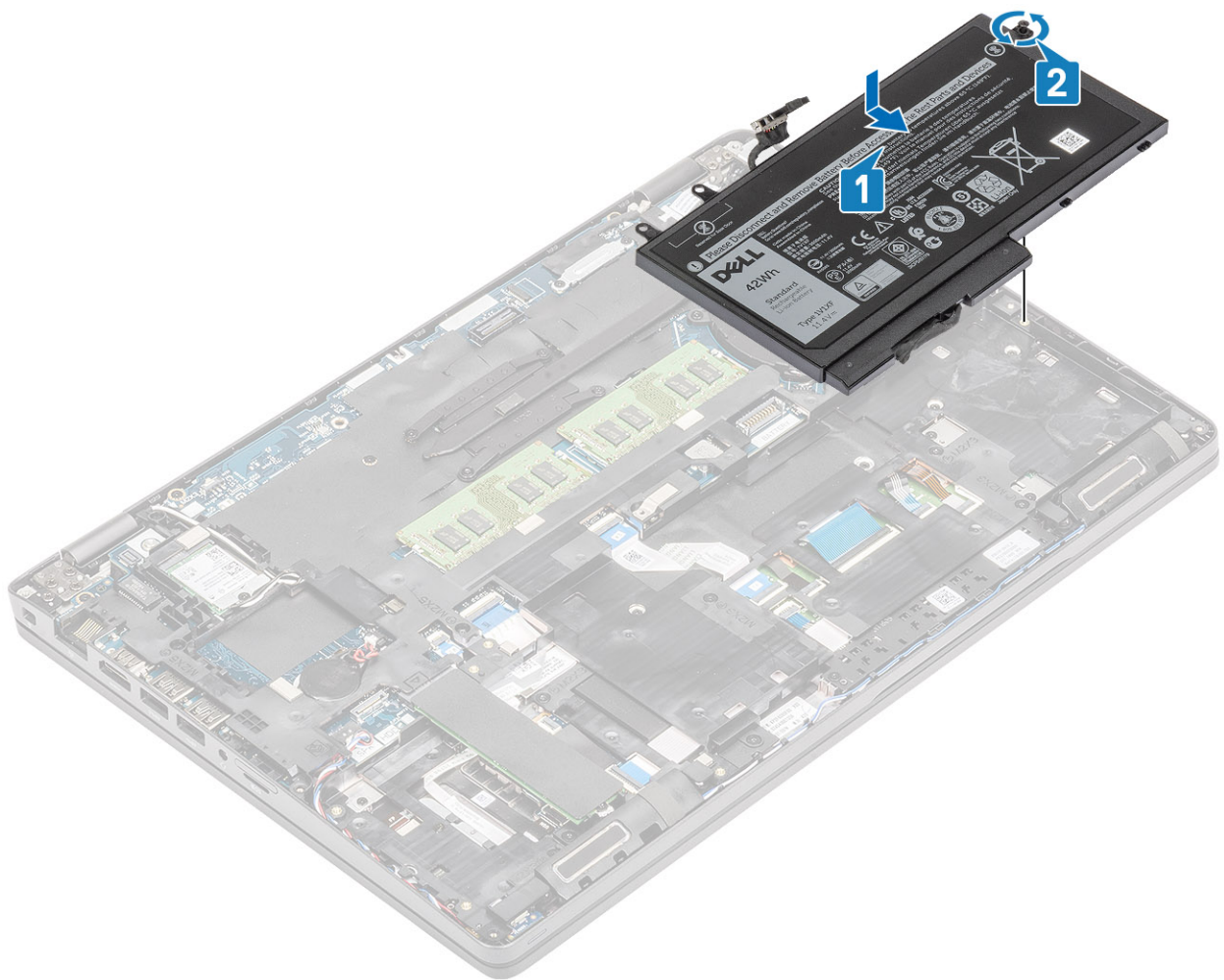


- 2 Loosen the single captive screw that secures the battery to the palmrest [1].
- 3 Slide the battery inward and lift the battery away from the palmrest [2].

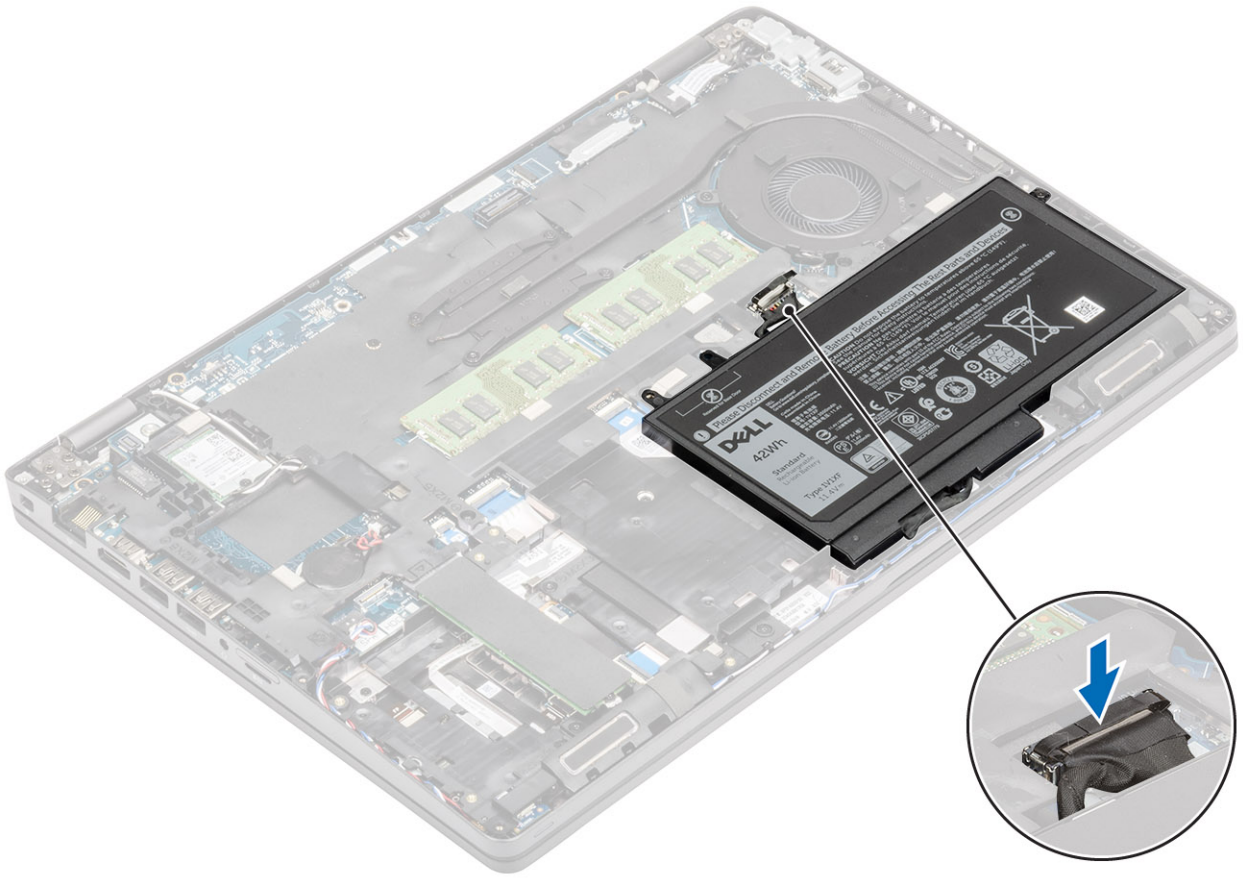


Installing the battery

- 1 Align and slide the battery on the palmrest [1].
- 2 Tighten the single captive screw to secure the battery to the palmrest [2].



- 3 Connect the battery cable to the connector on the system board.

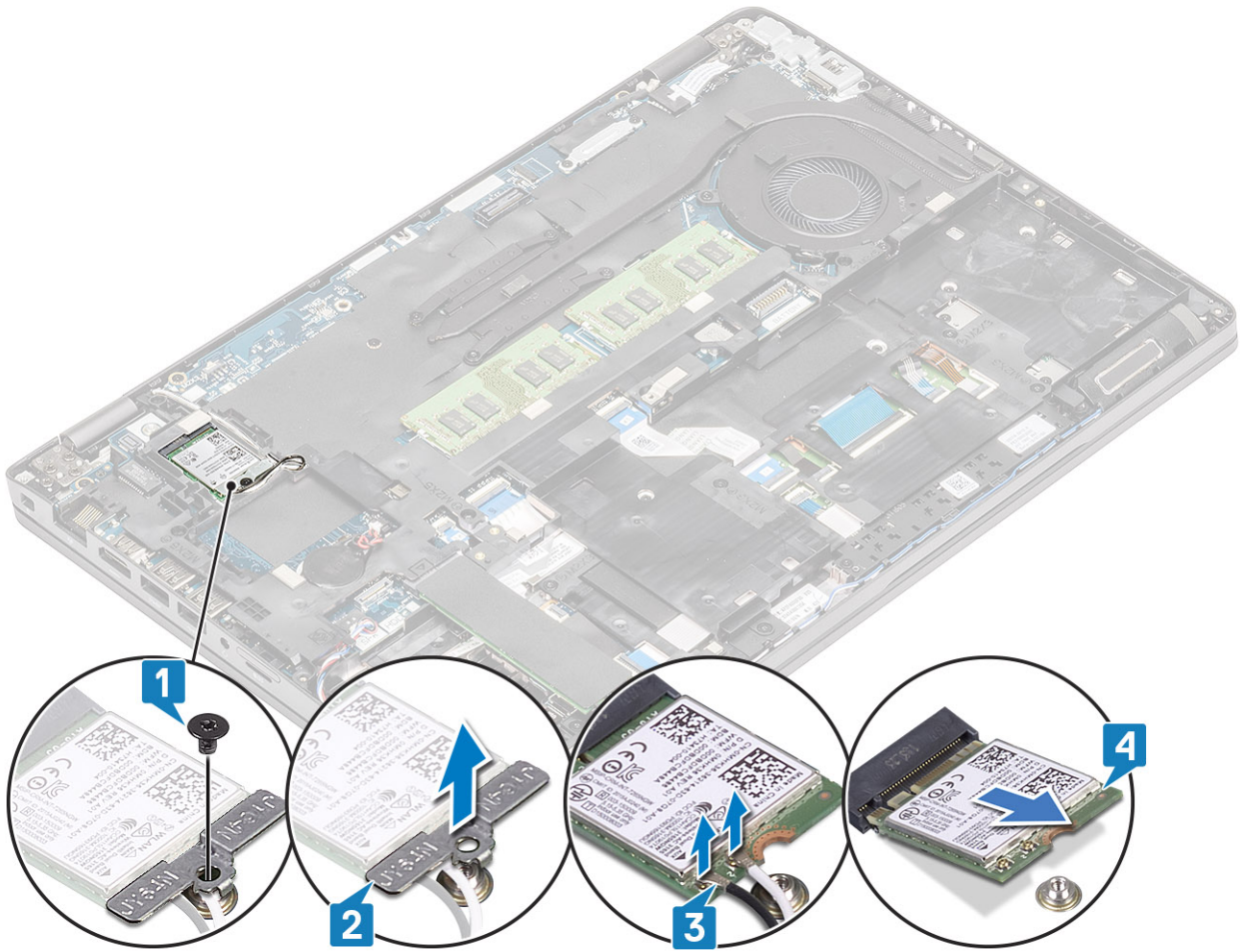


- 1 Replace the [base cover](#).
- 2 Replace the [microSD card](#).
- 3 Follow the procedure in [after working inside your computer](#)

WLAN card

Removing the WLAN card

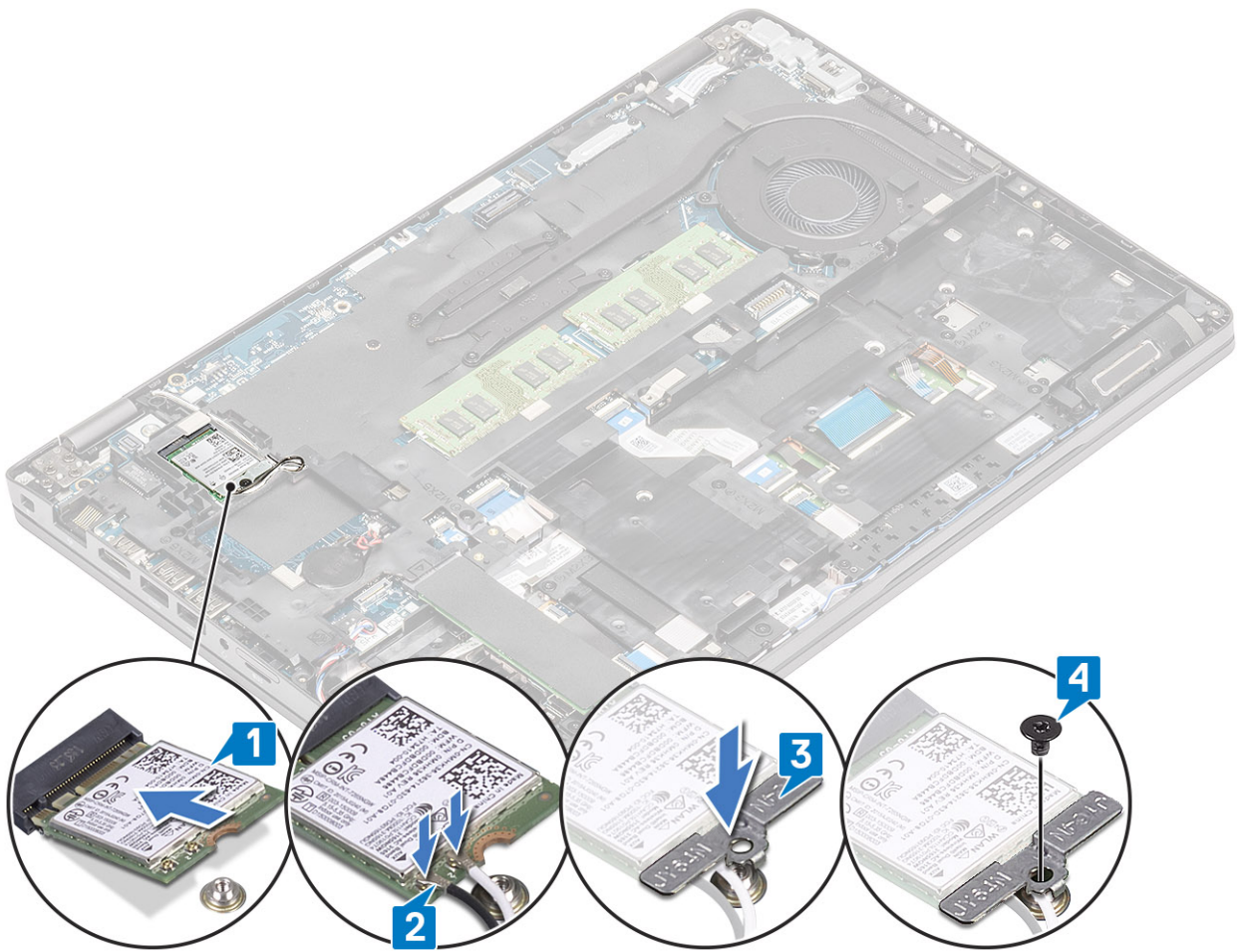
- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
- 1 Remove the single (M2x3) screw that secures the WLAN card bracket to the system board [1].
 - 2 Remove the WLAN card bracket that secures the WLAN antenna cables [2].
 - 3 Disconnect the WLAN antenna cables from the connectors on the WLAN card [3].
 - 4 Slide and lift the WLAN card away from the connector on the system board [4].



Installing the WLAN card

⚠ CAUTION: To avoid damage to the WLAN card, do not place any cables under it.

- 1 Insert the WLAN card into the connector on the system board [1].
- 2 Connect the WLAN antenna cables to the connectors on the WLAN card [2].
- 3 Place the WLAN card bracket to secure the WLAN antenna cables to the WLAN card [3].
- 4 Replace the single (M2x3) screw to secure the WLAN card bracket to the WLAN card [4].

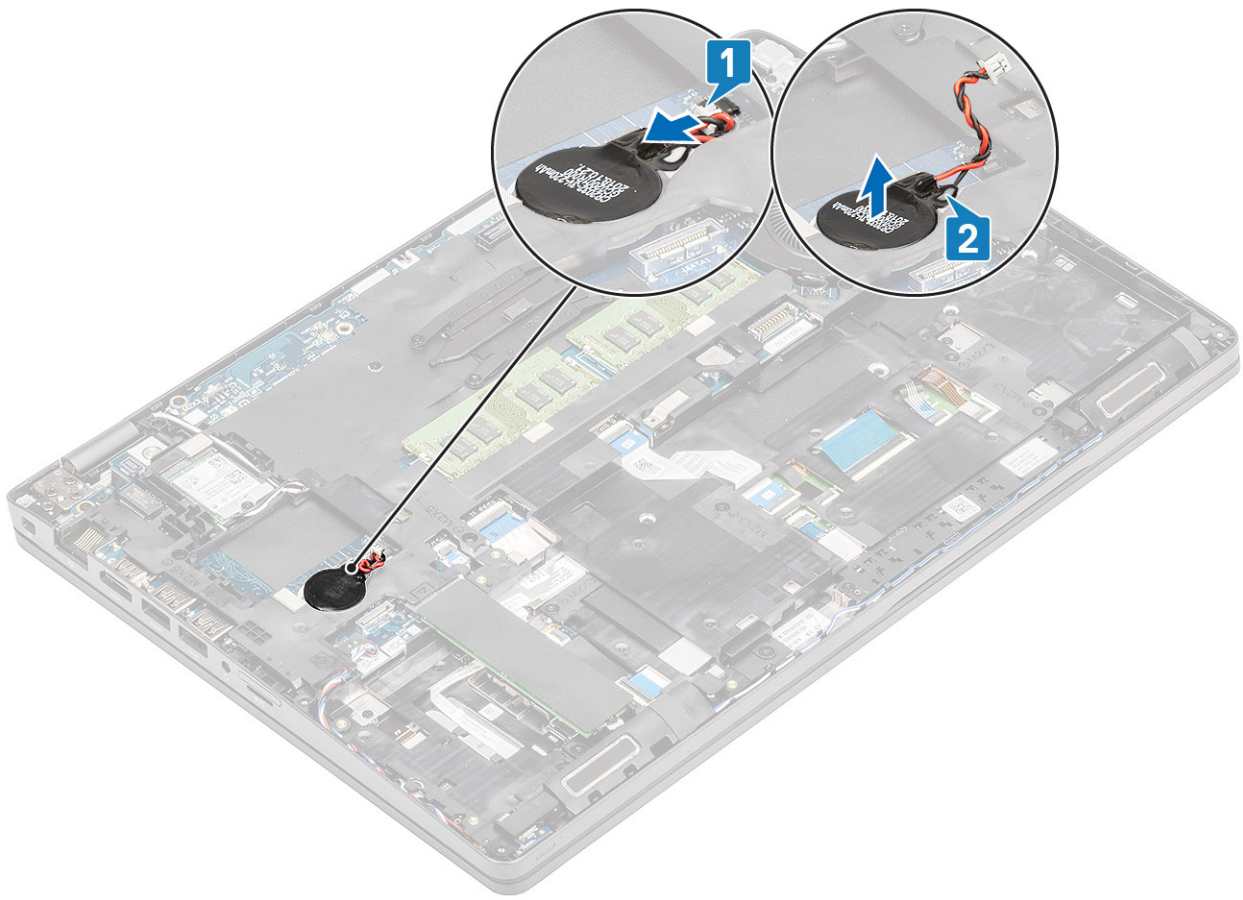


- 1 Replace the [battery](#).
- 2 Replace the [base cover](#).
- 3 Replace the [microSD card](#).
- 4 Follow the procedure in [after working inside your computer](#).

Coin-cell battery

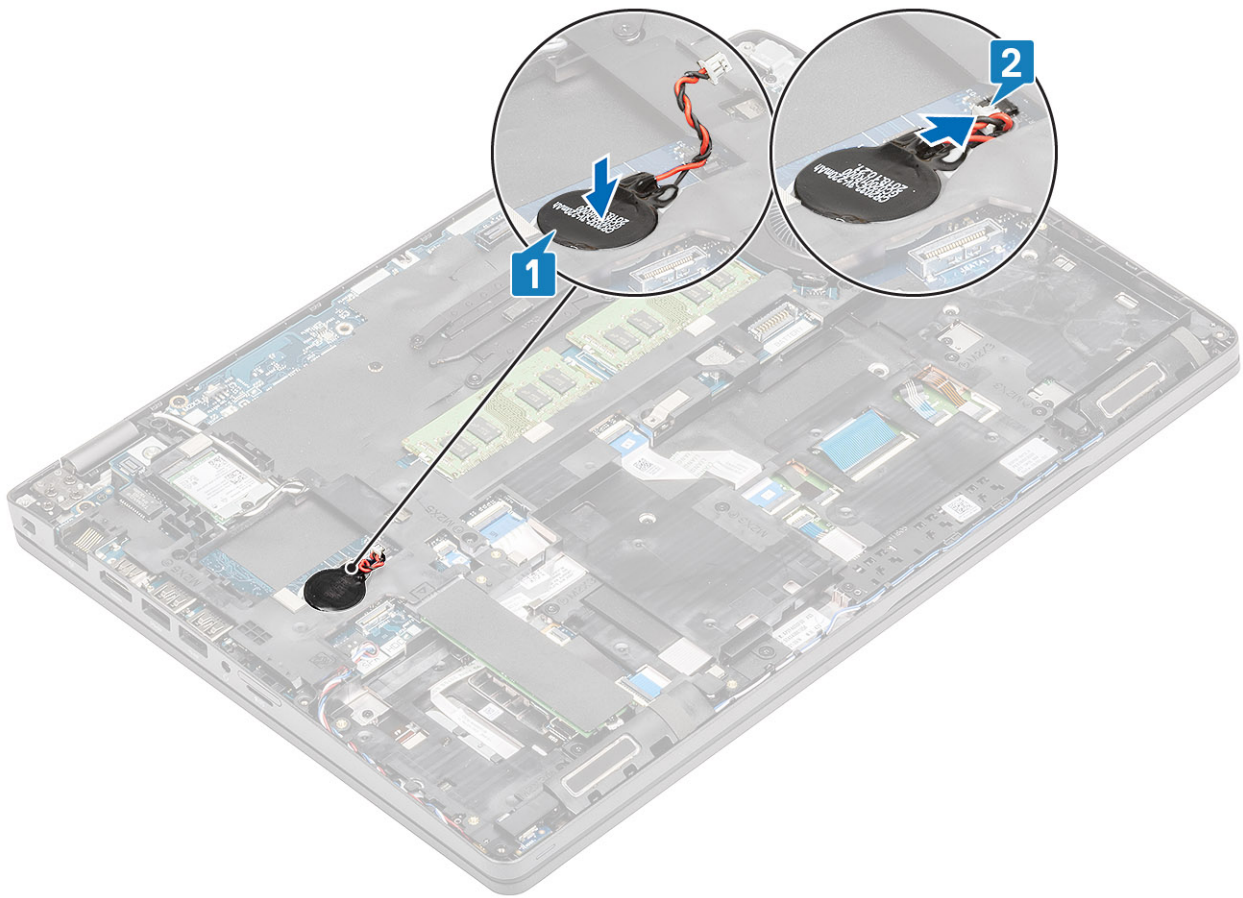
Removing the coin-cell battery

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
- 1 Disconnect the coin cell battery cable from the connector on the system board [1].
 - 2 Lift the coin cell battery from the system board [2].



Installing the coin-cell battery

- 1 Place the coin cell on the system board [1].
- 2 Connect the coin cell battery cable to the connector on the system board [2].

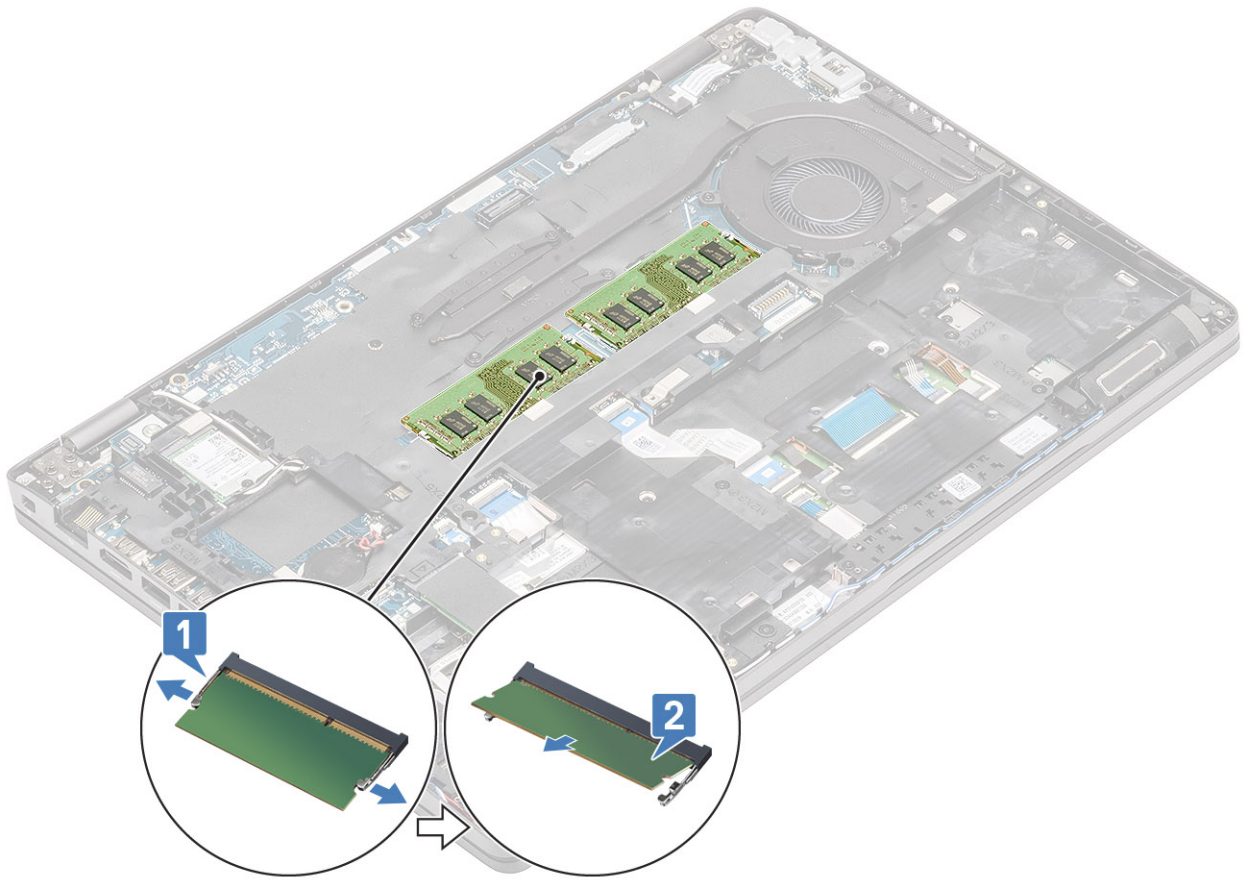


- 1 Replace the [battery](#).
- 2 Replace the [base cover](#).
- 3 Replace the [microSD card](#).
- 4 Follow the procedure in [after working inside your computer](#).

Memory modules

Removing the memory module

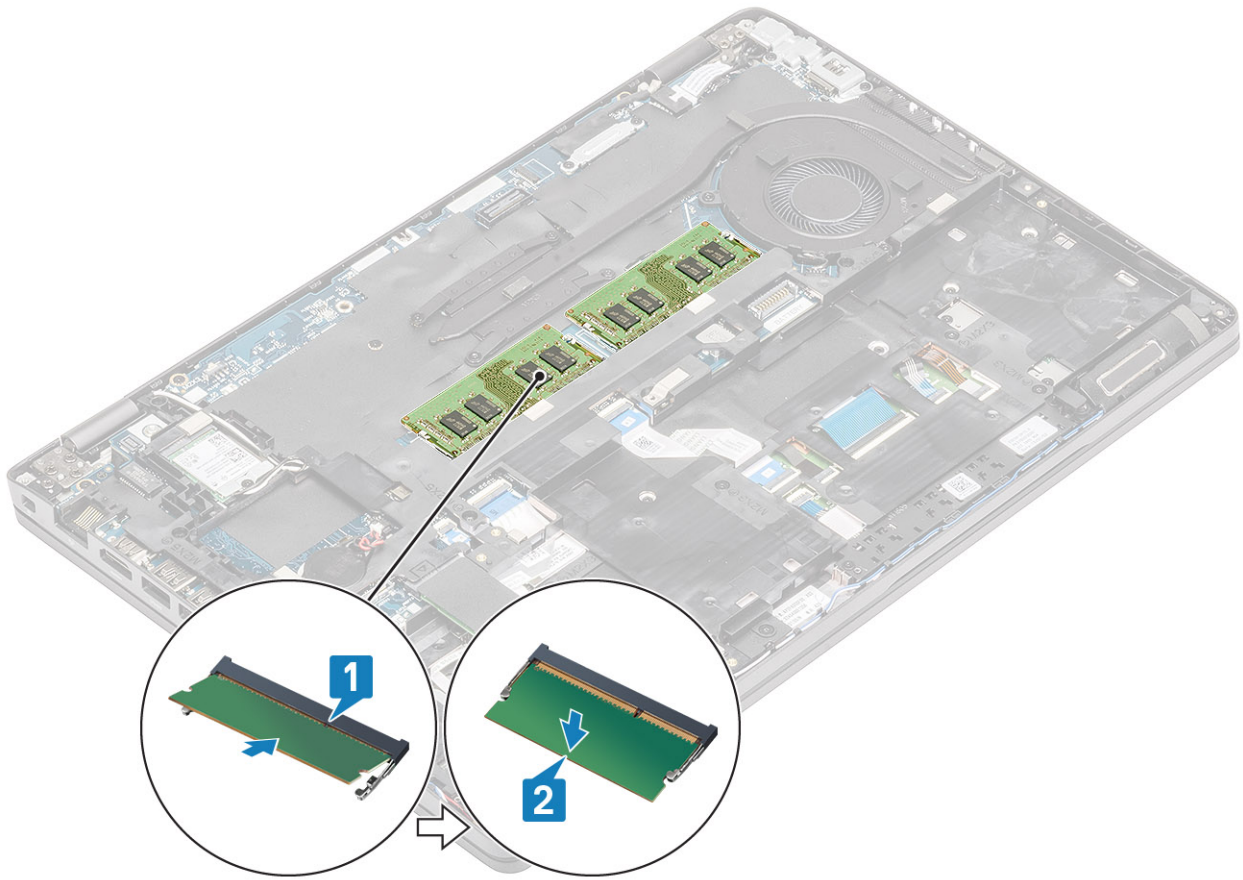
- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
-
- 1 Pry the retention clips securing the memory module until the memory module pops-up [1].
 - 2 Remove the memory module from the memory module slot [2].



Installing the memory module

- 1 Align the notch on the memory module with the tab on the memory-module slot.
- 2 Slide the memory module firmly into the slot at an angle [1].
- 3 Press the memory module down until the clips secure it [2].

NOTE: If you do not hear the click, remove the memory module and reinstall it.

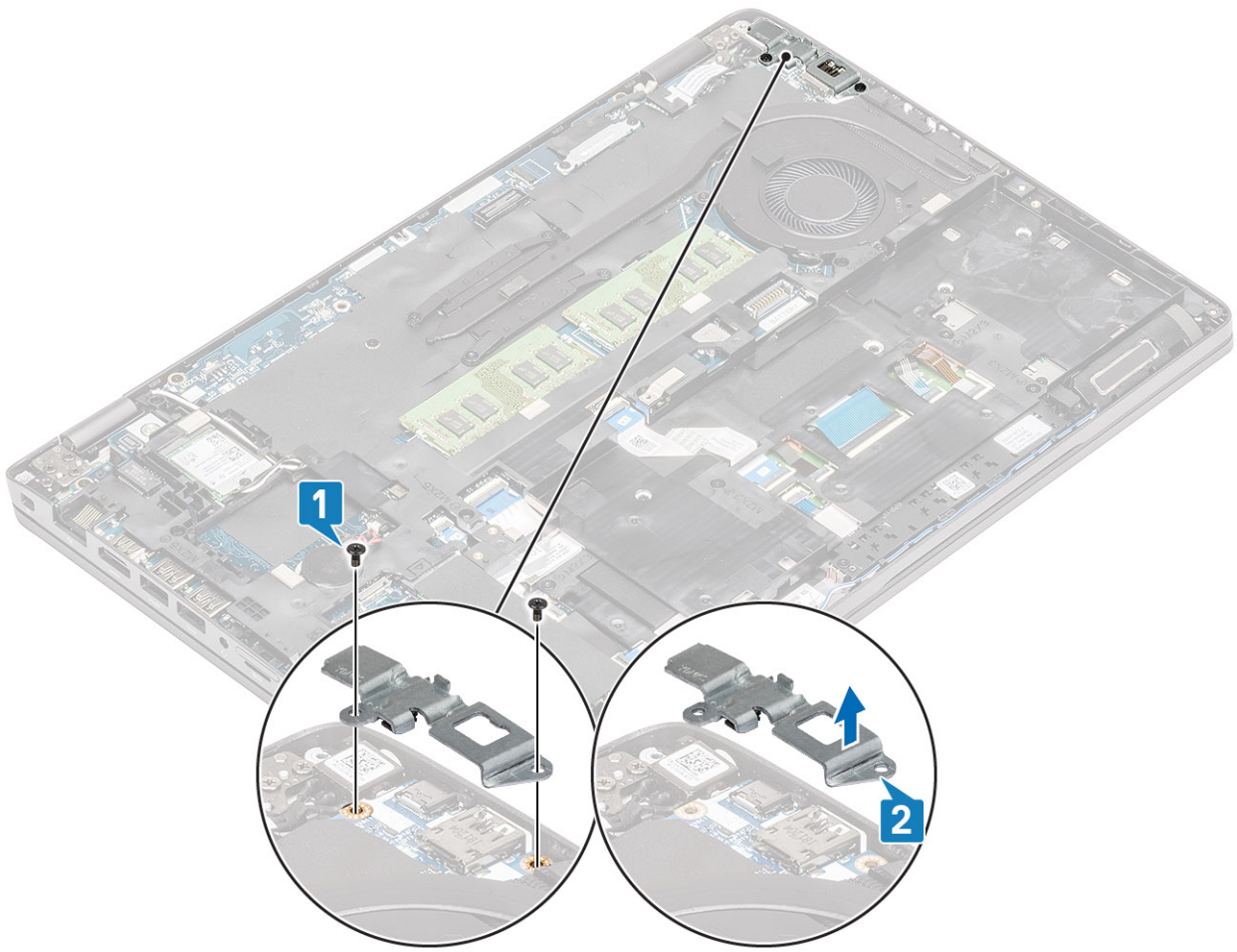


- 1 Replace the [battery](#).
- 2 Replace the [base cover](#).
- 3 Replace the [microSD card](#).
- 4 Follow the procedure in [after working inside your computer](#).

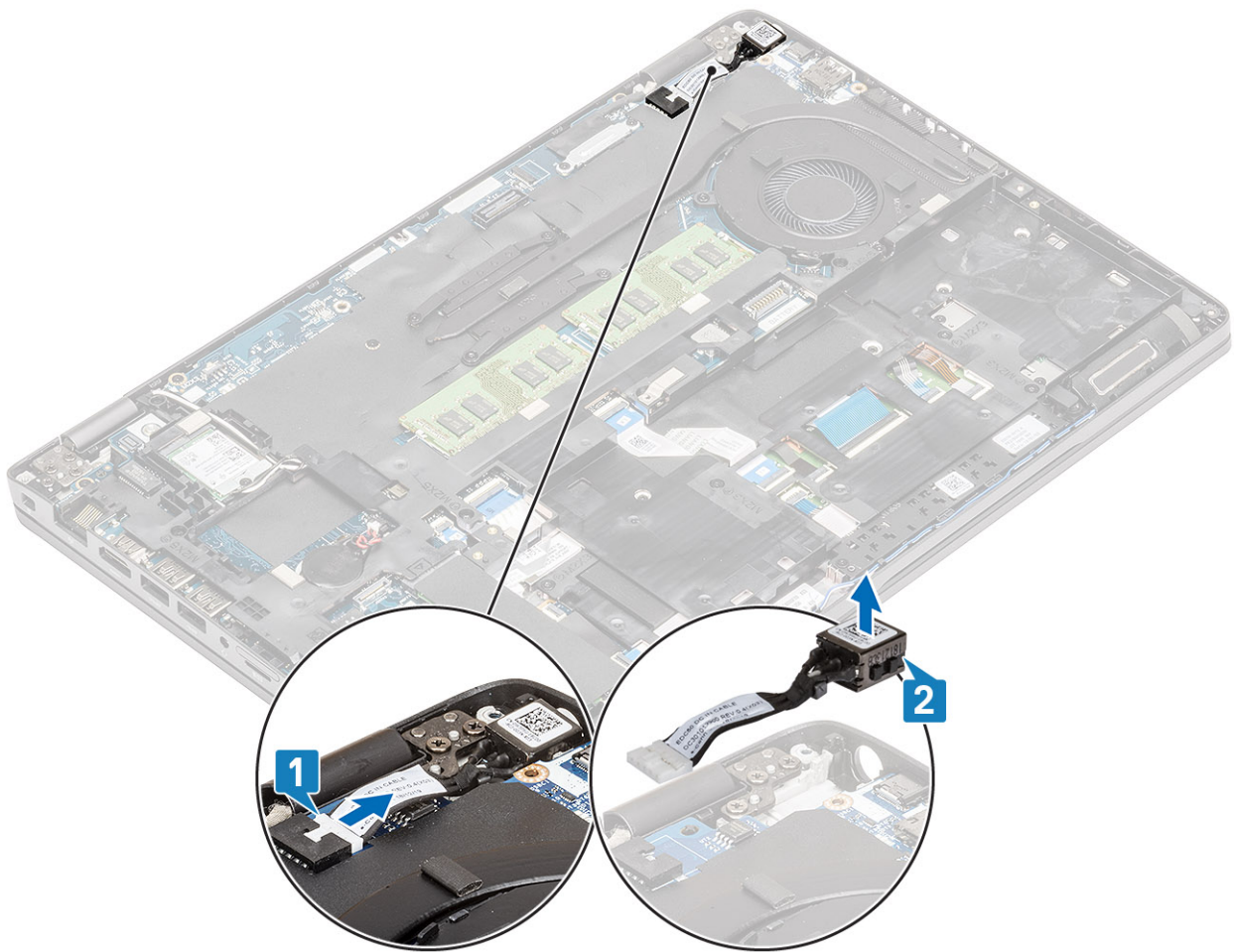
DC-in port

Removing the DC-in port

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
- 1 Remove the two (M2x5) screws that secure the Type-C bracket to the system board [1].
 - 2 Lift the Type-C bracket away from the computer [2].

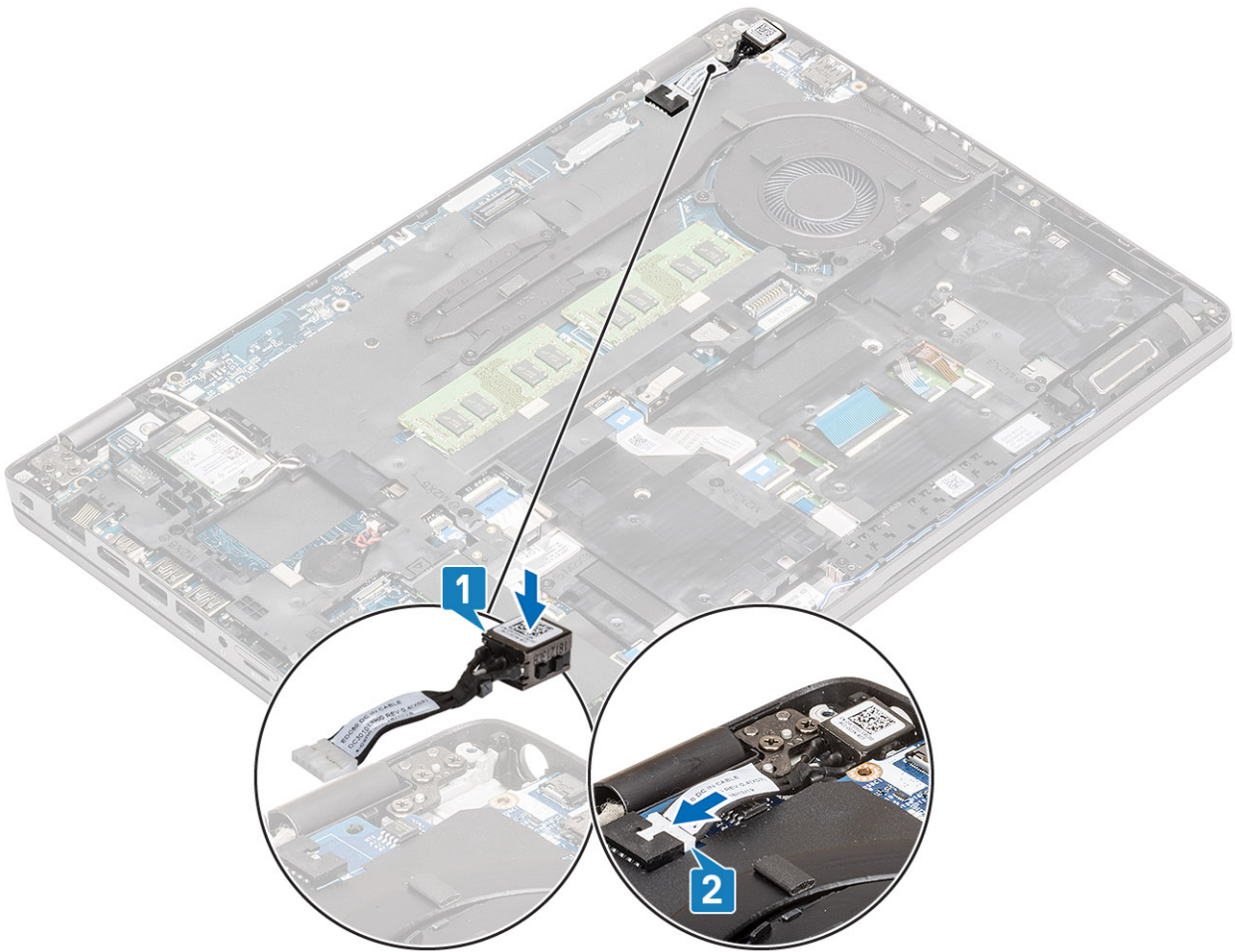


- 3 Disconnect the DC-in port cable from the connector on the system board and remove the DC-in port from the computer [1, 2].

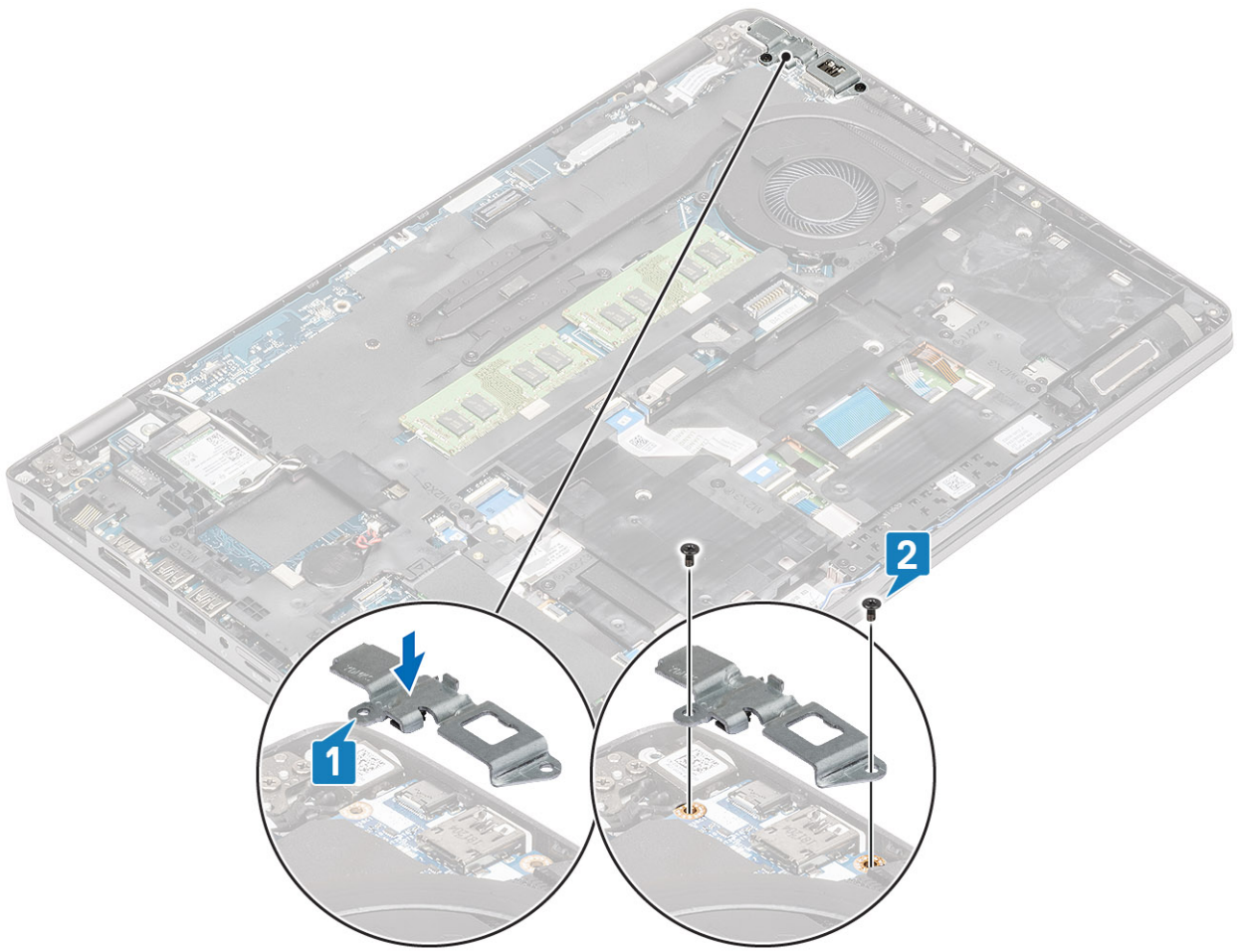


Installing the DC-in port

- 1 Place the DC-in port to its slot on the computer [1].
- 2 Connect the DC-in port cable to the connector on the system board [2].



- 3 Place the Type-C bracket on its slot on the computer [1].
- 4 Replace the two (M2x5) screws to secure the Type-C bracket to the palmrest [2].

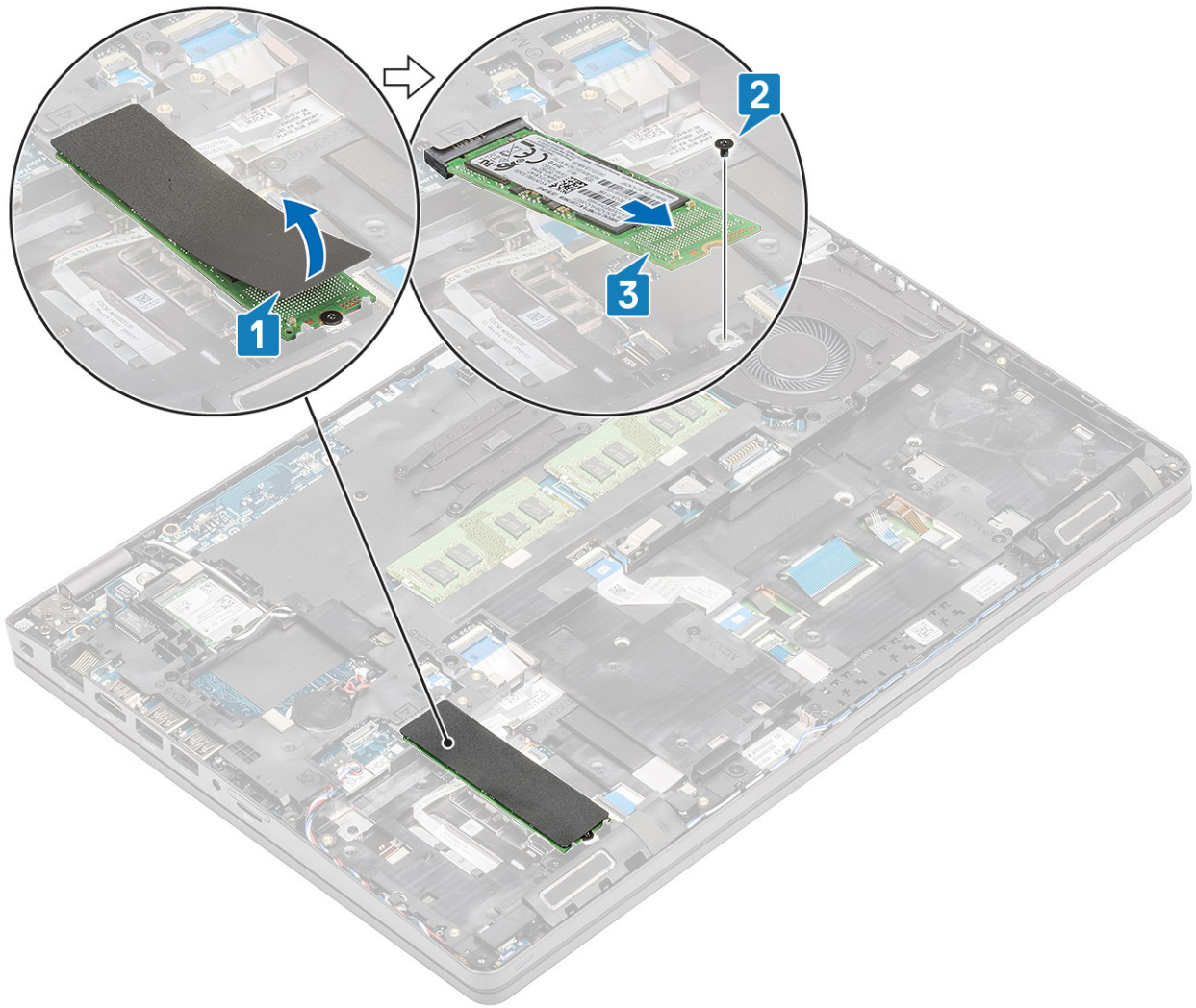


- 1 Replace the [battery](#).
- 2 Replace the [base cover](#).
- 3 Replace the [microSD card](#).
- 4 Follow the procedure in [after working inside your computer](#).

Solid state drive

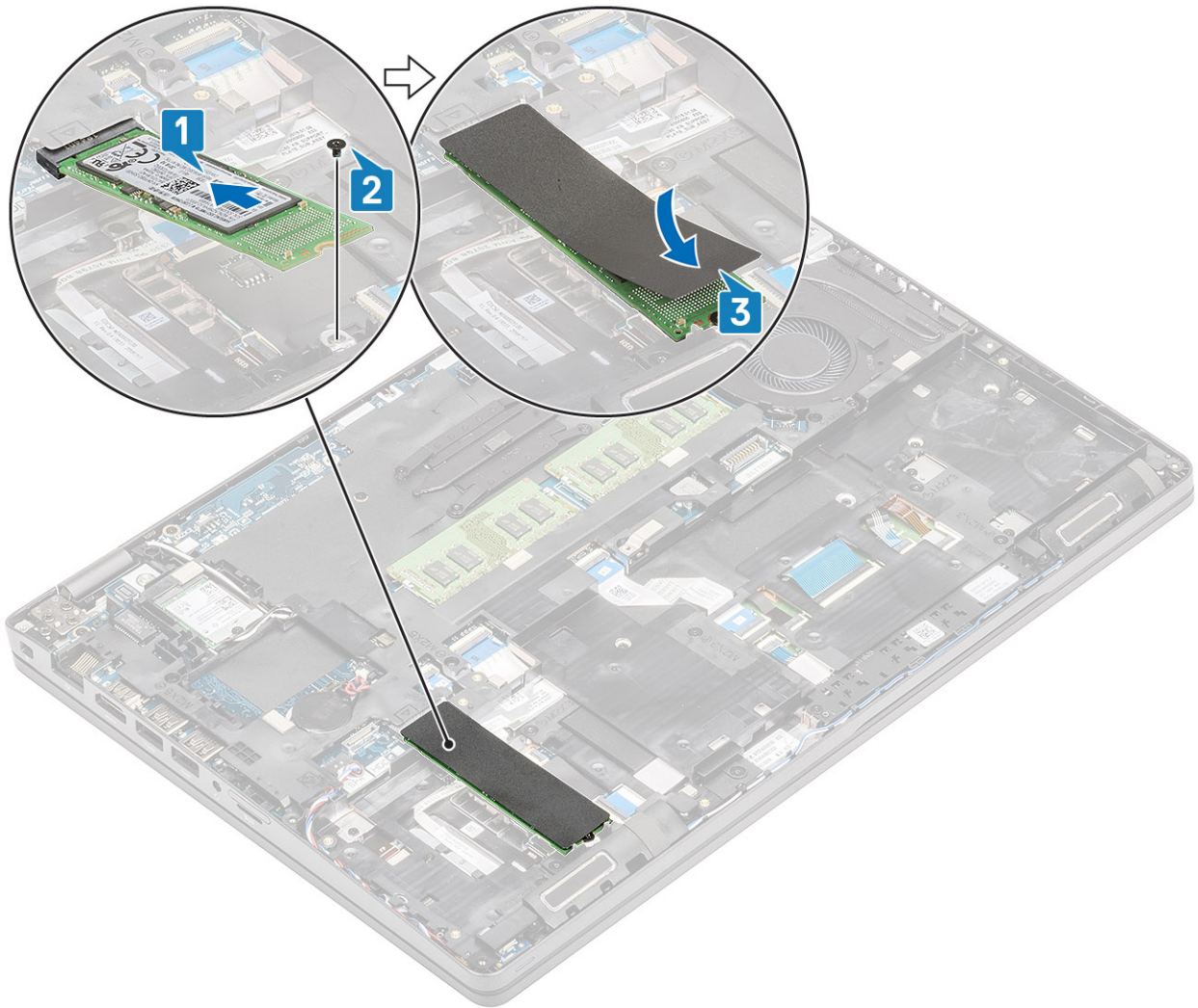
Removing the M.2 SSD

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
- 1 Peel the costume tape from the SSD module [1].
 - 2 Remove the single (M2x3) screw that secures the M.2 SSD to the palmrest [2].
 - 3 Lift the M.2 SSD away from the computer [3].



Installing the M.2 SSD

- 1 Place the M.2 SSD into the slot on the palmrest [1].
- 2 Replace the single (M2x3) screw to secure the M.2 SSD to the palmrest [2].
- 3 Adhere the cosmetic tape to the M.2 SSD [3].

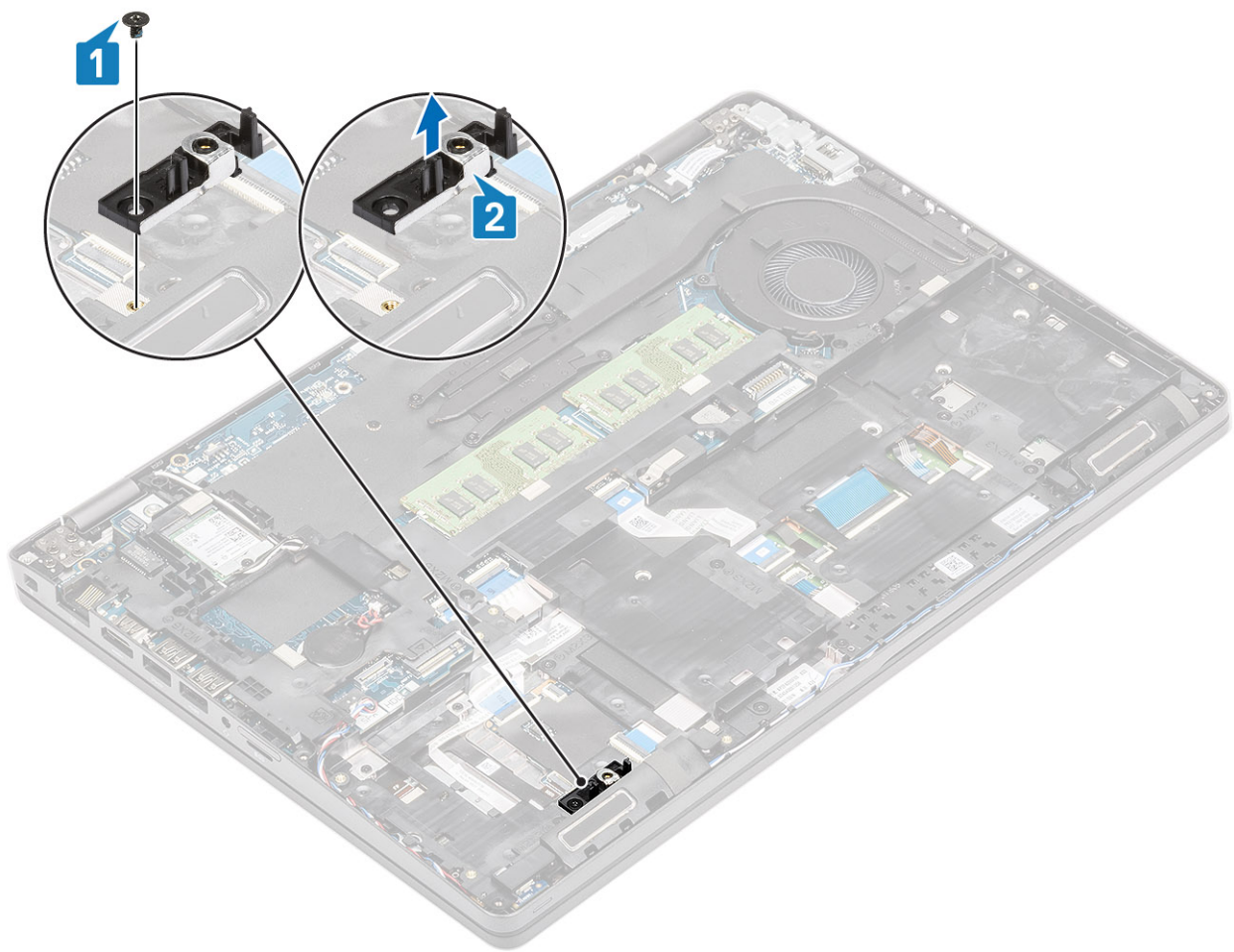


- 1 Replace the [battery](#).
- 2 Replace the [base cover](#).
- 3 Replace the [microSD card](#).
- 4 Follow the procedure in [after working inside your computer](#).

Solid state drive bracket

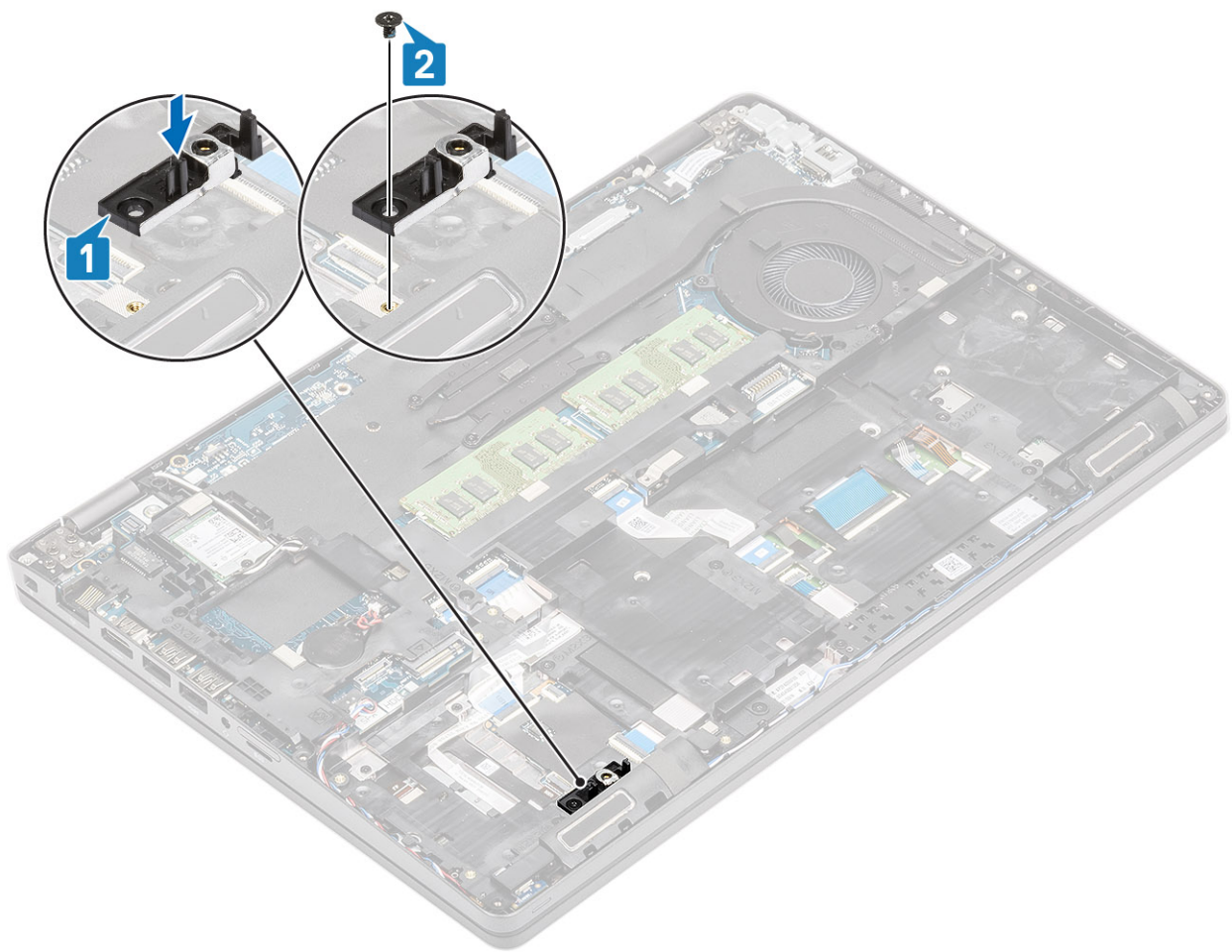
Removing the solid state drive bracket

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
 - 5 Remove the [M.2 SSD](#).
- 1 Remove the single (M2x3) screw that secures the bracket to the palmrest [1].
 - 2 Lift the SSD bracket of the slot on the palmrest [2].



Installing the solid state drive bracket

- 1 Align the bracket and insert it into the slot on the palmrest [1].
- 2 Replace the single (M2x3) screw to secure the bracket to the palmrest [2].

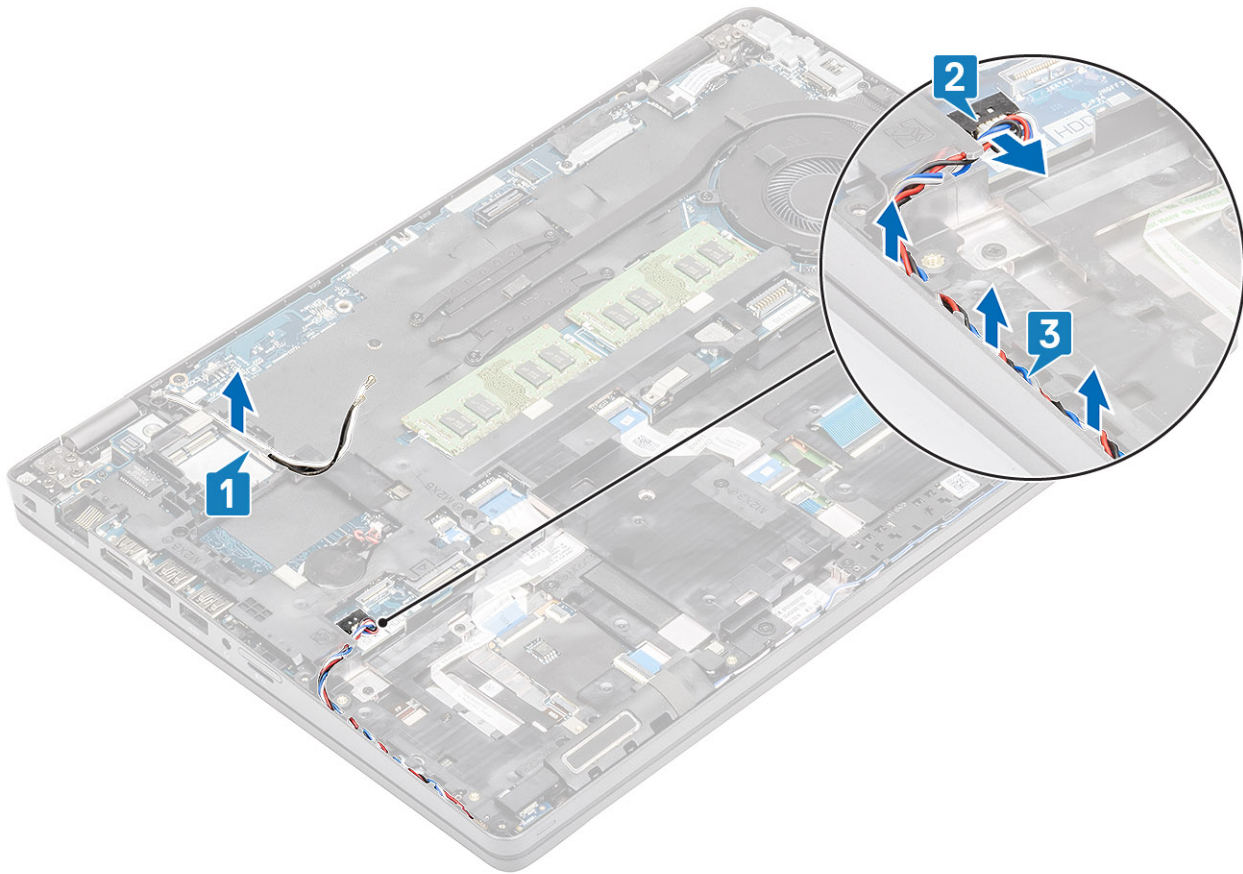


- 1 Replace the [M.2 SSD](#).
- 2 Replace the [battery](#).
- 3 Replace the [base cover](#).
- 4 Replace the [microSD card](#).
- 5 Follow the procedure in [after working inside your computer](#).

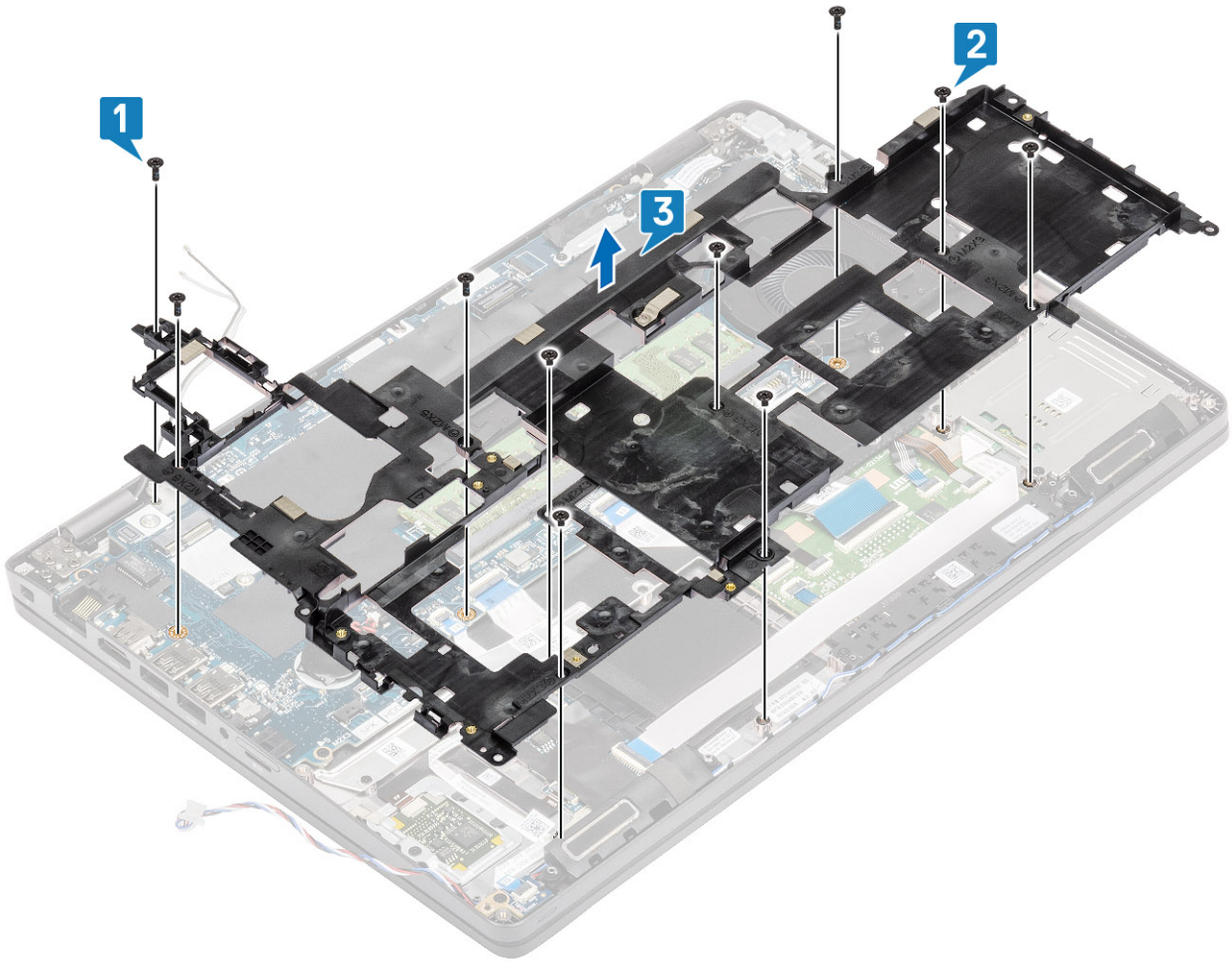
Inner frame

Removing the inner frame

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 5 Remove the [WLAN card](#).
- 6 Remove the [M.2 SSD](#).
- 7 Remove the [M.2 SSD bracket](#).
- 1 Unroute the WLAN antenna cables.

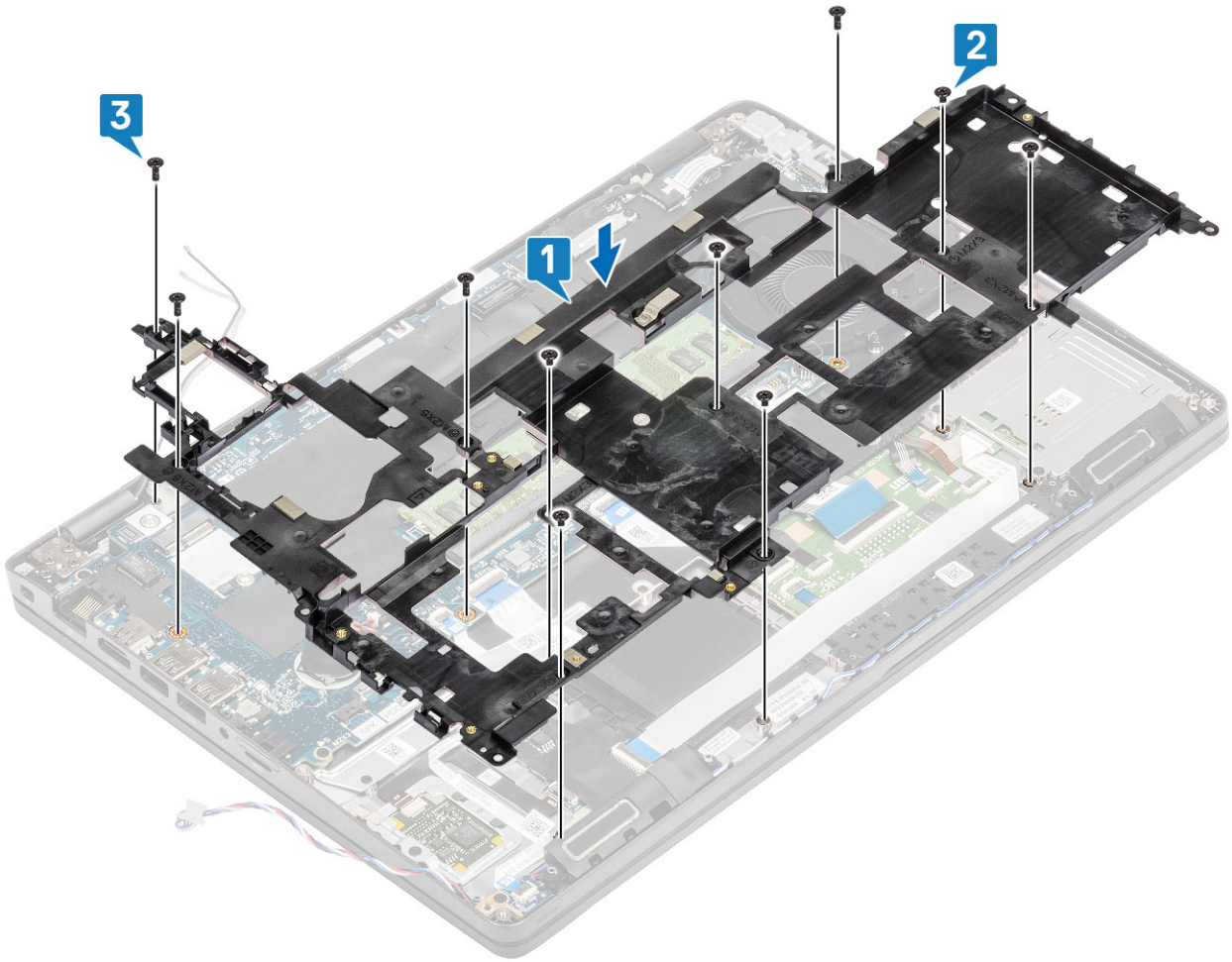


- 2 Remove the four (M2x5) screws that secure the inner frame to the system board [1].
- 3 Remove the six (M2x3) screws that secure the inner frame to the system chassis [2].
- 4 Lift the inner frame away from the system chassis [3].

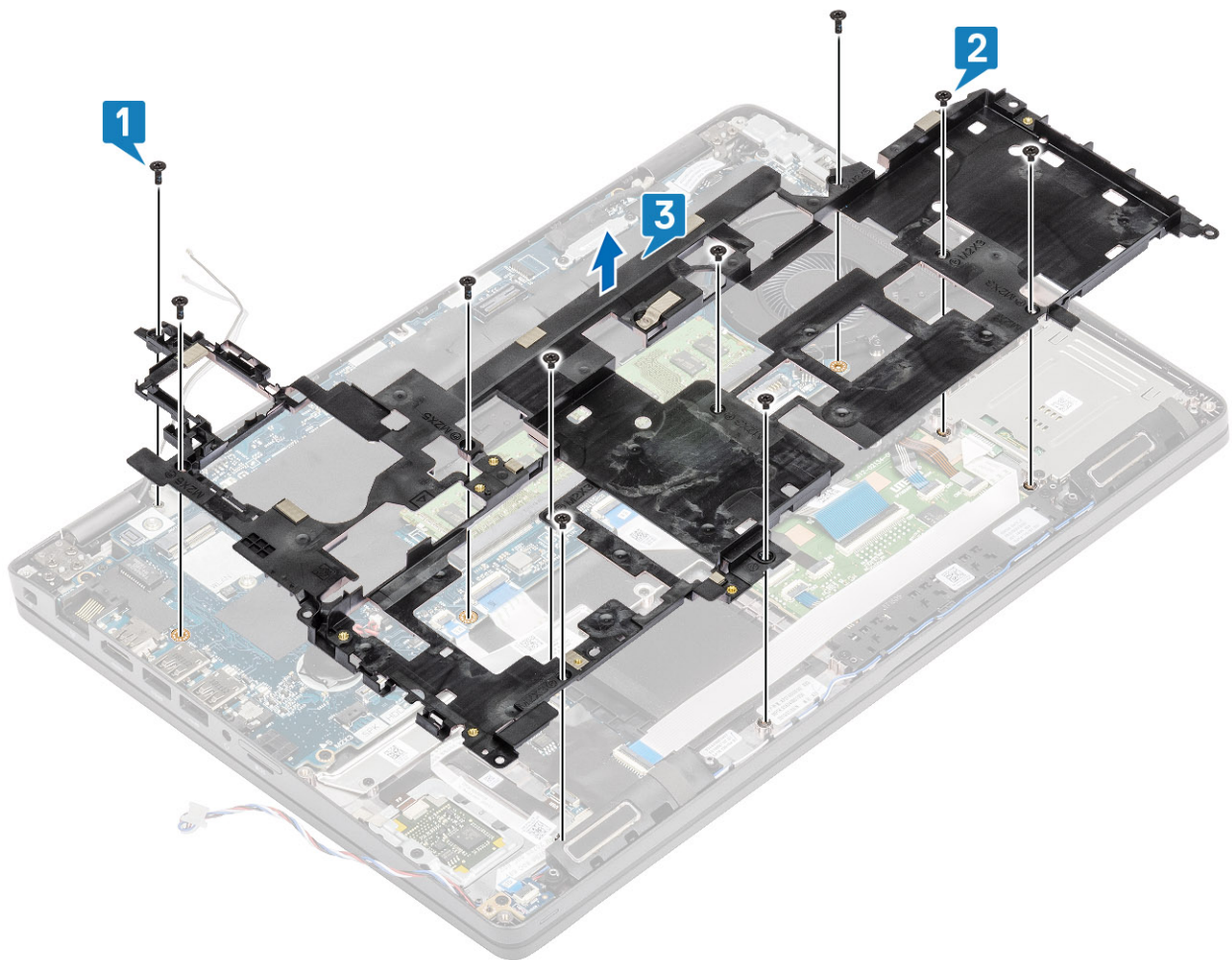


Installing the inner frame

- 1 Align and place the inner frame on the system chassis [1].
- 2 Replace the six (M2x3) screws to secure the inner frame to the system chassis [2].
- 3 Replace the four (M2x5) screws to secure the inner frame to the system board [3].



- 4 Reroute the WLAN antenna cables.

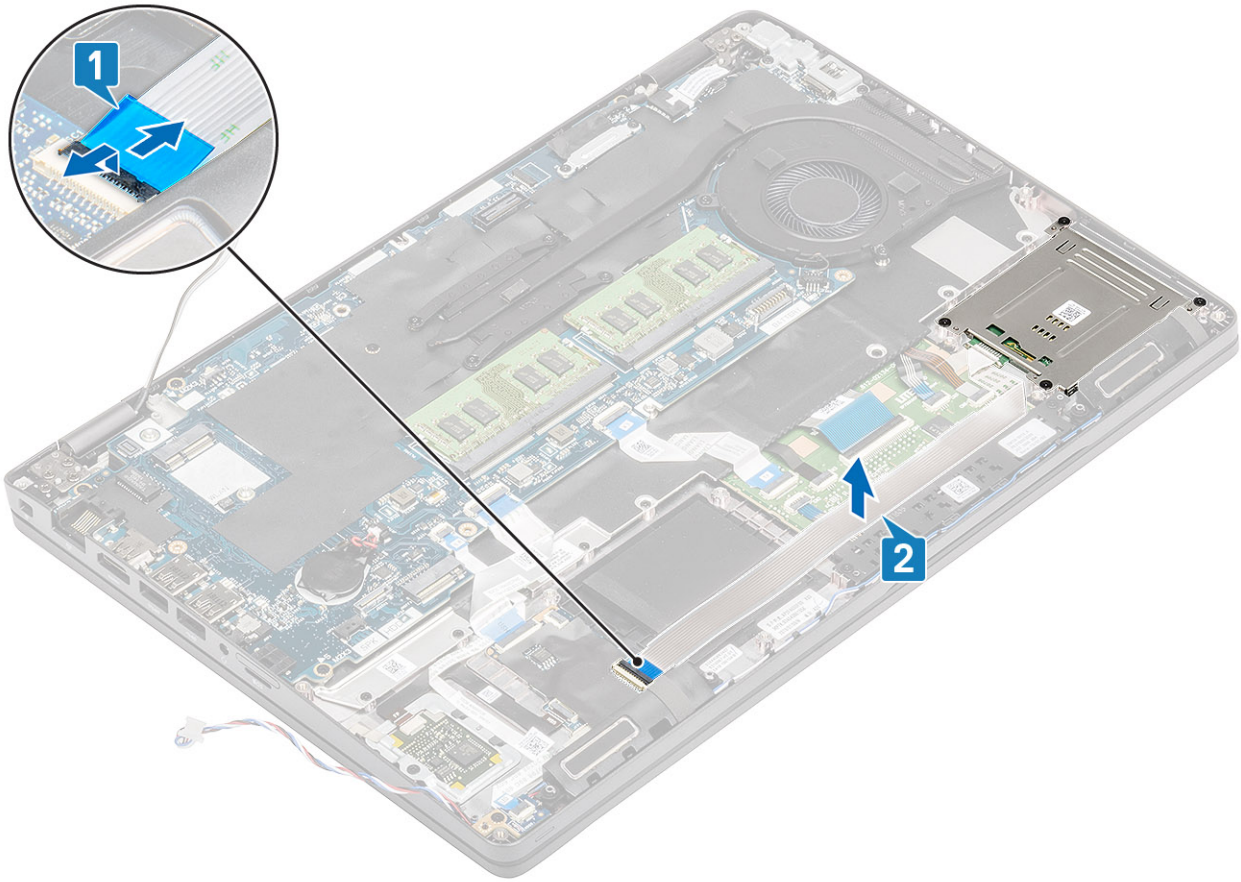


- 1 Replace the [M.2 SSD holder](#).
- 2 Replace the [M.2 SSD](#).
- 3 Replace the [WLAN card](#).
- 4 Replace the [battery](#).
- 5 Replace the [base cover](#).
- 6 Replace the [microSD card](#).
- 7 Follow the procedure in [after working inside your computer](#).

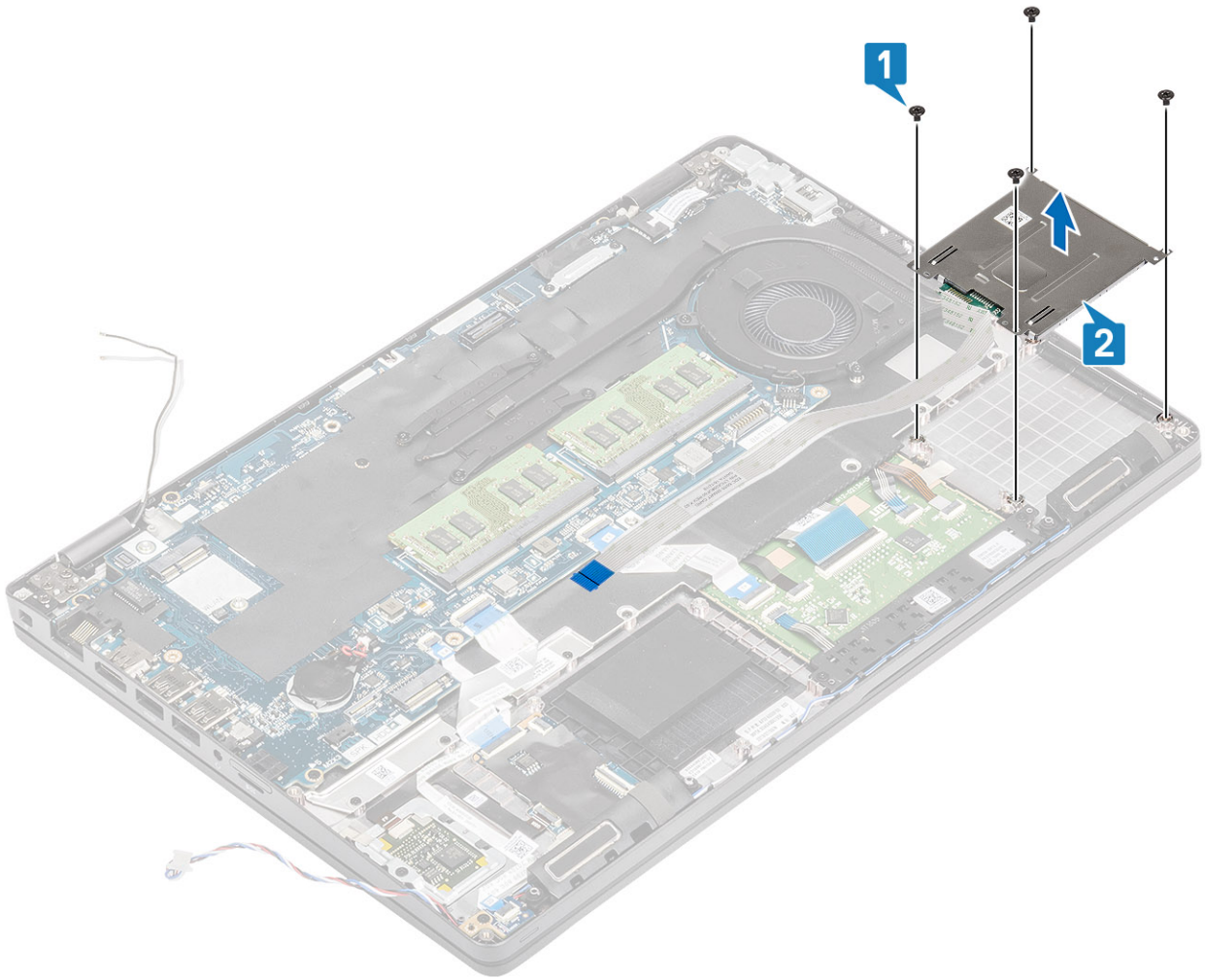
SmartCard reader

Removing the SmartCard reader

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
 - 5 Remove the [WLAN card](#).
 - 6 Remove the [inner frame](#).
- 1 Disconnect the SmartCard reader flexible flat cable (FFC) from the connector on the USH board [1].
 - 2 Peel the SmartCard FFC from the palmrest [2].

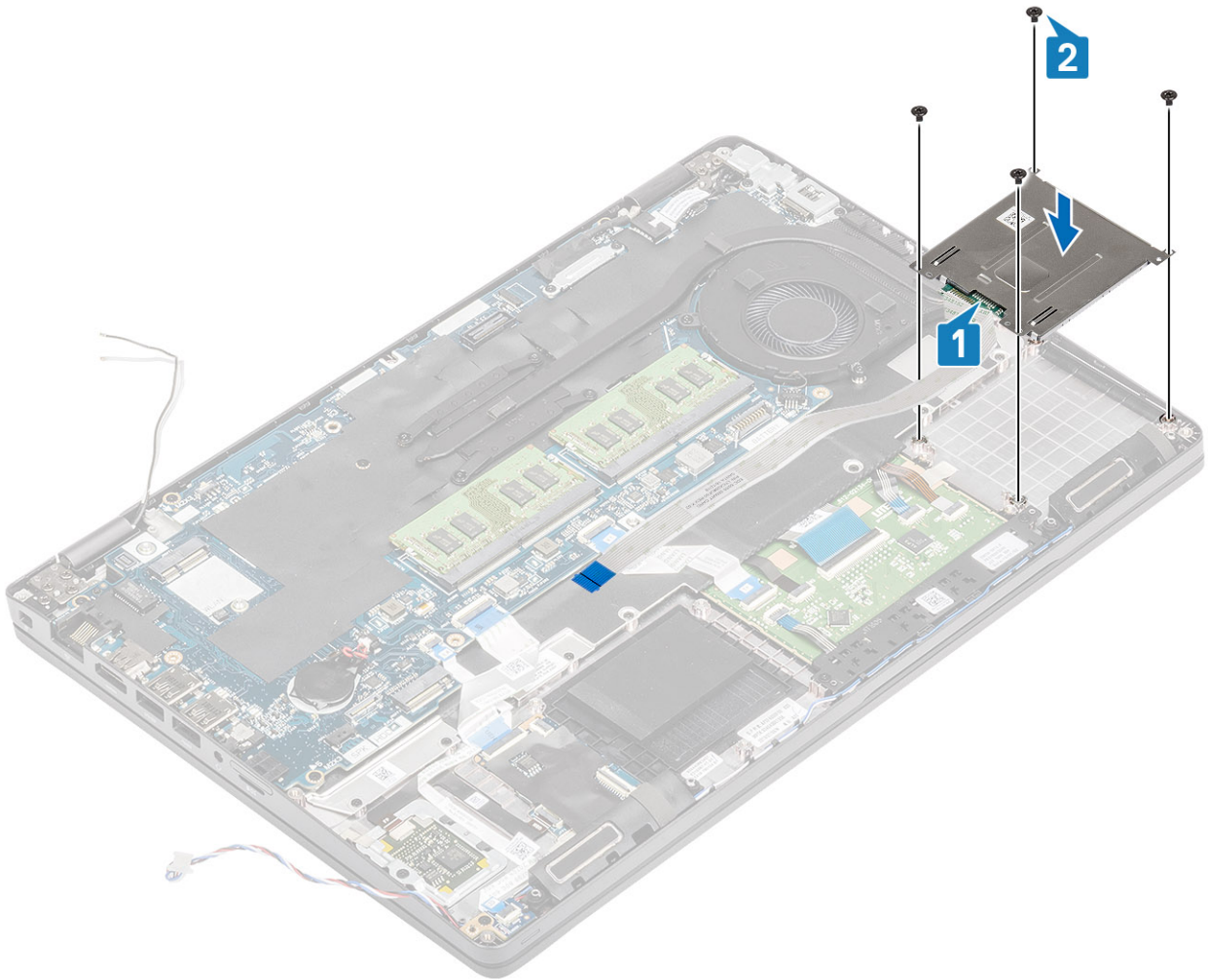


- 3 Remove the four (M2x3) screws that secure the smartcard reader to the palmrest [1].
- 4 Lift the smartcard reader board away from the palmrest [2].

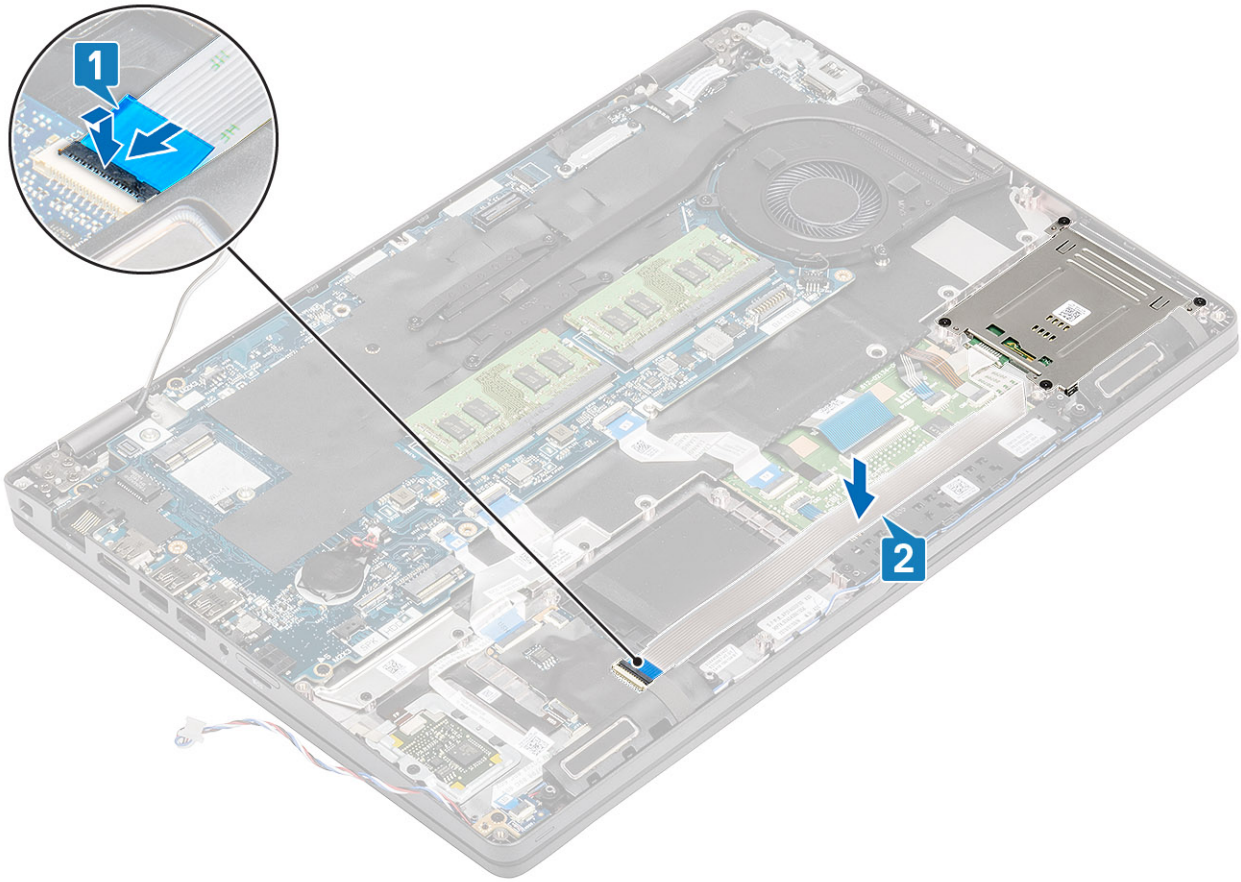


Installing the SmartCard reader

- 1 Place the smart card reader board on the palmrest [1].
- 2 Replace the four (M2x3) screws to secure the smartcard reader on the palmrest [2].



- 3 Connect the smartcard reader FFC to the connector on the USB board [1].
- 4 Adhere the smartcard FFC to the palmrest [2].

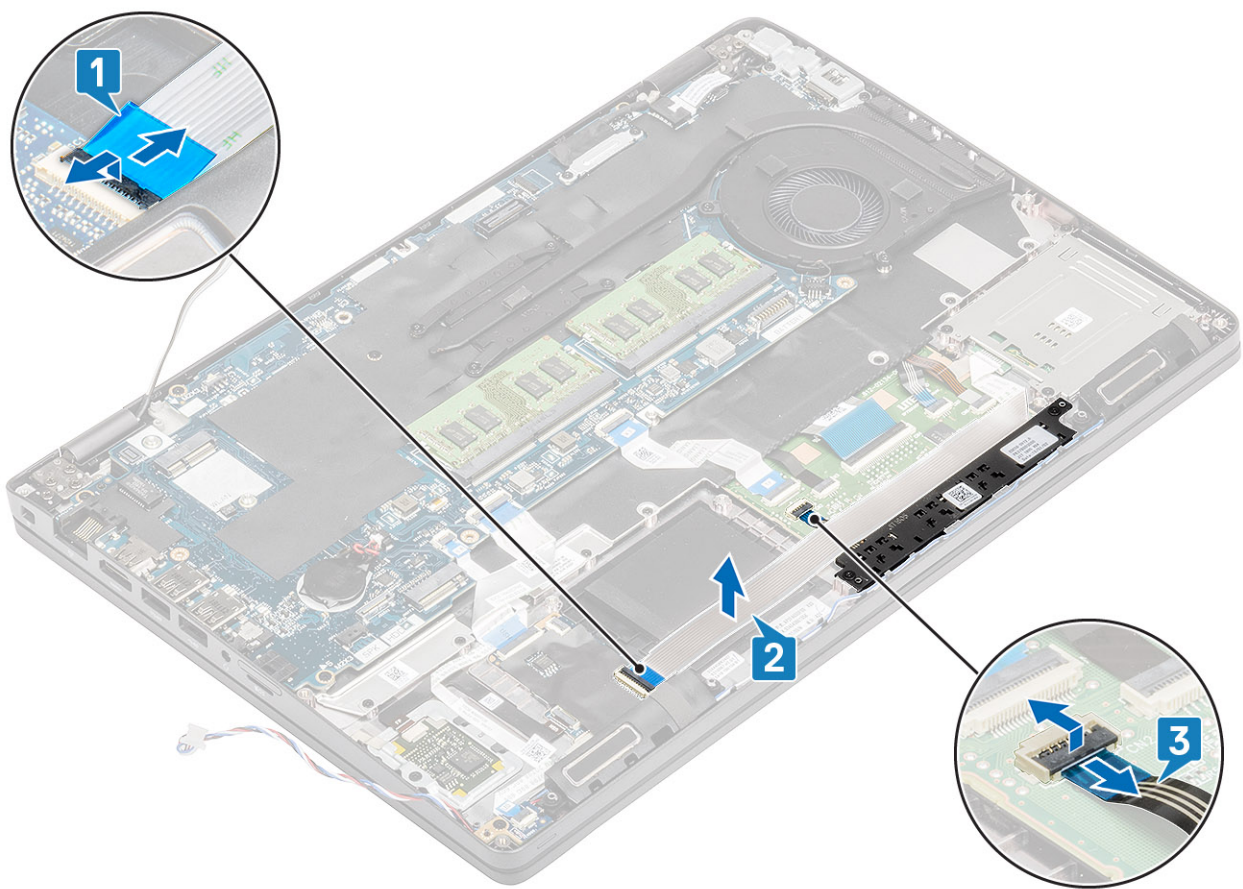


- 1 Replace the [inner frame](#).
- 2 Replace the [WLAN card](#).
- 3 Replace the [battery](#).
- 4 Replace the [base cover](#).
- 5 Replace the [microSD card](#).
- 6 Follow the procedure in [after working inside your computer](#).

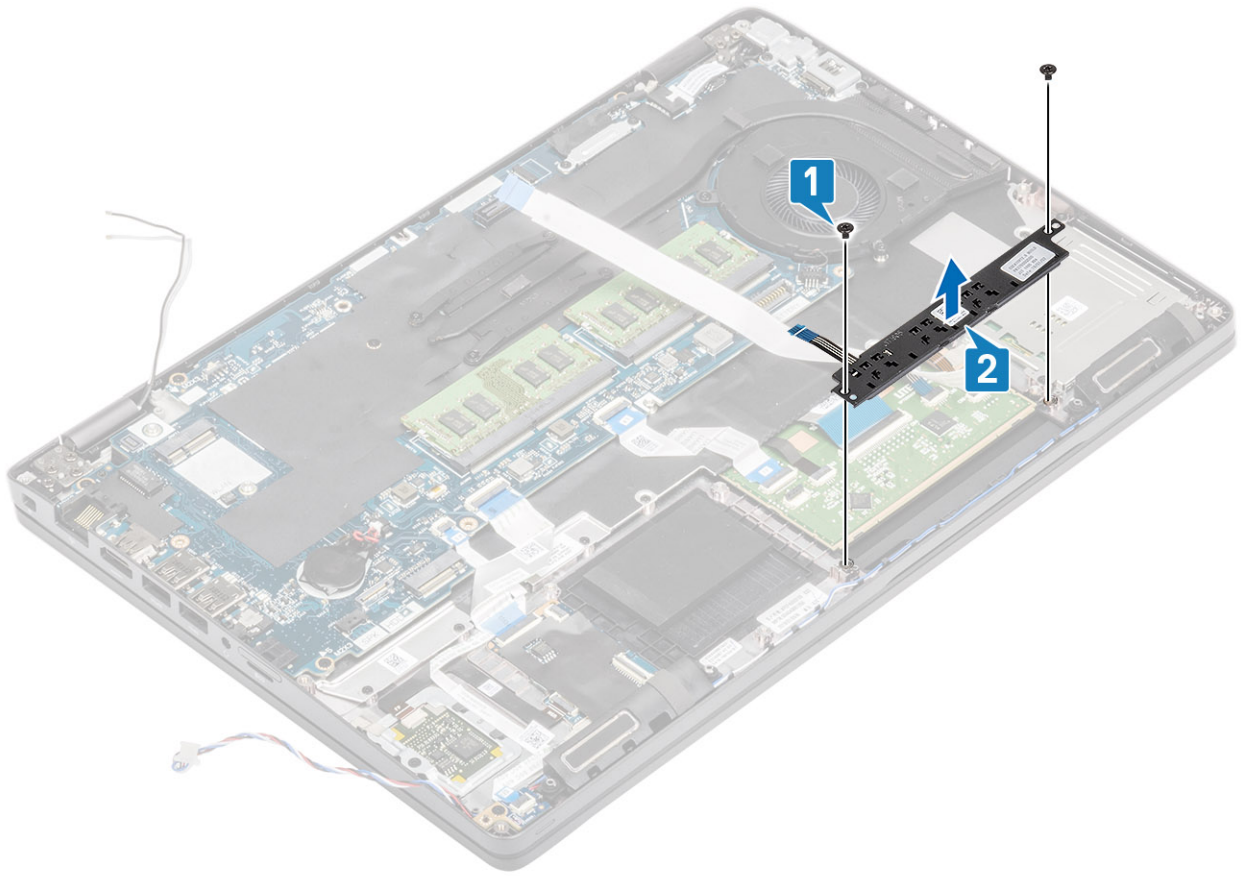
Touchpad buttons

Removing the touchpad button board

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
 - 5 Remove the [speaker](#).
- 1 Open the latch and disconnect the smartcard reader Flexible Flat Cable (FFC) from the USH board [1].
 - 2 Peel the smartcard reader FFC of the palmrest [2] and disconnect the touchpad button board cable from the connector on the touchpad [3].

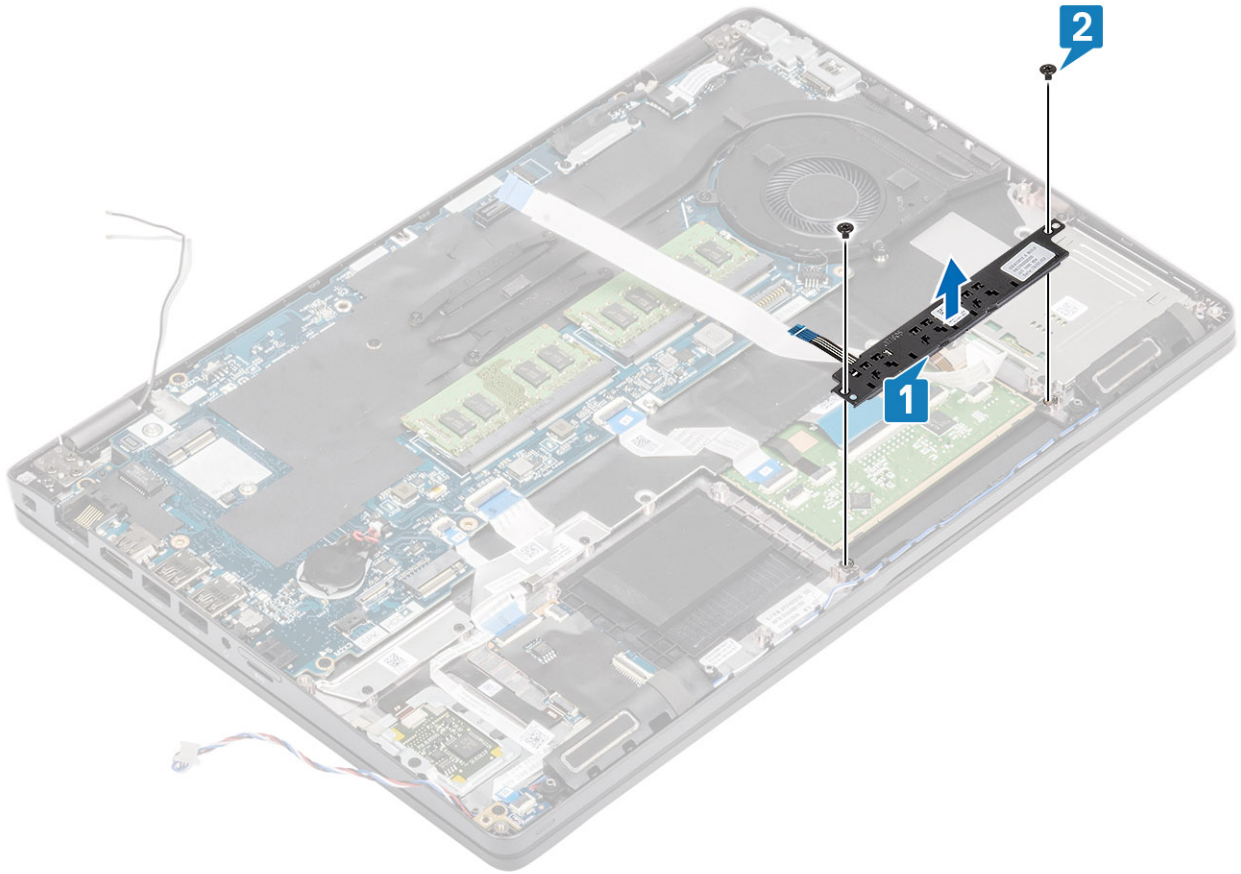


- 3 Remove the two (M2x3) screws that secure the touchpad button bracket to the palmrest [1].
- 4 Lift the touchpad button board bracket away from the computer [2].

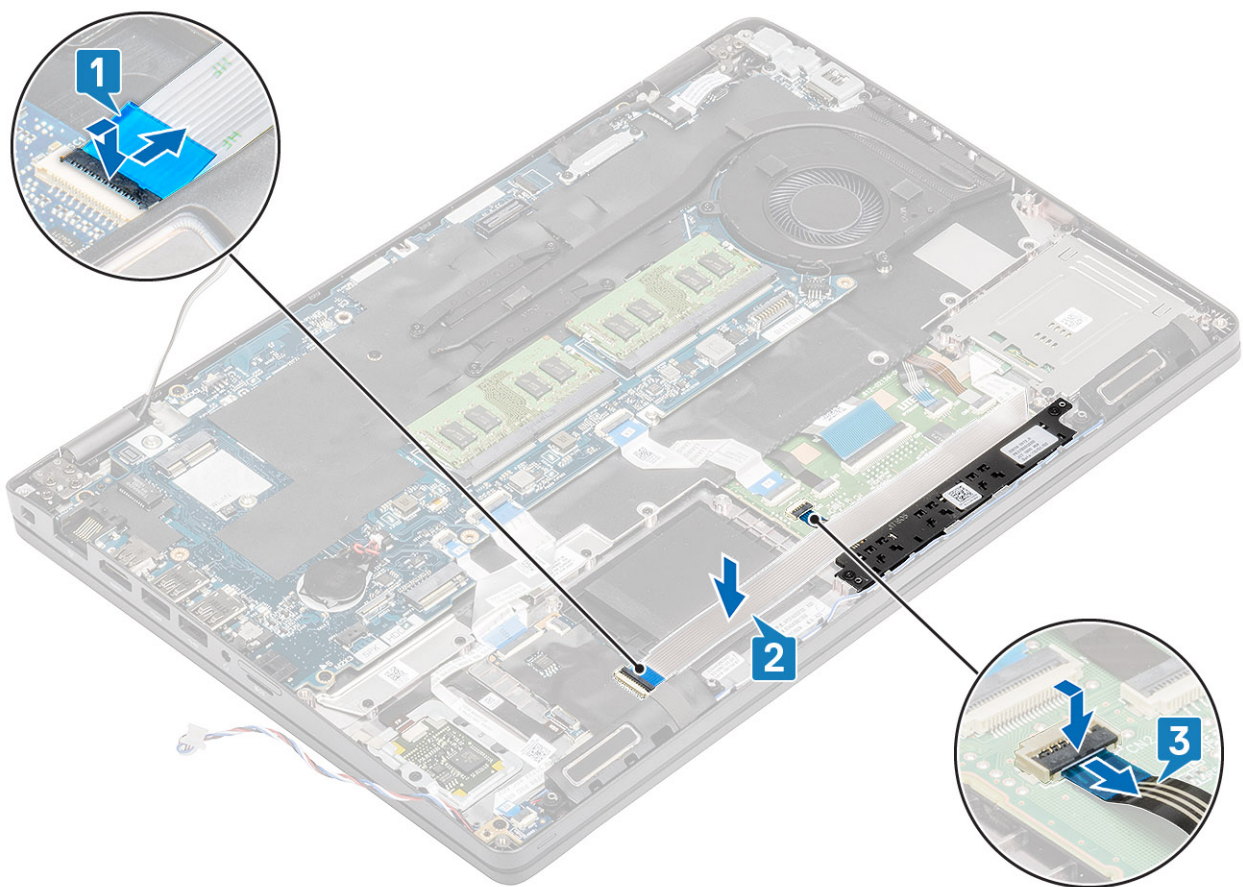


Installing the touchpad button board

- 1 Place the touchpad button board into the slot on the palmrest [1].
- 2 Replace the two (M2x3) screws to secure the touchpad button board to the palmrest [2].



- 3 Connect the Smartcard reader Flexible Flat Cable (FFC) to the USB board [1].
- 4 Adhere the FFC on the palmrest [2] and connect the touchpad button board cable to the connector on the touchpad [3].

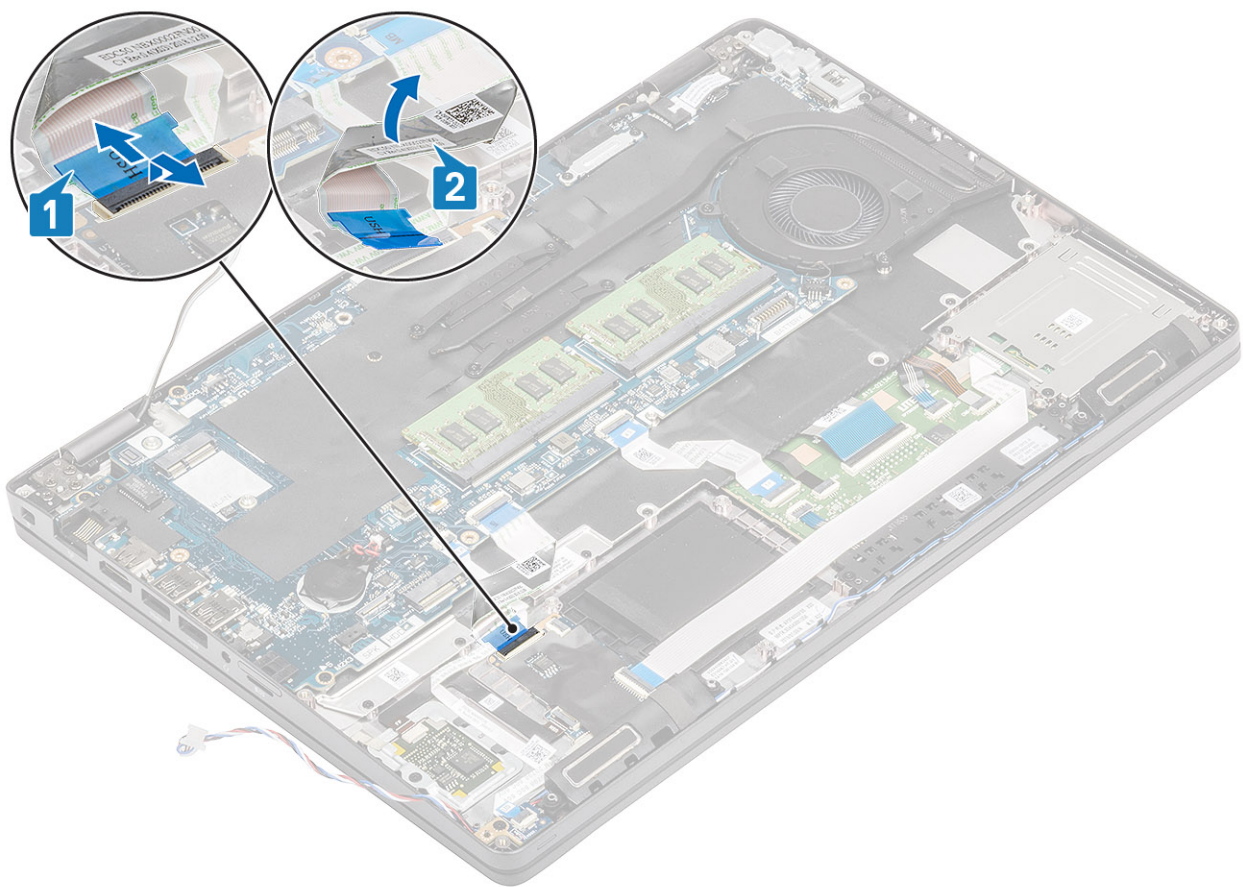


- 1 Replace the [speaker](#).
- 2 Replace the [battery](#).
- 3 Replace the [base cover](#).
- 4 Replace the [microSD card](#).
- 5 Follow the procedure in [after working inside your computer](#).

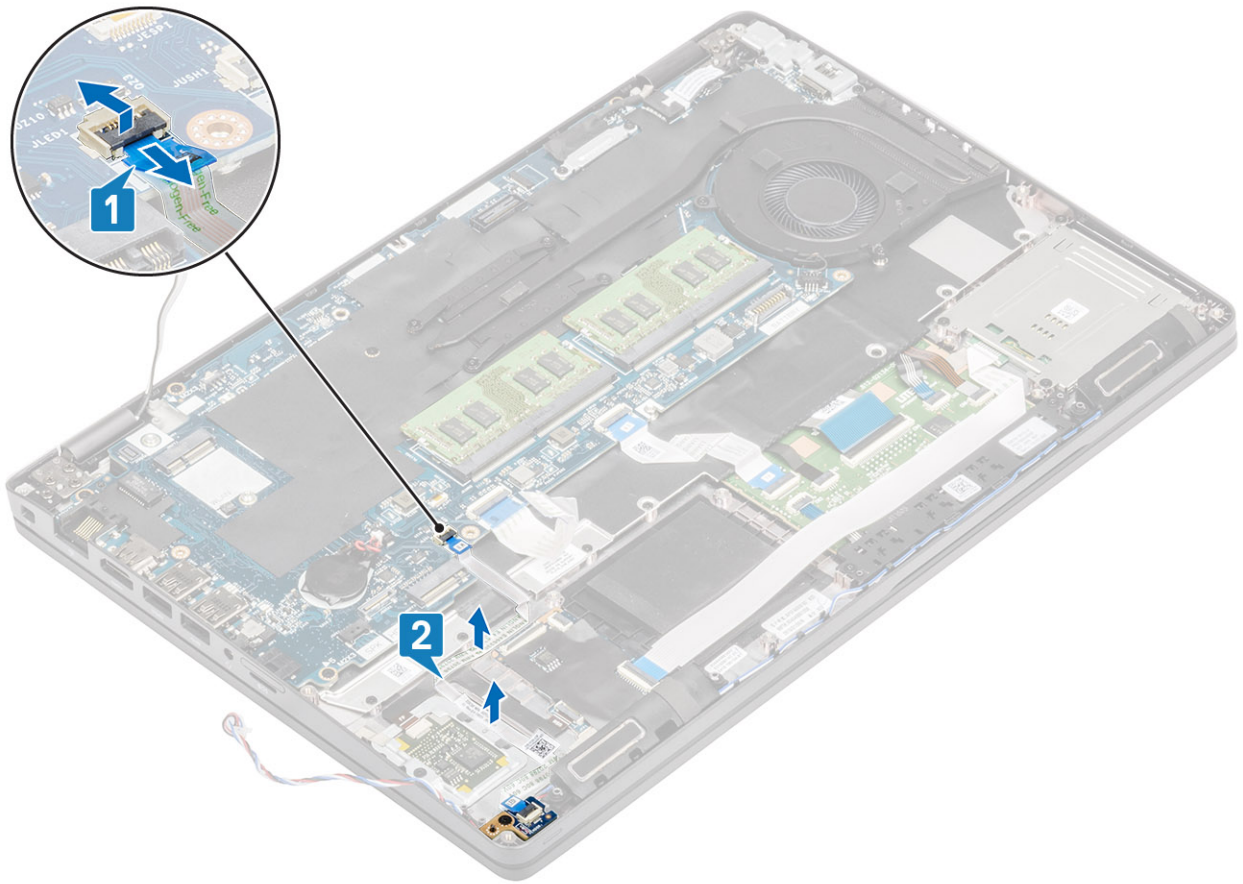
LED board

Removing the LED board

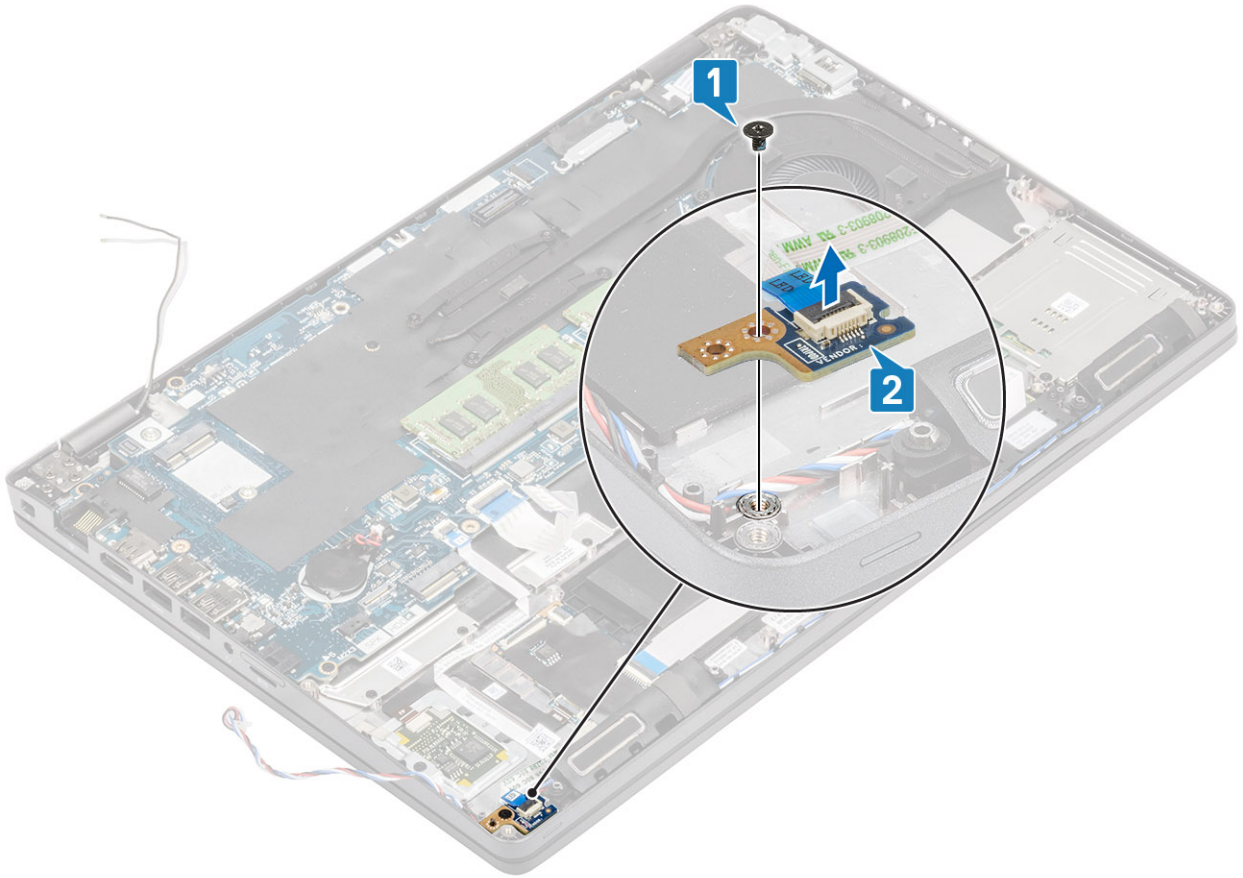
- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 1 Disconnect and peel the USH daughter board Flexible Flat Cable (FFC) from the USH daughter board [1, 2].



- 2 Disconnect the LED board cable from the connector on the system board [1].
- 3 Unroute the LED board cable [2].

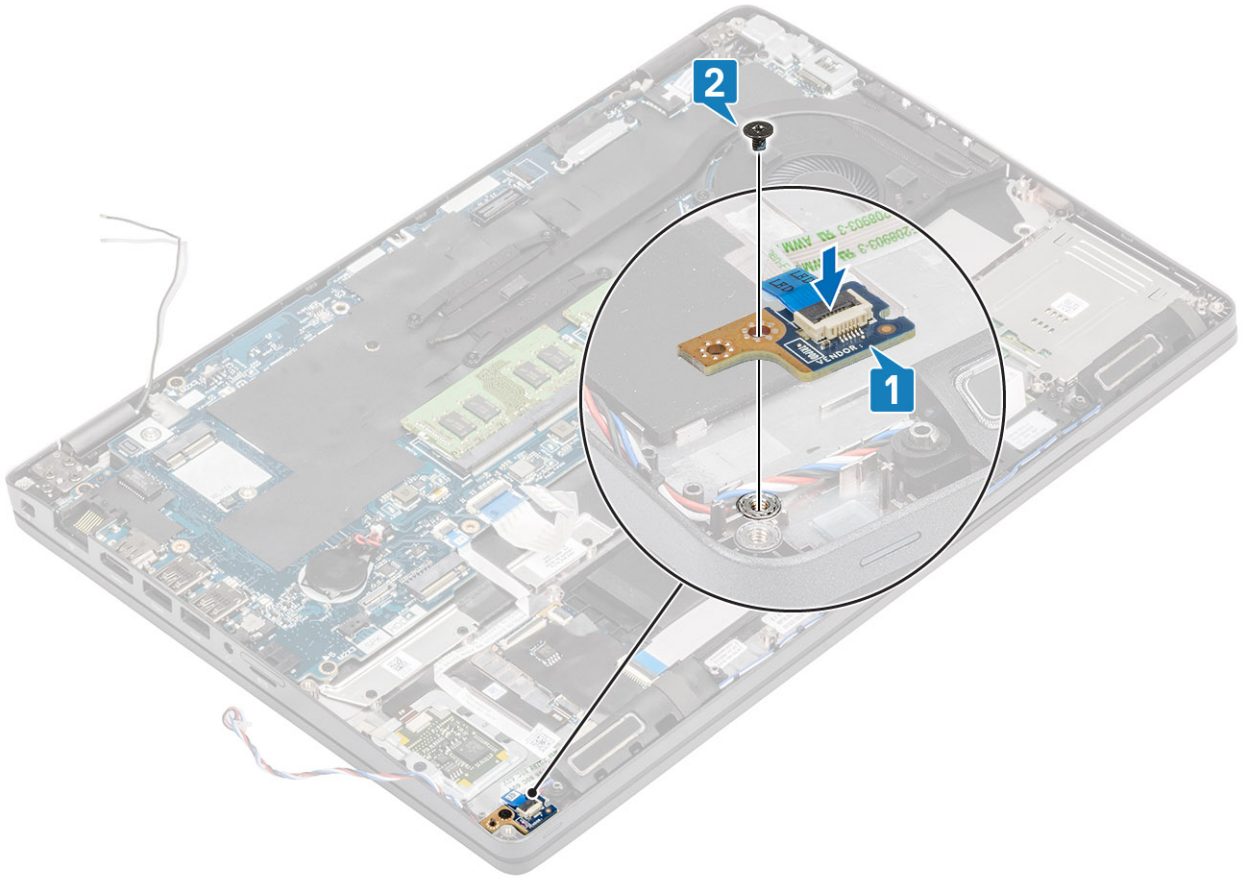


- 4 Remove the single (M2x3) screw that secures LED board to the palmrest [1].
- 5 Lift the LED board away from the computer [2].

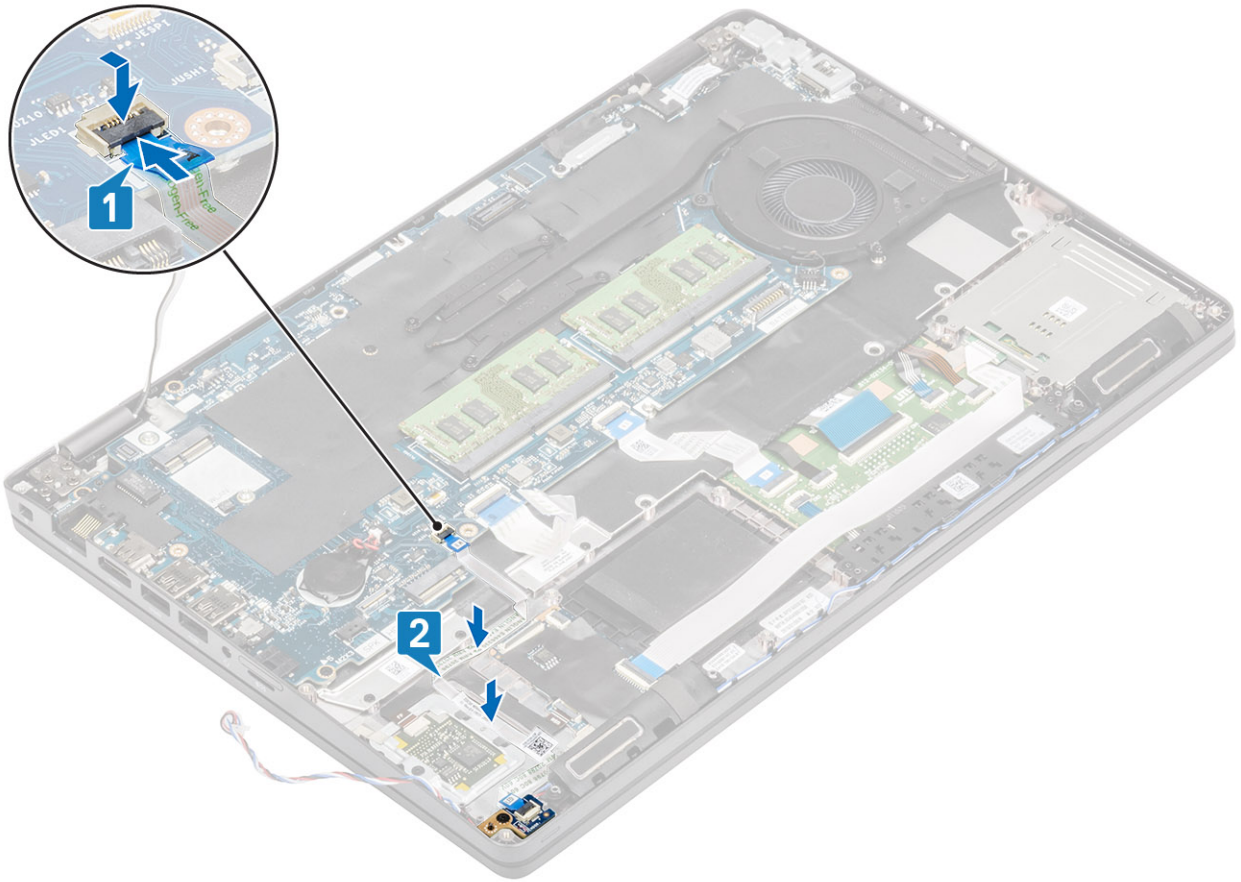


Installing the LED board

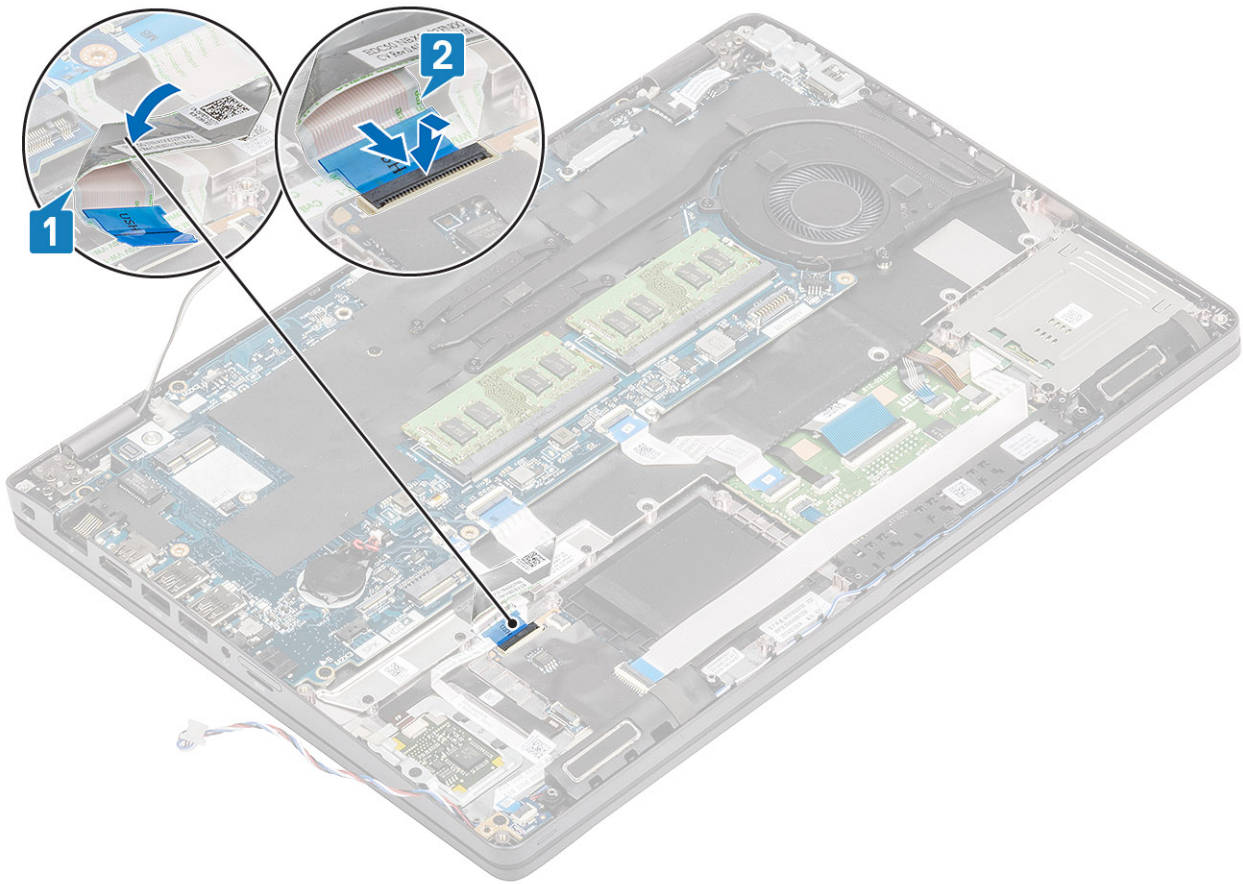
- 1 Place the LED board and align the screw hole on the LED board with the screw hole on the palmrest [1].
- 2 Replace the single (M2x3) screw to secure the LED board to the palmrest [2].



- 3 Connect the LED board cable to the connector on the system board and route the LED board cable [1, 2].



- 4 Connect and adhere the USB daughter board Flexible Flat Cable (FFC) from the USB daughter board [1, 2].

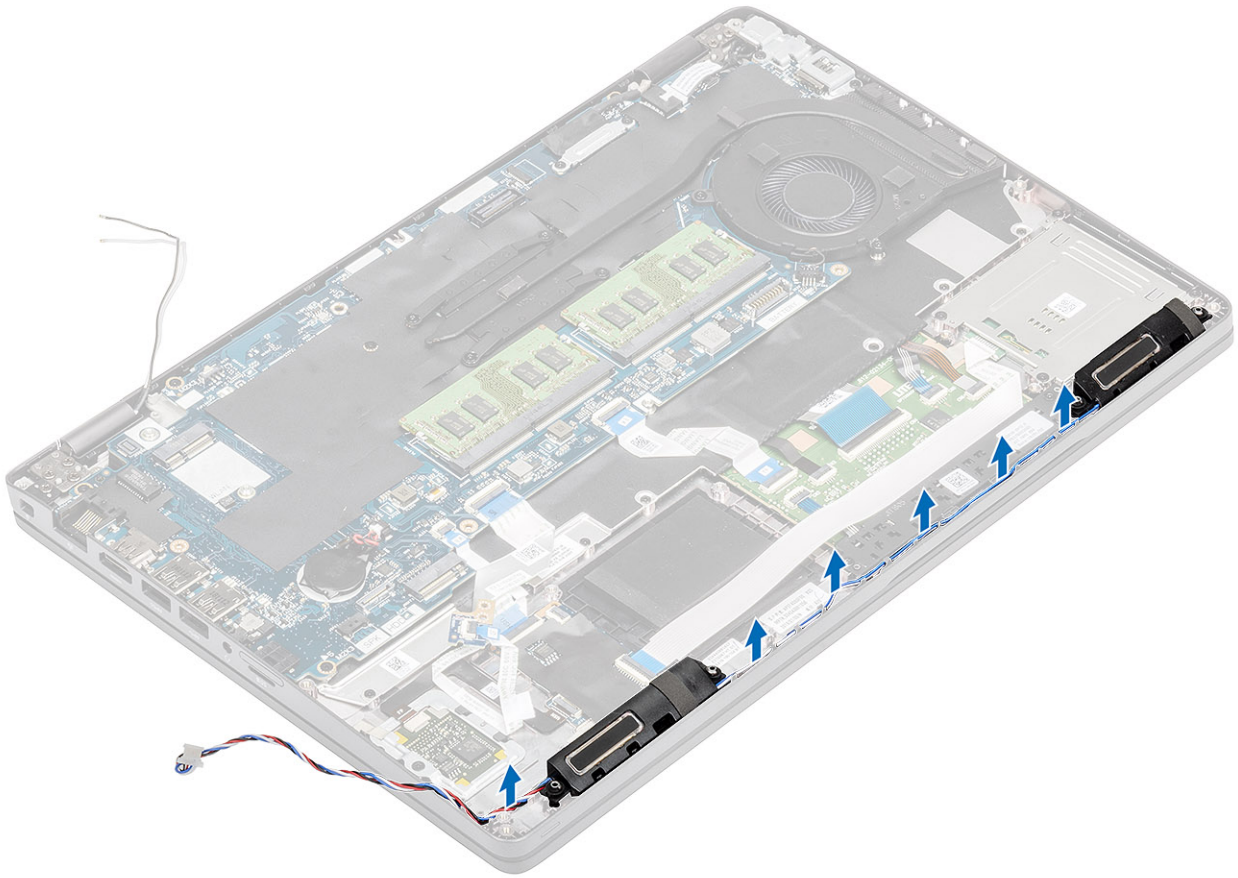


- 1 Replace the [battery](#).
- 2 Replace the [base cover](#).
- 3 Replace the [microSD card](#).
- 4 Follow the procedure in [after working inside your computer](#).

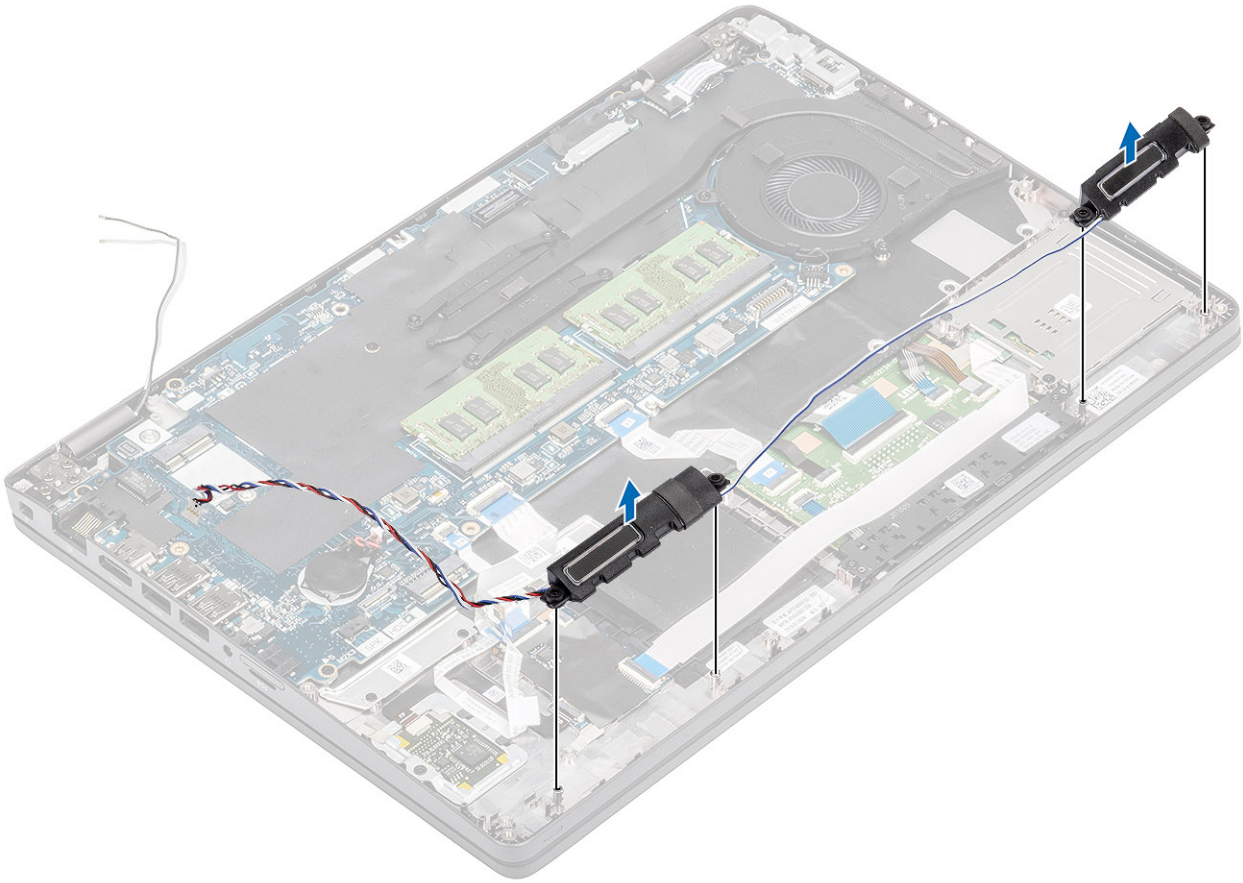
Speakers

Removing the speakers

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
 - 5 Remove the [LED board](#).
- 1 Disconnect the speaker cable from the connector on the system board.
 - 2 Peel the adhesive tapes and unroute the speaker cable.

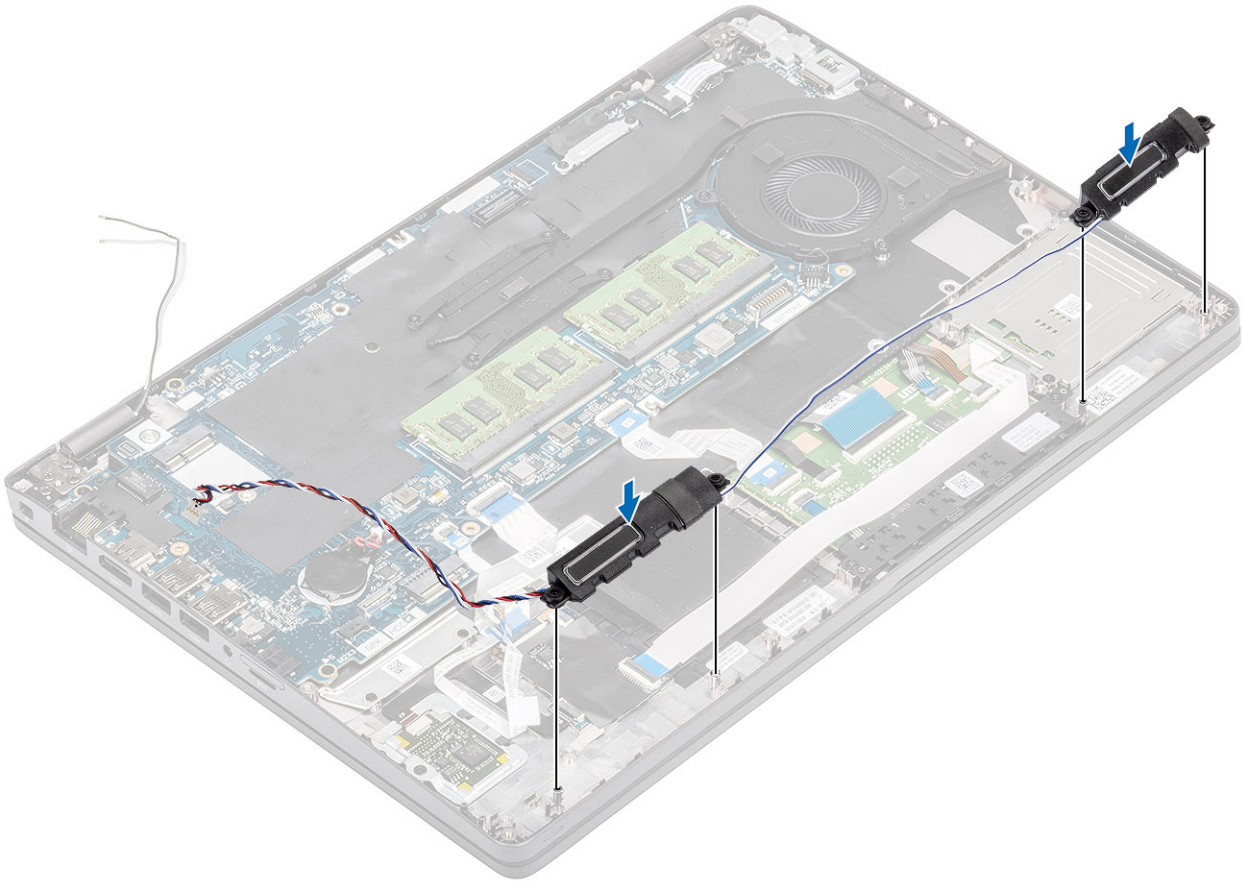


- 3 Lift and remove the speakers away from the palmrest.

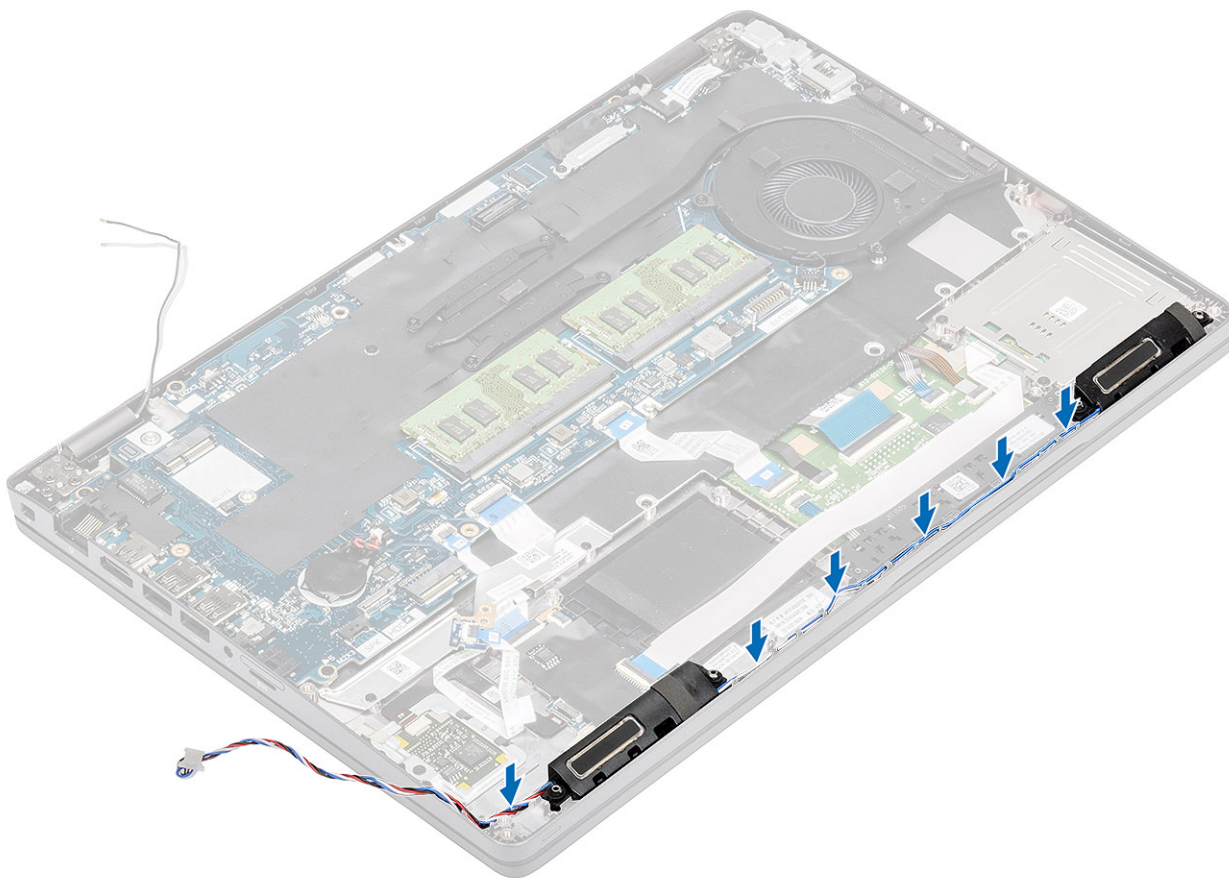


Installing the speakers

- 1 Using the alignment posts and rubber grommets, place the speakers in the slots on the palmrest.
- 2 Route the speaker cable through the routing guides.



- 3 Affix the adhesive tape to secure speaker cable to the palmrest [1].
- 4 Connect the speaker cable to the connector on the system board .

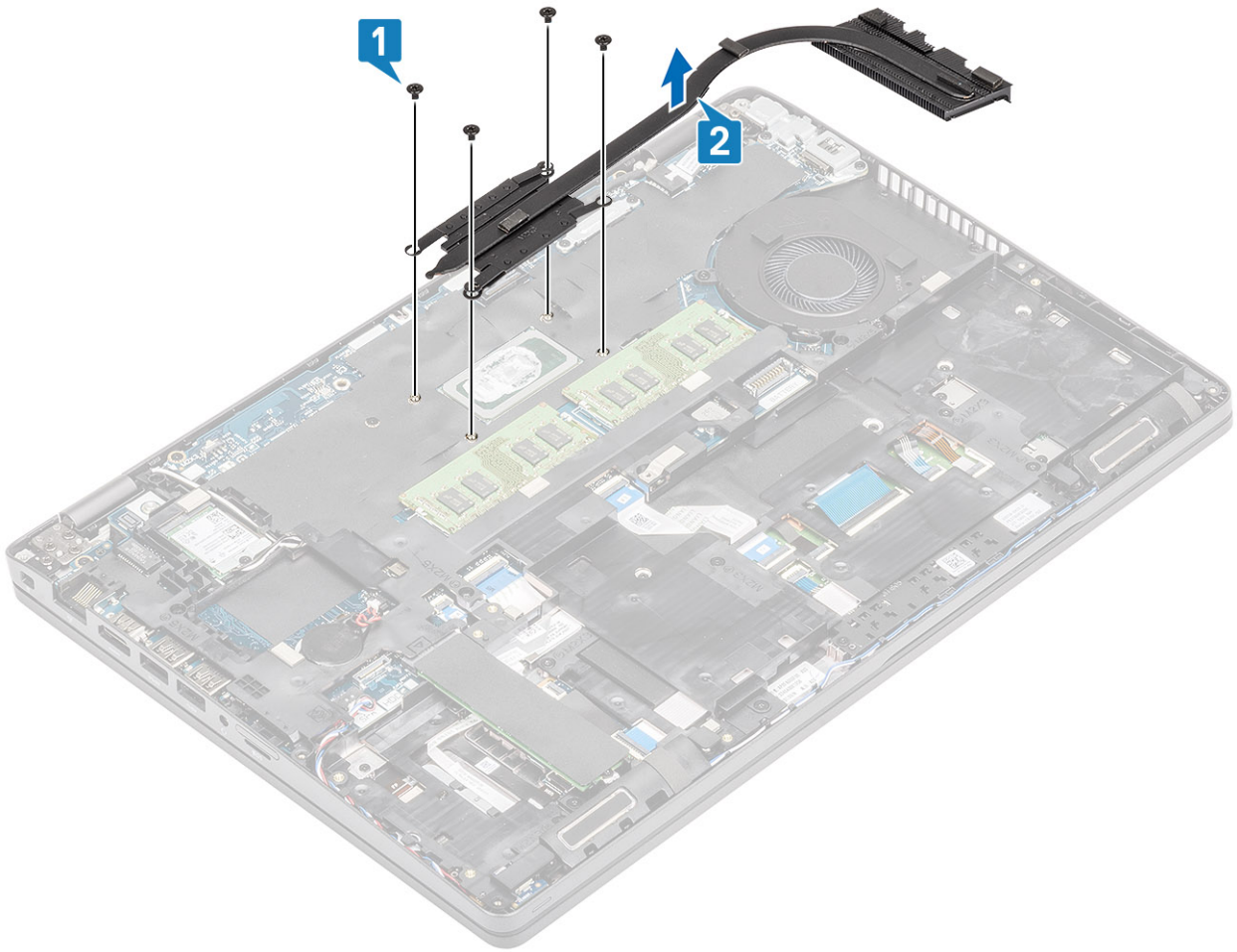


- 1 Replace the [LED board](#).
- 2 Replace the [battery](#).
- 3 Replace the [base cover](#).
- 4 Replace the [microSD card](#).
- 5 Follow the procedure in [after working inside your computer](#).

Heat sink

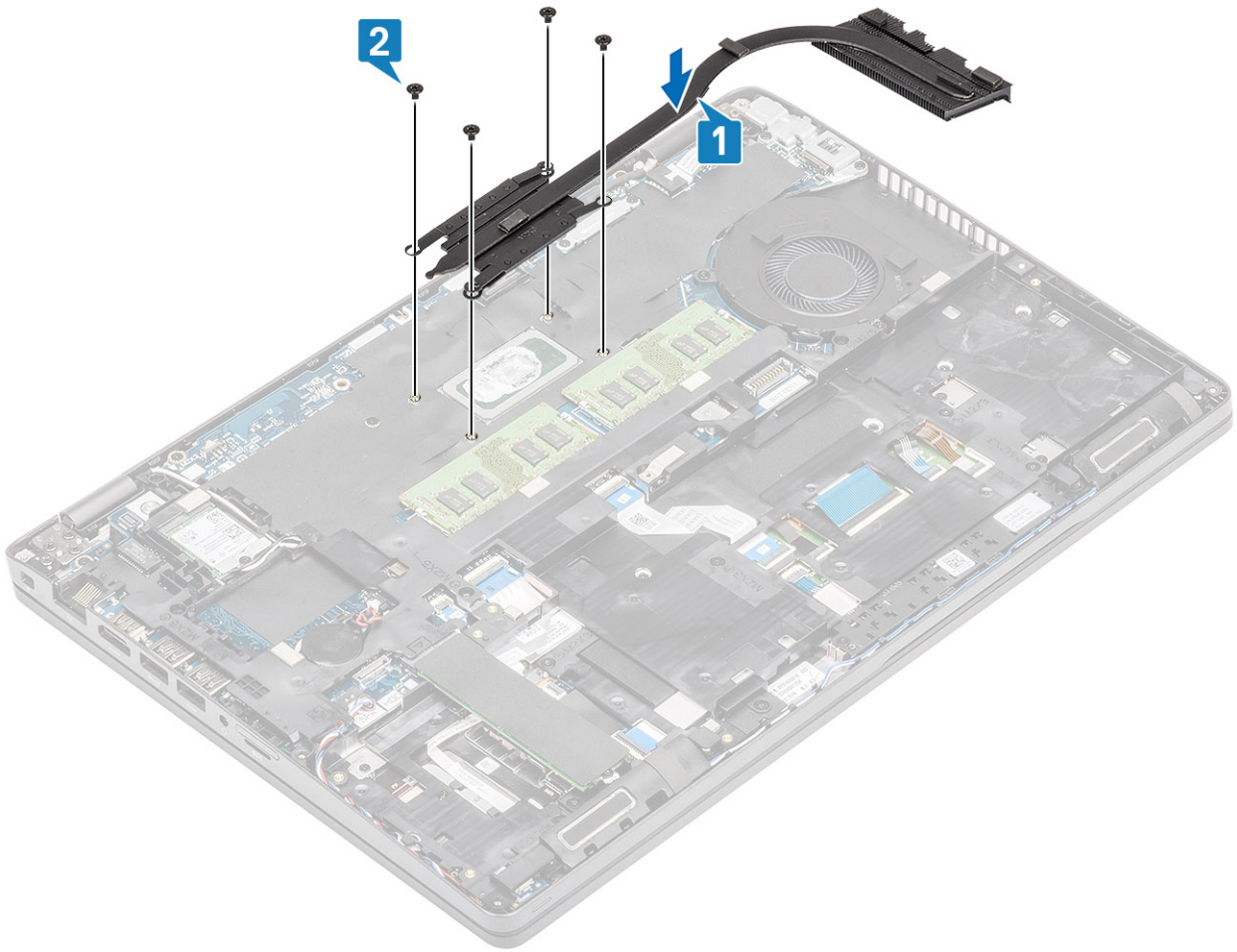
Removing the heatsink - UMA

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
-
- 1 Loosen the four (M2x3) screws that secure the heatsink to the system board [1].
 - 2 Lift the heatsink away from the system board [2].



Installing the heatsink - UMA

- 1 Place the heatsink on the system board and align the screw holes on the heatsink with the screw holes on the system board [1].
- 2 In sequential order (as indicated on the heatsink), tighten the four (M2x3) screws that secure the heatsink to the system board [2].

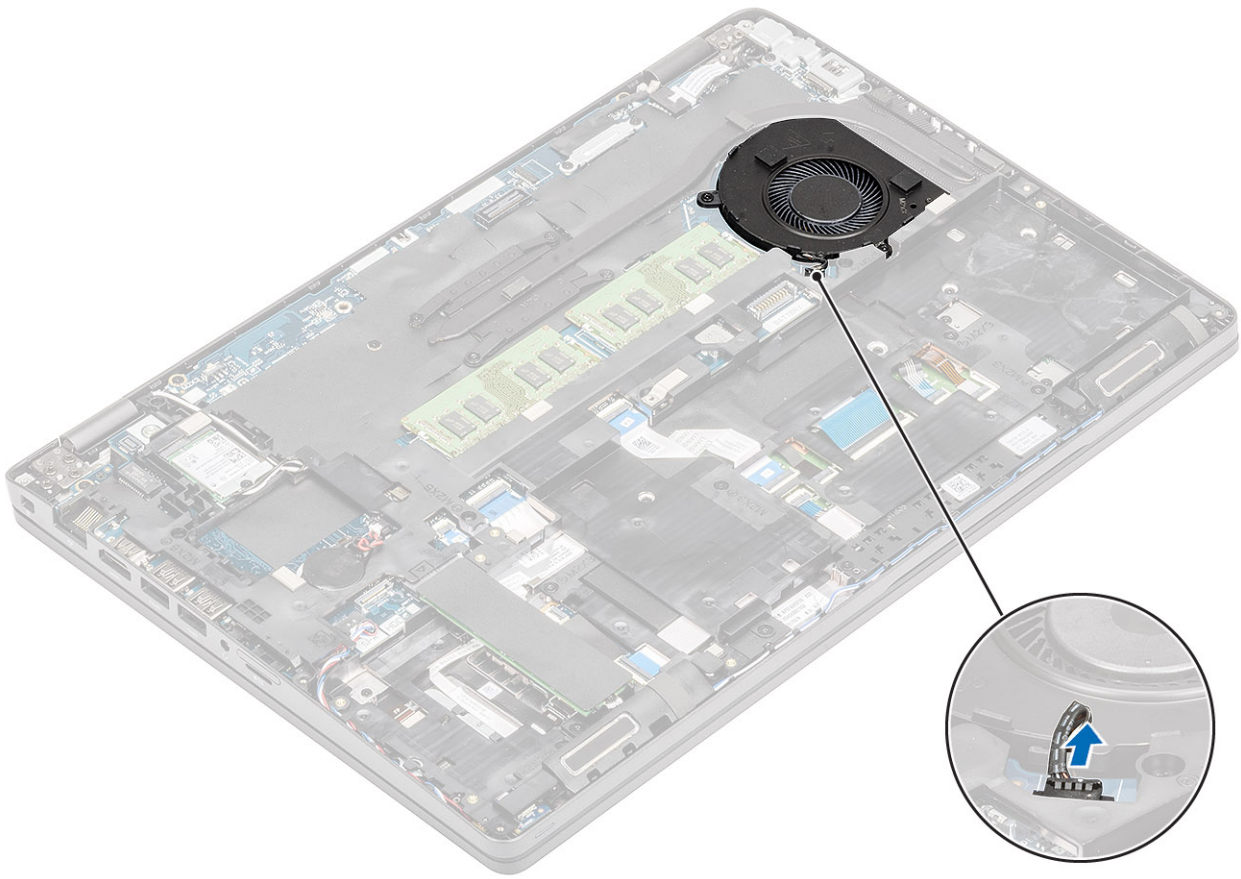


- 1 Replace the [battery](#).
- 2 Replace the [base cover](#).
- 3 Replace the [microSD card](#).
- 4 Follow the procedure in [after working inside your computer](#).

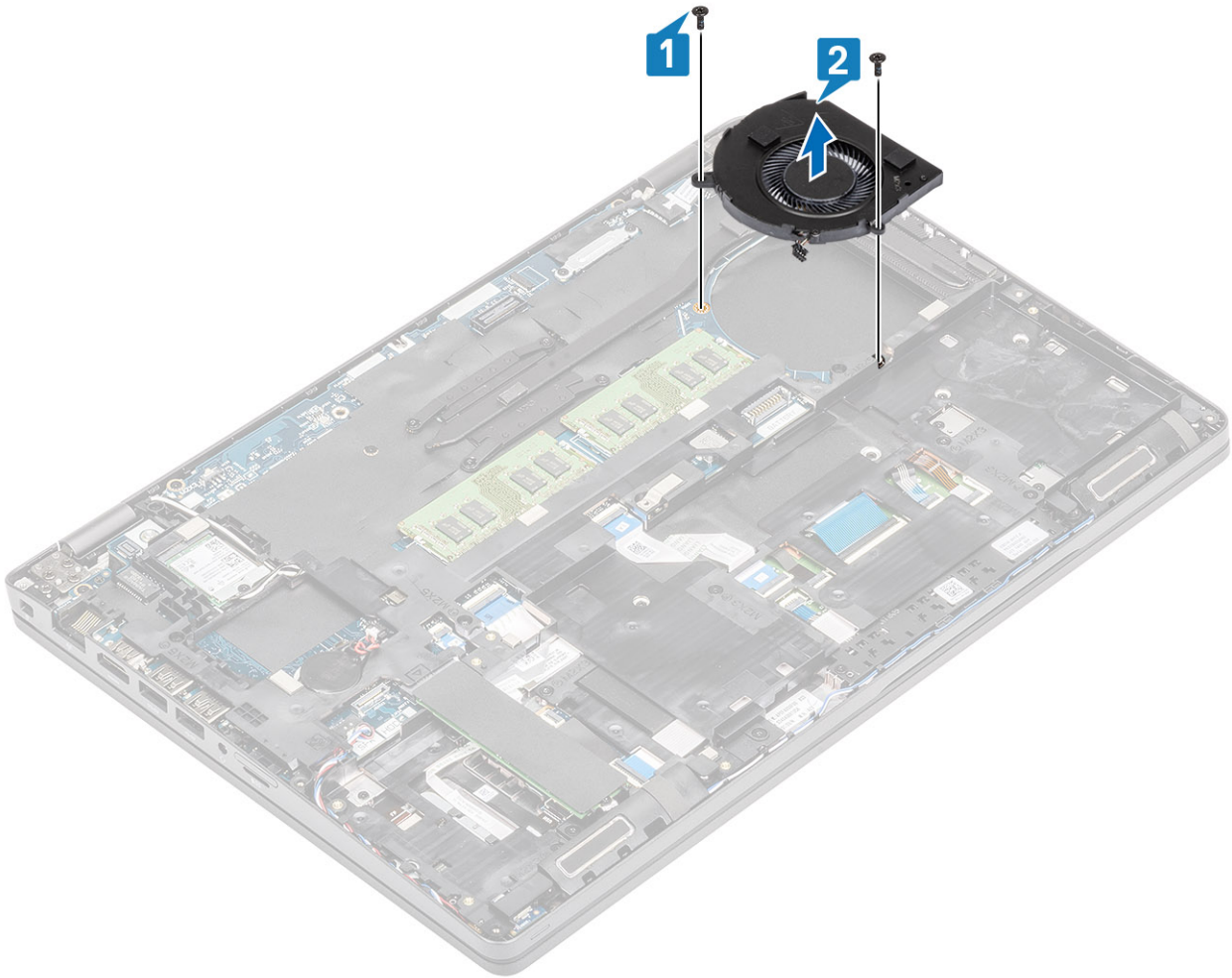
System fan

Removing the system fan

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 1 Disconnect the system fan cable from the connector on the system board.

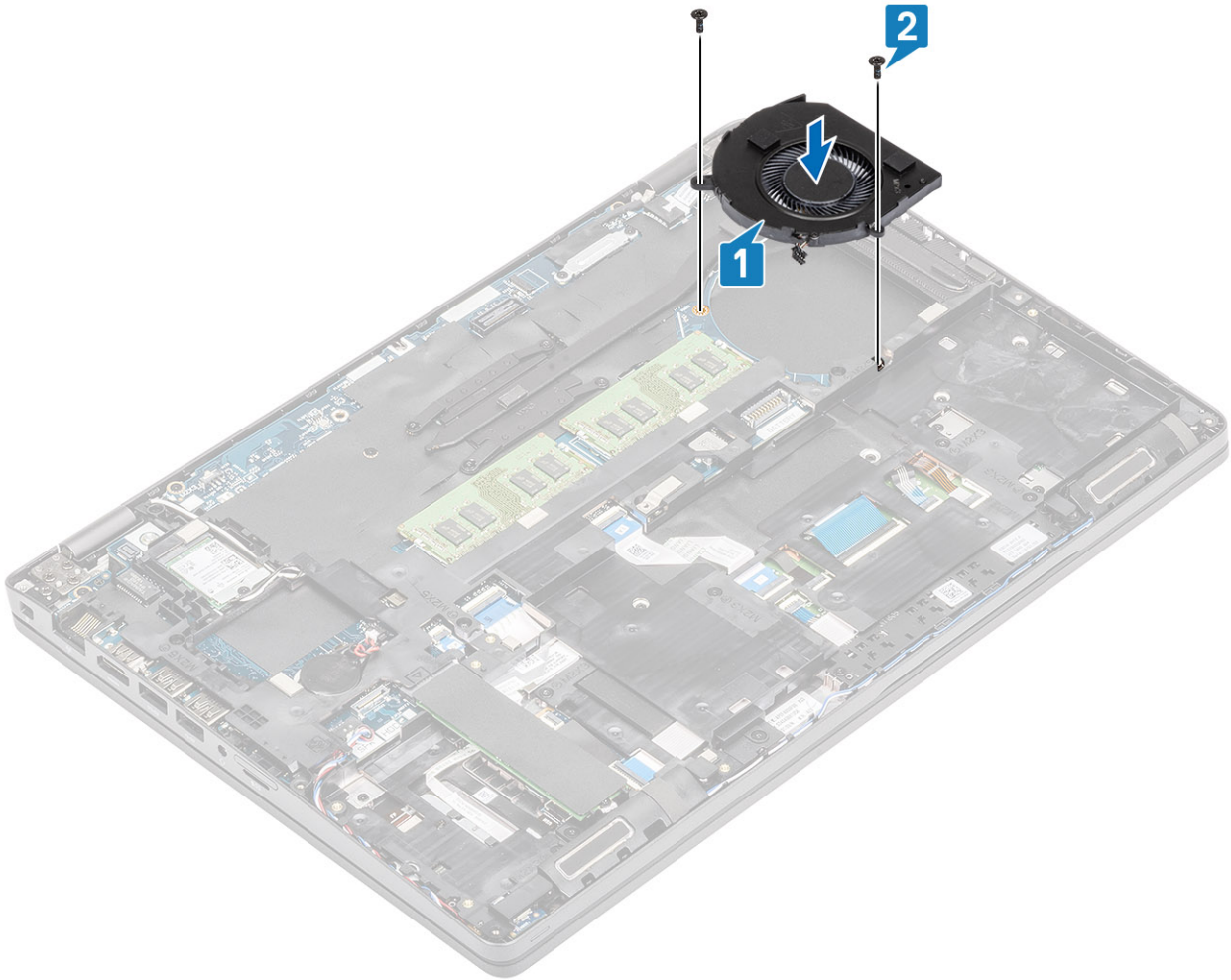


- 2 Remove the two (M2x5) screws that secure the system fan to the palmrest [1].
- 3 Lift the system fan away from the computer [2].

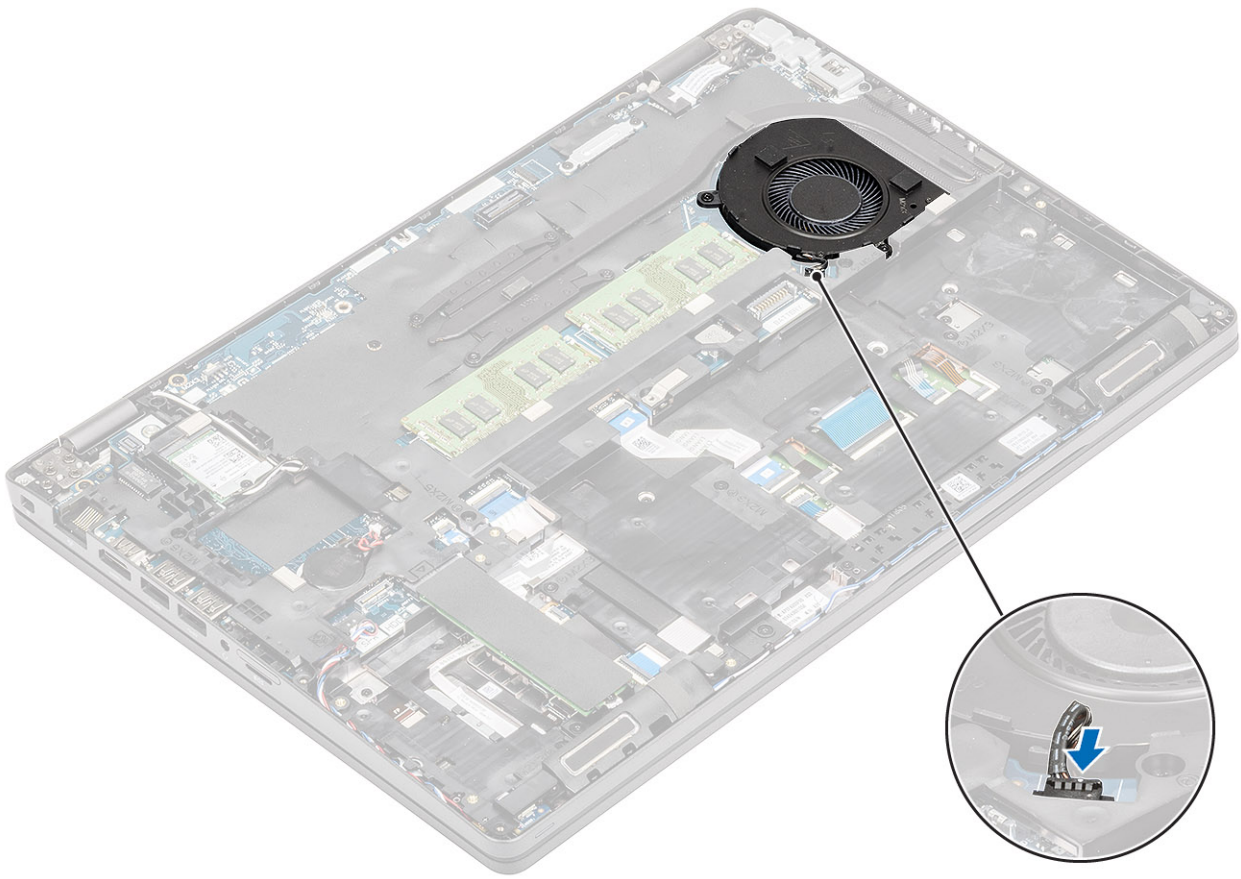


Installing the system fan

- 1 Place and align the screw holes on the system fan with the screw holes on to the palmrest [1].
- 2 Replace the two (M2x5) screws to secure the system fan to the palmrest [2].



- 3 Connect the system fan cable to the connector on the system board.



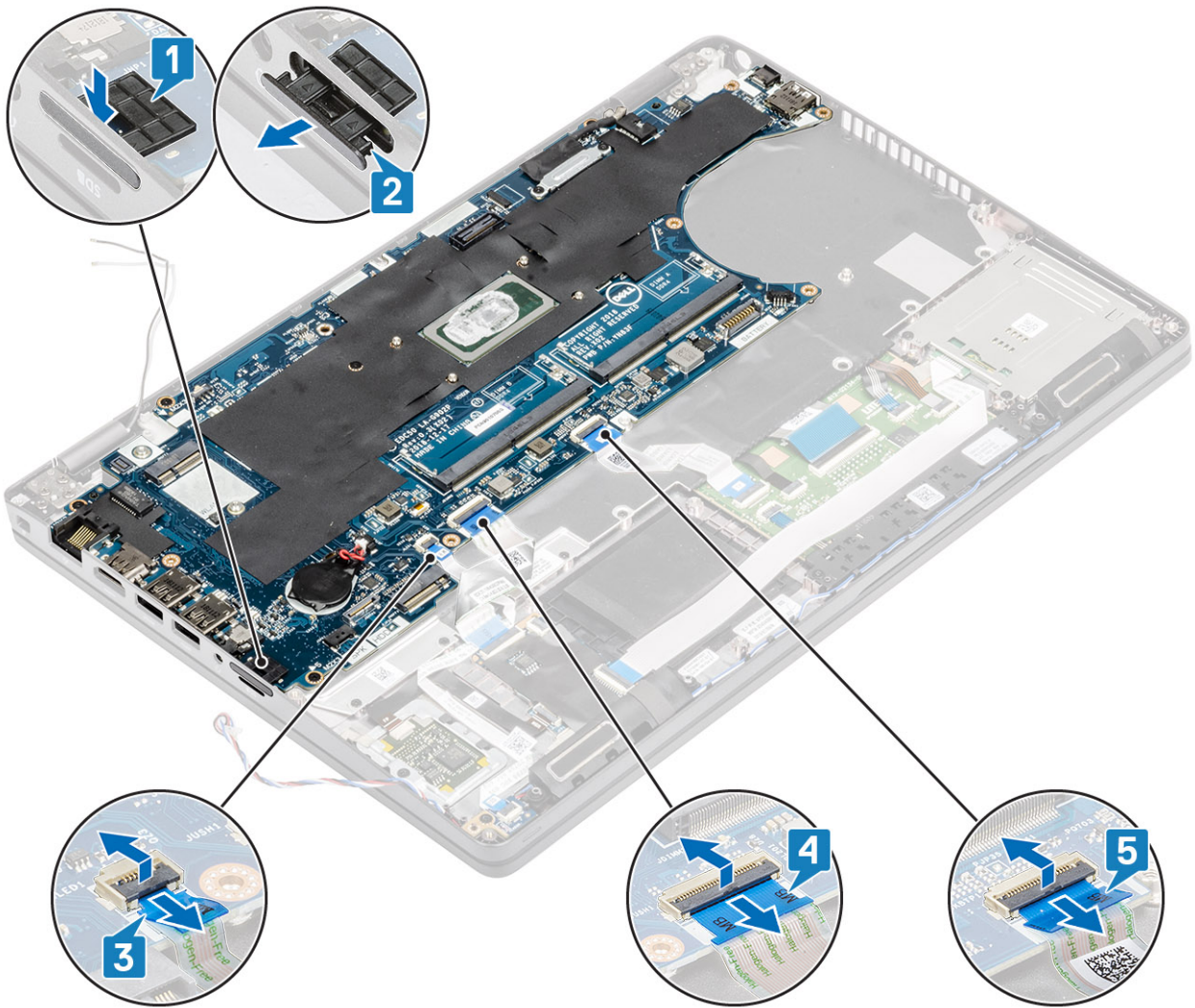
- 1 Replace the [battery](#).
- 2 Replace the [base cover](#).
- 3 Replace the [microSD card](#).
- 4 Follow the procedure in [after working inside your computer](#).

System board

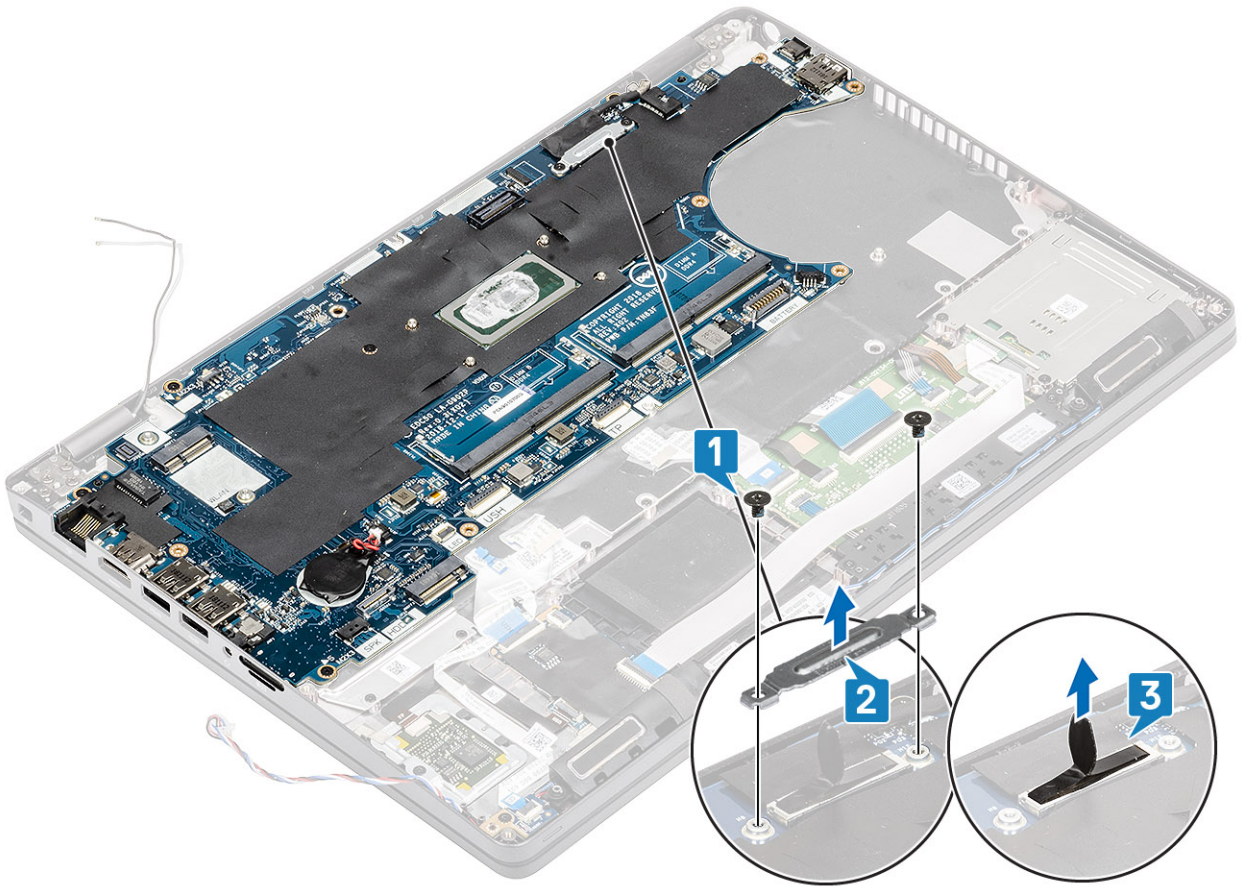
Removing the system board

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
 - 5 Remove the [memory module](#).
 - 6 Remove the [WLAN card](#).
 - 7 Remove the [coin cell battery](#).
 - 8 Remove the [DC-in](#).
 - 9 Remove the [M.2 SSD](#).
 - 10 Remove the [heatsink](#).
 - 11 Remove the [system fan](#).
- 1 Push the dummy sim card out of the sim card slot [1, 2].
 - 2 Lift the latch and disconnect the following cables from the system board:
 - a LED board cable [3].

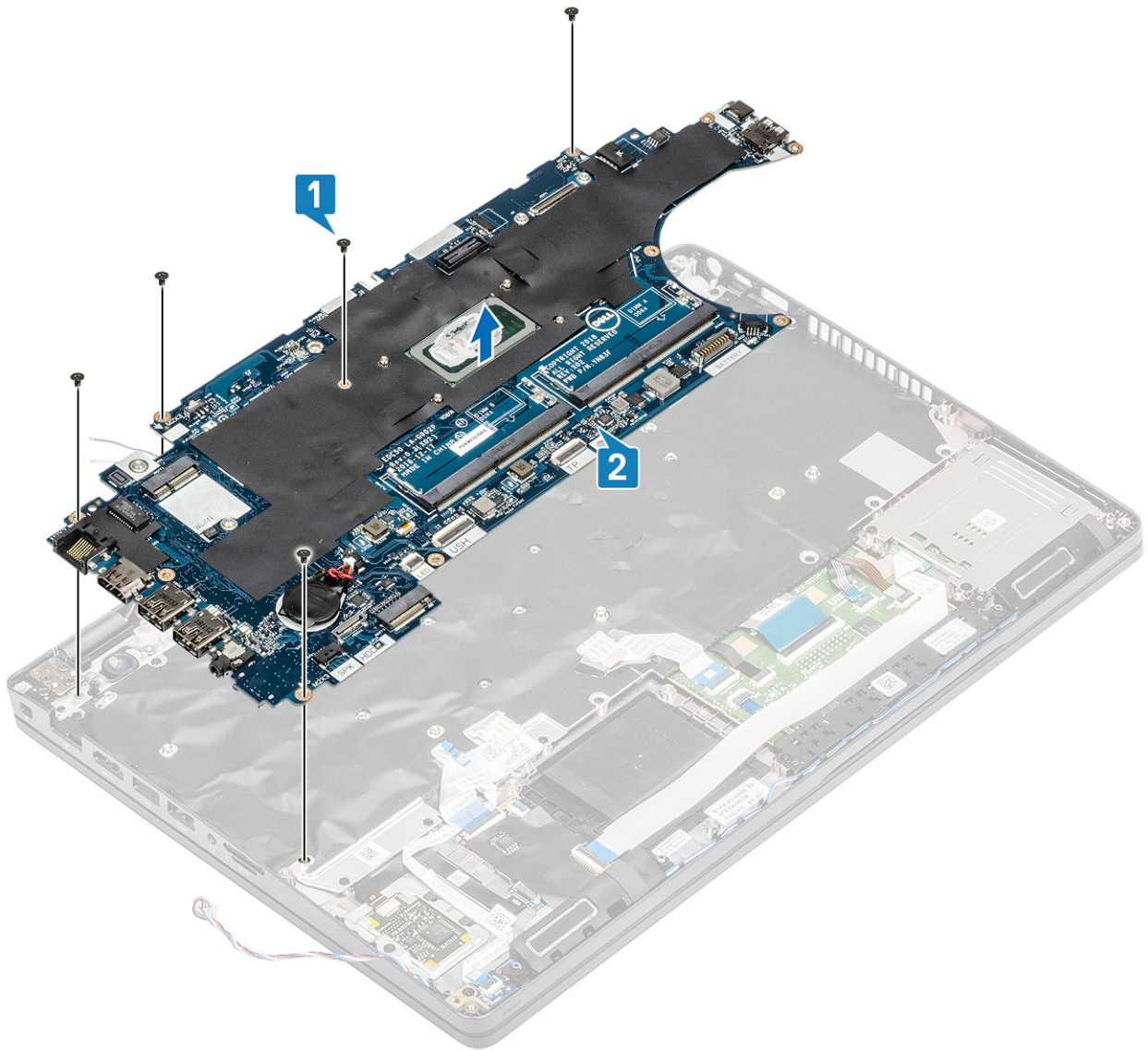
- b USH FFC [4].
- c Touchpad FFC [5].



- 3 Remove the two (M2x3) screws that secure the eDP bracket to the system board [1].
- 4 Remove the eDP bracket away from the computer [2].
- 5 Lift the latch and disconnect the eDP cable from the connector on the system board [3].

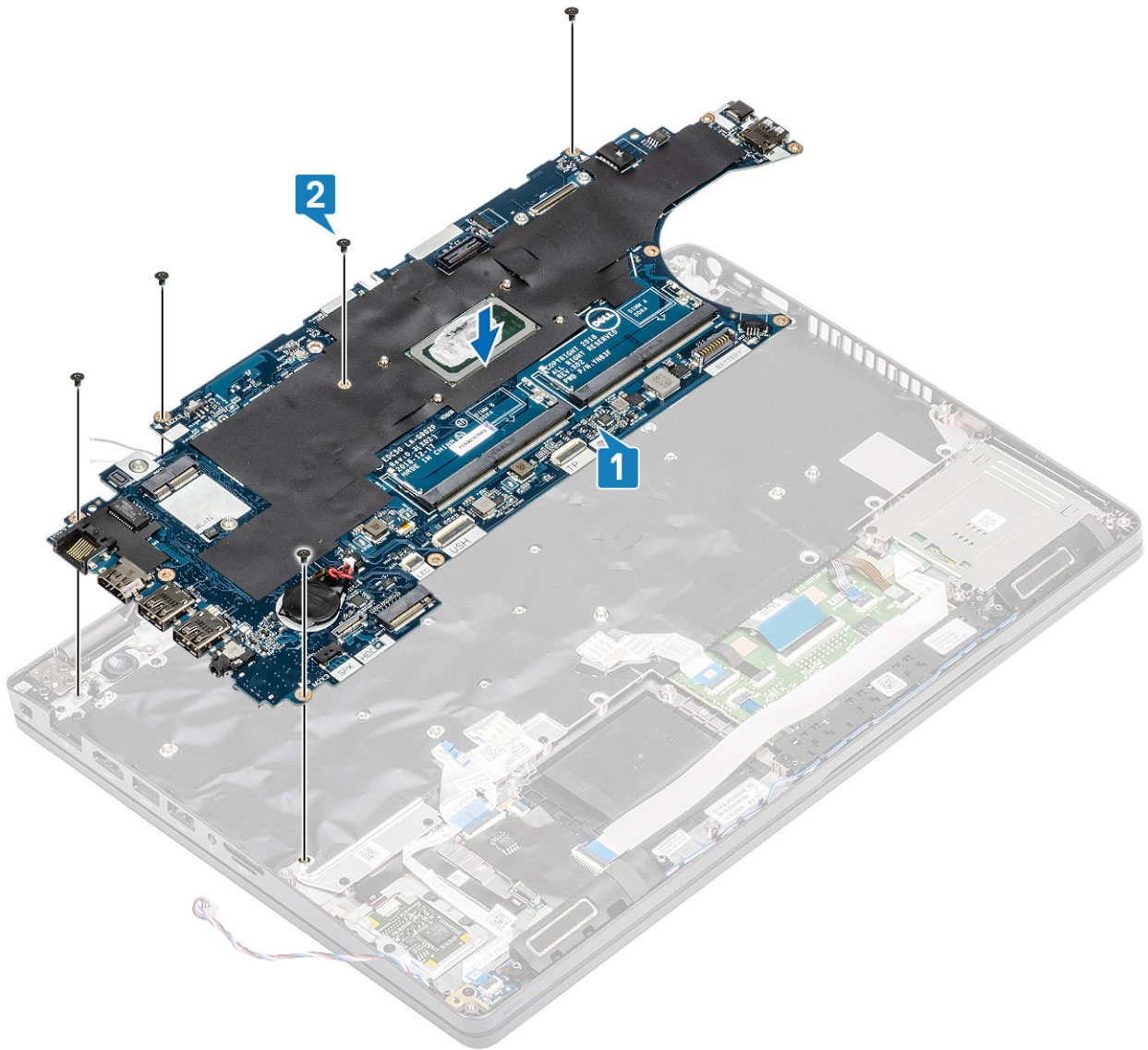


- 6 Remove the five (M2x3) screws that secure the system board to the palmrest [1].
- 7 Lift the system board away from the computer [2].

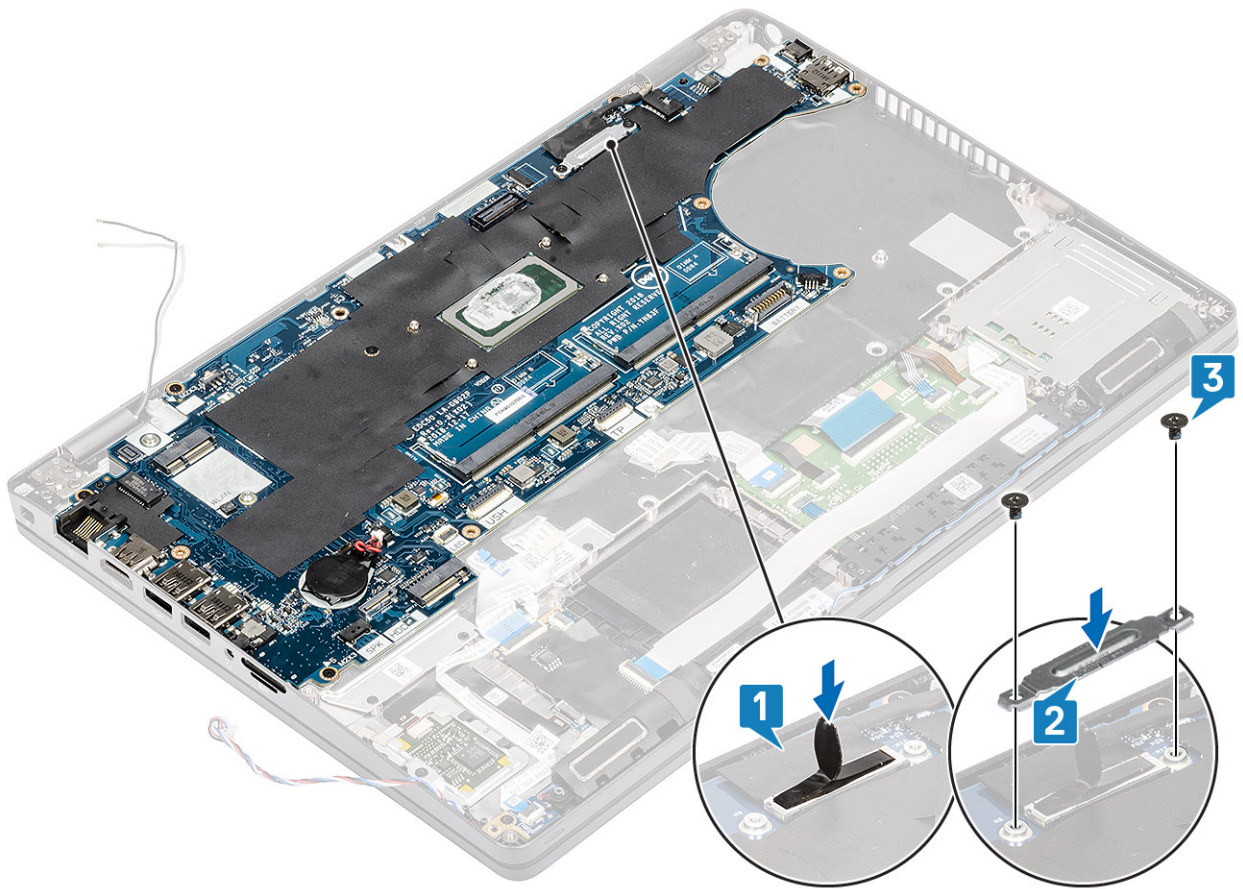


Installing the system board

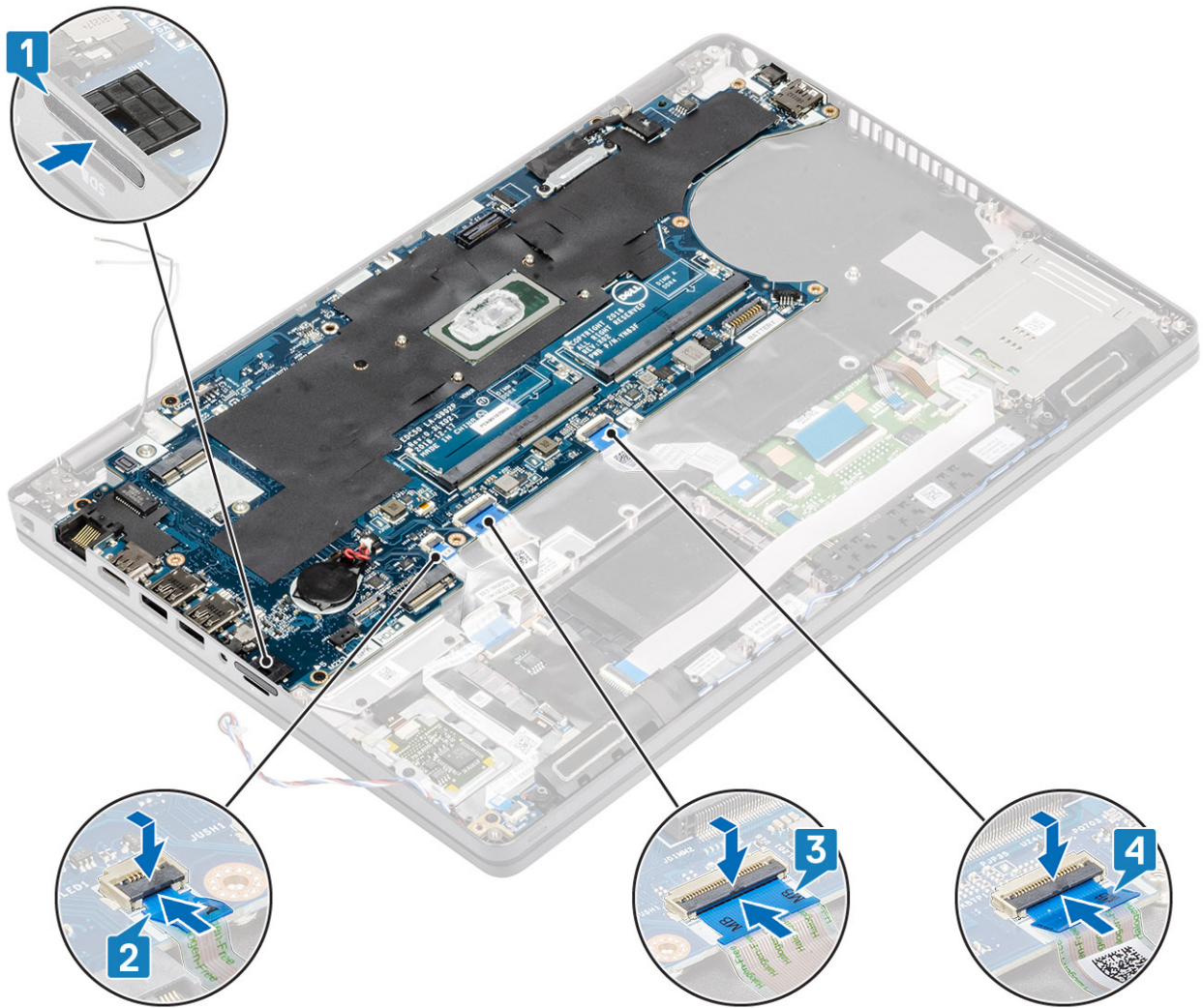
- 1 Align and place the system board on the palmrest [1].
- 2 Replace the five (M2x3) screws to secure the system board to the palmrest [2].



- 3 Connect the eDP cable to the connector on the system board [1].
- 4 Place the eDP support bracket above the eDP connector [2].
- 5 Replace the two (M2x3) screws to secure the eDP bracket to the system board [3].



- 6 Insert the dummy sim card into the sim card slot [1].
- 7 Connect the following cables to the system board:
 - a LED board cable [2].
 - b USH FFC [3]
 - c Touchpad FFC [4].



- 1 Replace the [system fan](#).
- 2 Replace the [heatsink](#).
- 3 Replace the [M.2 SSD](#).
- 4 Replace the [DC-in](#).
- 5 Replace the [coin cell battery](#).
- 6 Replace the [WLAN card](#).
- 7 Replace the [memory module](#).
- 8 Replace the [battery](#).
- 9 Replace the [base cover](#).
- 10 Replace the [microSD card](#).
- 11 Follow the procedure in [after working inside your computer](#).

Keyboard

Removing the keyboard

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).

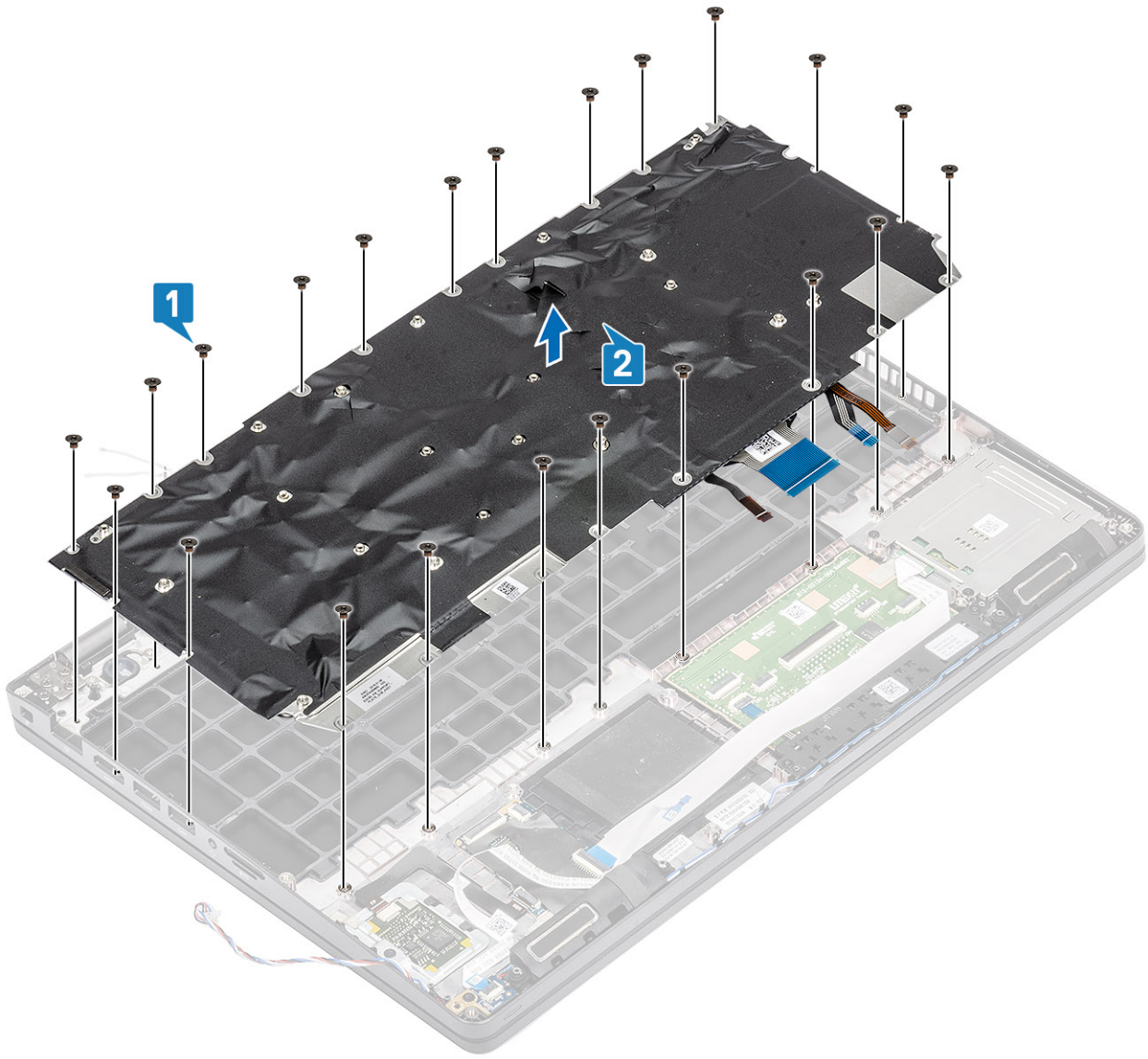
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 5 Remove the [speaker](#).
- 6 Remove the [memory module](#).
- 7 Remove the [system fan](#).
- 8 Remove the [DC-in](#).
- 9 Remove the [WLAN card](#).
- 10 Remove the [system board](#).

 **NOTE:** System board can be removed with heatsink attached.

- 11 Remove the [coin cell battery](#).
- 1 Lift the latch and disconnect the backlit cable and the keyboard cable from the connectors on the touchpad.

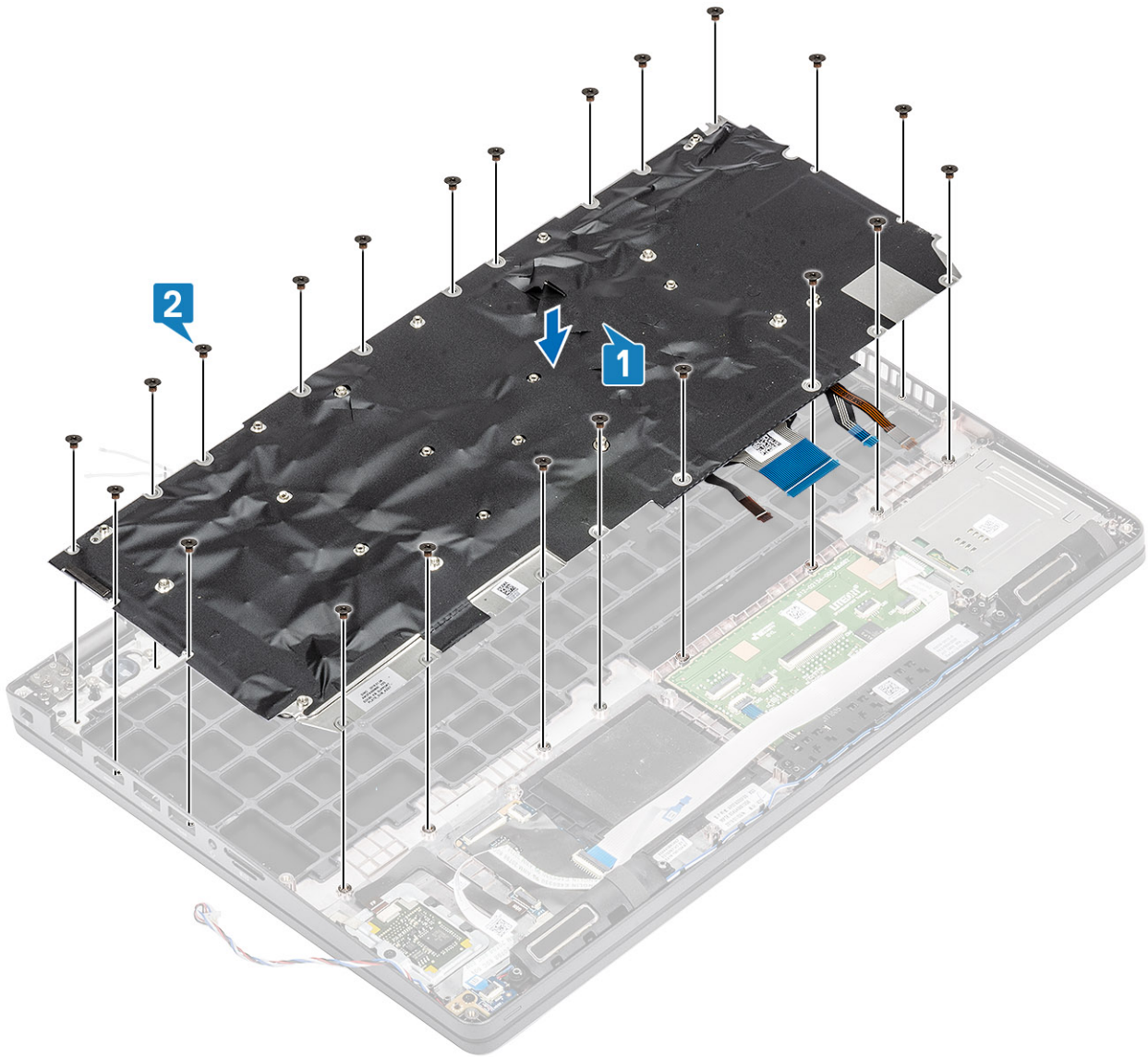


- 2 Remove the 22 (M2x2) screws that secure the keyboard to the palmrest [1].
- 3  **NOTE:** The touchpad FFC covers one of the screws that secure the keyboard assembly to the palmrest.
Remove the keyboard away from the computer [2].



Installing the keyboard

- 1 Align and place the keyboard on the palmrest [1].
- 2 Replace the 22 (M2x2) screws to secure the keyboard to the palmrest [2].



- 3 Connect the backlit cable and the keyboard cable to the connectors on the touchpad.



- 1 Replace the [coin cell battery](#).
- 2 Replace the [system board](#).
-  **NOTE:** System board can be replaced with heatsink attached.
- 3 Replace the [WLAN card](#).
- 4 Replace the [DC-in](#).
- 5 Replace the [system fan](#).
- 6 Replace the [memory module](#).
- 7 Replace the [speaker](#).
- 8 Replace the [battery](#).
- 9 Replace the [base cover](#).
- 10 Replace the [microSD card](#).
- 11 Follow the procedure in [after working inside your computer](#).

Keyboard bracket

Removing the keyboard bracket

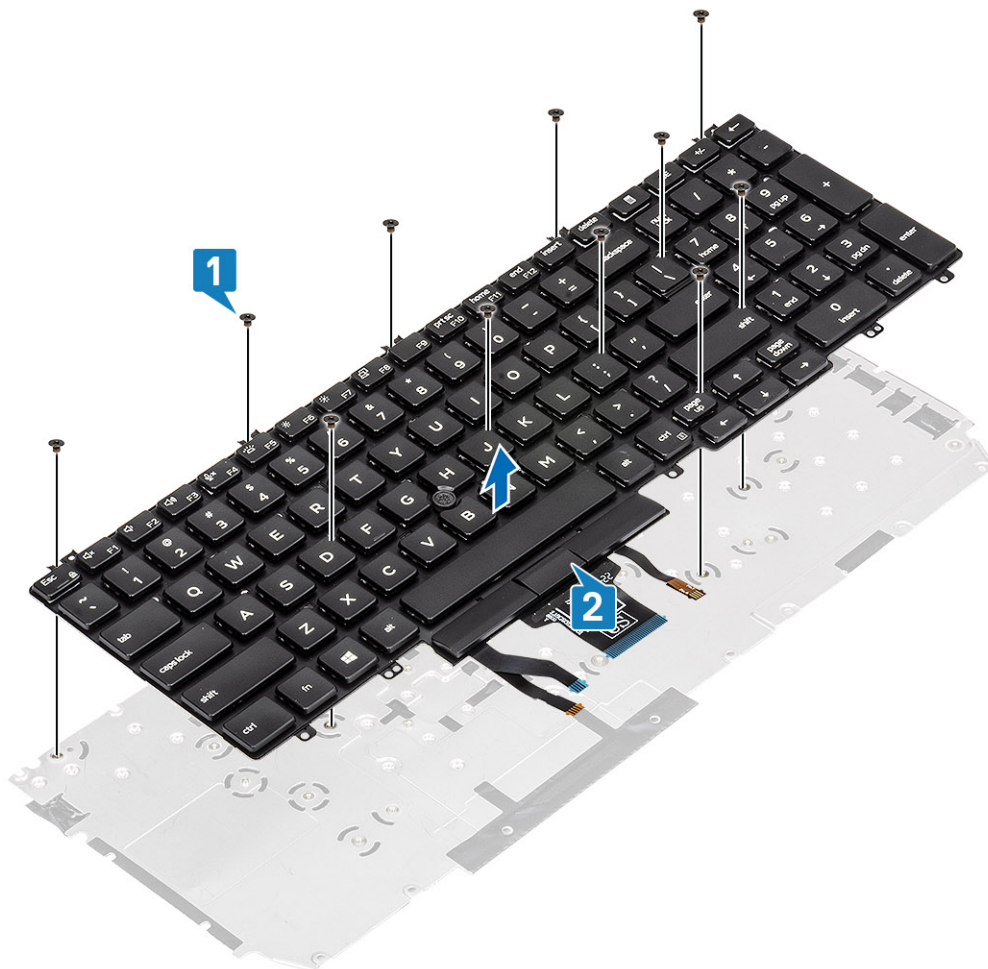
- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 5 Remove the [speaker](#).

- 6 Remove the [memory module](#).
- 7 Remove the [system fan](#).
- 8 Remove the [DC-in](#).
- 9 Remove the [WLAN card](#).
- 10 Remove the [system board](#).

 **NOTE:** System board can be removed with heatsink attached.

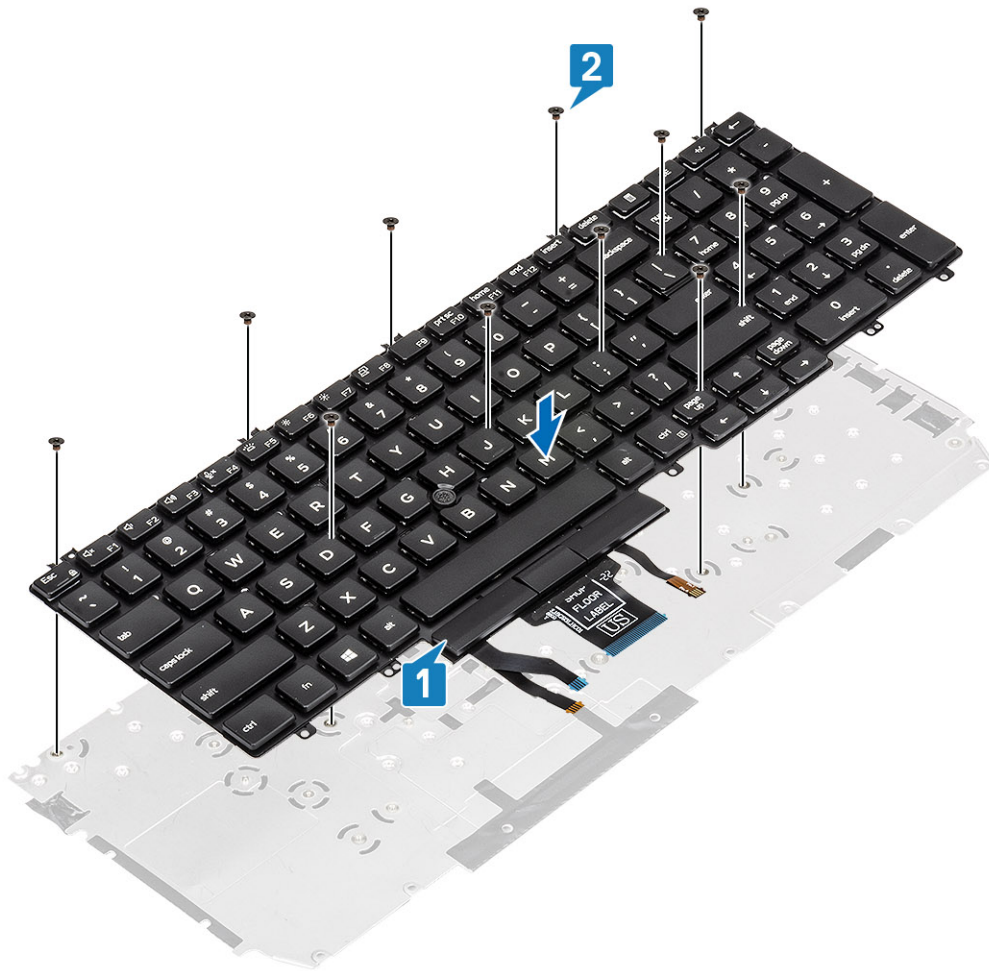
- 11 Remove the [coin cell battery](#).
- 12 Remove the [keyboard](#).

- 1 Remove the twelve (M2x2) screws that secure the keyboard to the keyboard bracket [1].
- 2 Remove the keyboard from the keyboard bracket [2].



Installing the keyboard bracket

- 1 Align and place the keyboard on the keyboard bracket [1].
- 2 Replace the 12 (M2x2) screws to secure the keyboard on the keyboard bracket [2].



- 1 Replace the [keyboard](#).
- 2 Replace the [coin cell battery](#).
- 3 Replace the [system board](#).

NOTE: System board can be replaced with heatsink attached.

- 4 Replace the [WLAN card](#).
- 5 Replace the [DC-in](#).
- 6 Replace the [memory module](#).
- 7 Replace the [system fan](#).
- 8 Replace the [speaker](#).
- 9 Replace the [battery](#).
- 10 Replace the [base cover](#).
- 11 Replace the [microSD card](#).
- 12 Follow the procedure in [after working inside your computer](#).

Power button

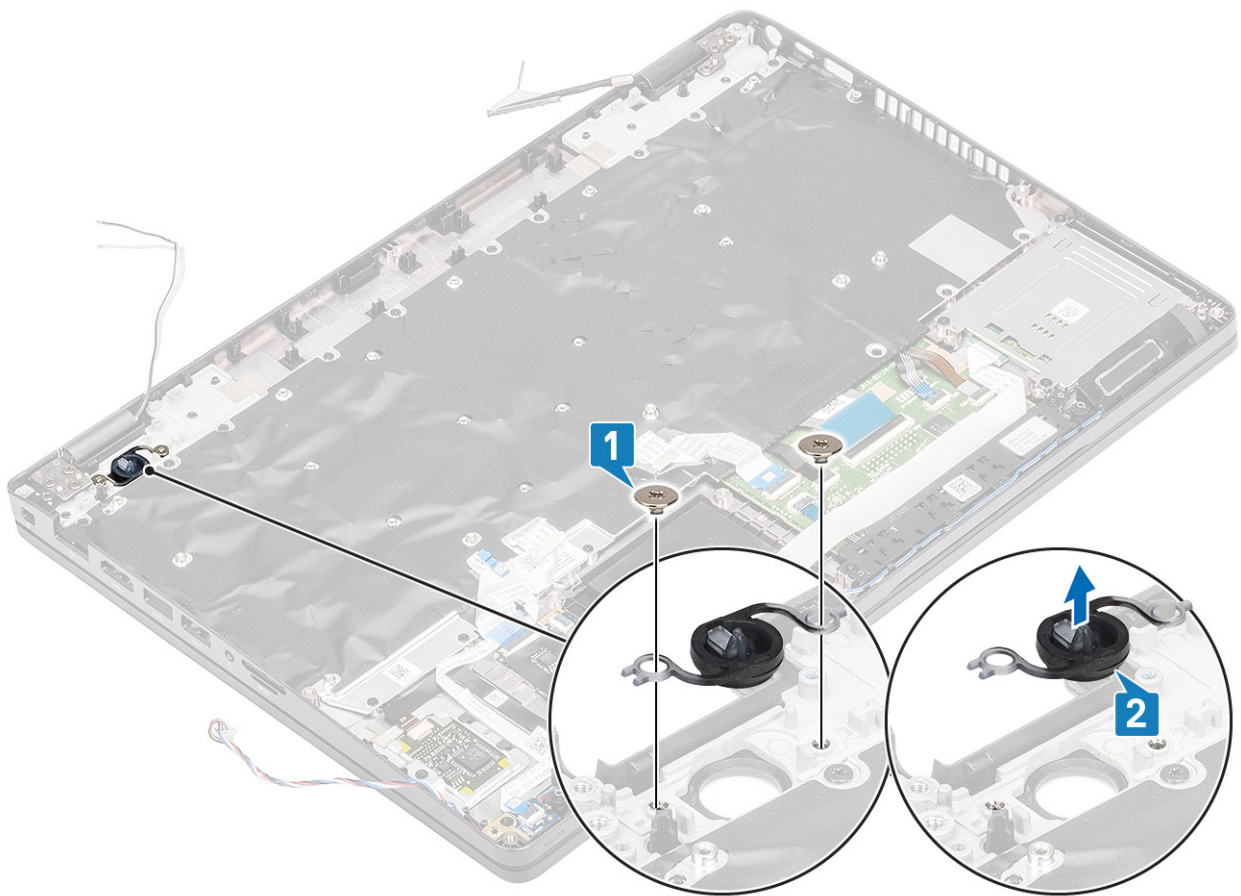
Removing the power button

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).

- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 5 Remove the [speaker](#).
- 6 Remove the [memory module](#).
- 7 Remove the [system fan](#).
- 8 Remove the [DC-in](#).
- 9 Remove the [WLAN card](#).
- 10 Remove the [system board](#).

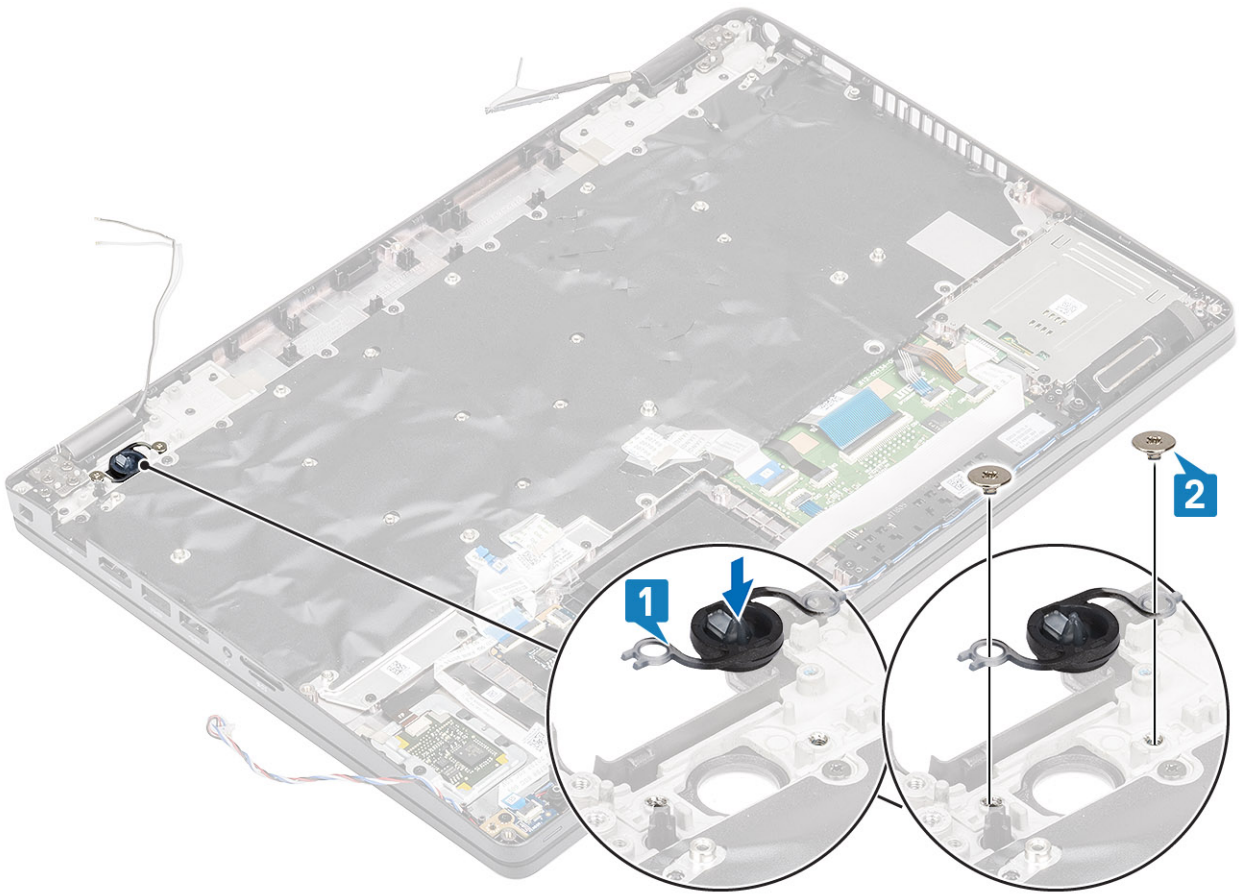
NOTE: System board can be removed with heatsink attached.

- 11 Remove the [coin cell battery](#).
- 12 Remove the [keyboard](#).
- 1 Remove the two (M2x2) screws that secure the power button on the palmrest [1].
- 2 Lift the power button off the palmrest [2].



Installing the power button

- 1 Place the power button on the palmrest [1].
- 2 Replace the two (M2x2) screws that secure the power button on the palmrest [2].



- 1 Replace the [keyboard](#).
- 2 Replace the [coin cell battery](#).
- 3 Replace the [system board](#).

 **NOTE:** System board can be replaced with heatsink attached.

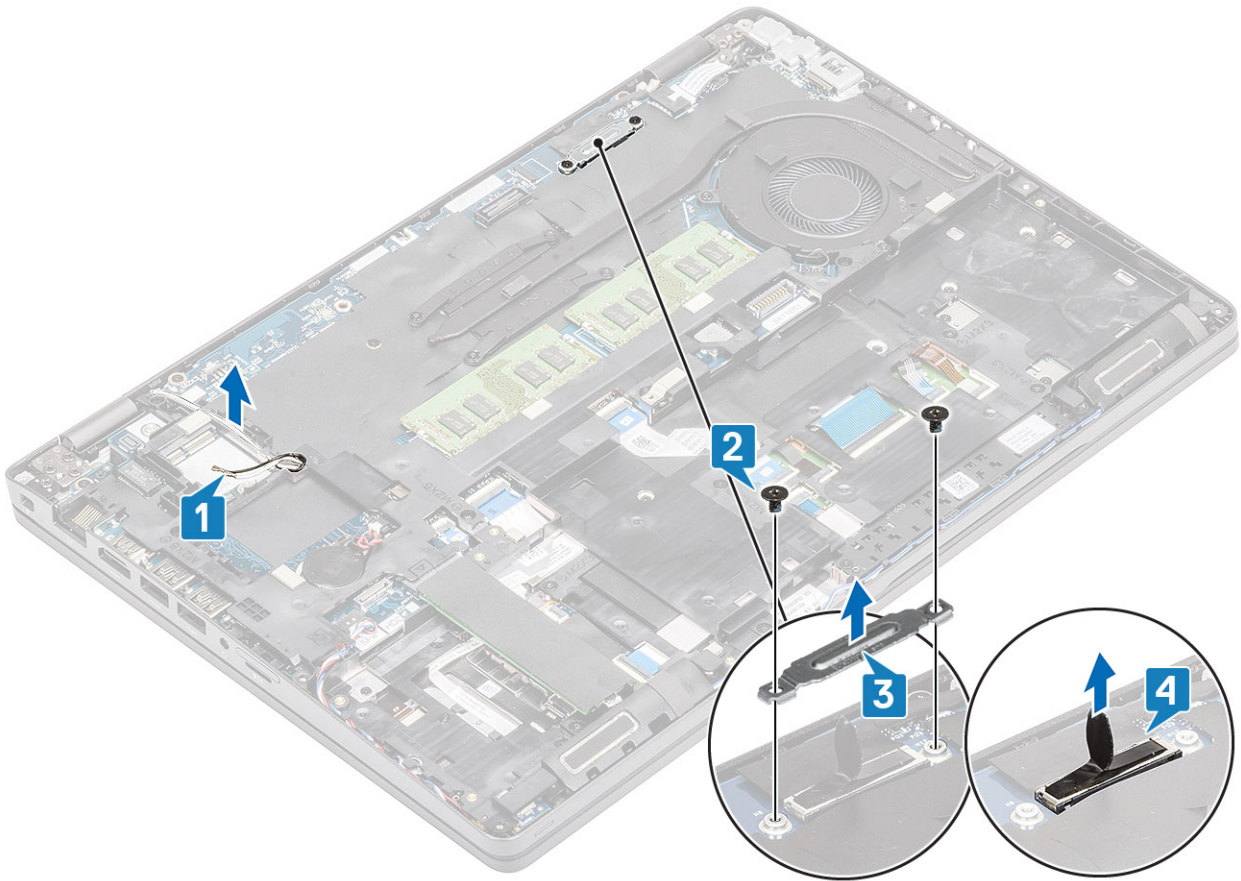
- 4 Replace the [WLAN card](#).
- 5 Replace the [DC-in](#).
- 6 Replace the [memory module](#).
- 7 Replace the [system fan](#).
- 8 Replace the [speaker](#).
- 9 Replace the [battery](#).
- 10 Replace the [base cover](#).
- 11 Replace the [microSD card](#).
- 12 Follow the procedure in [after working inside your computer](#).

Display assembly

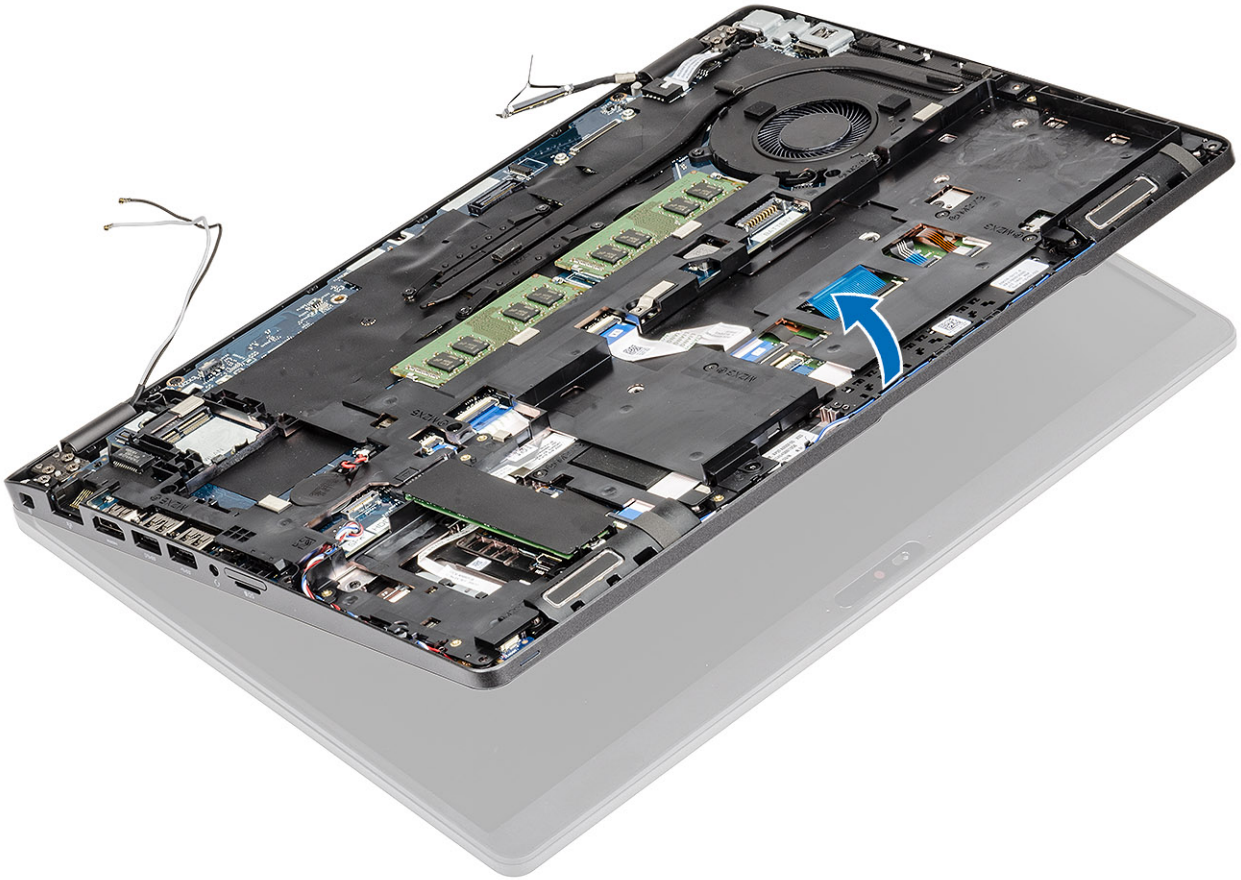
Removing the display assembly

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).

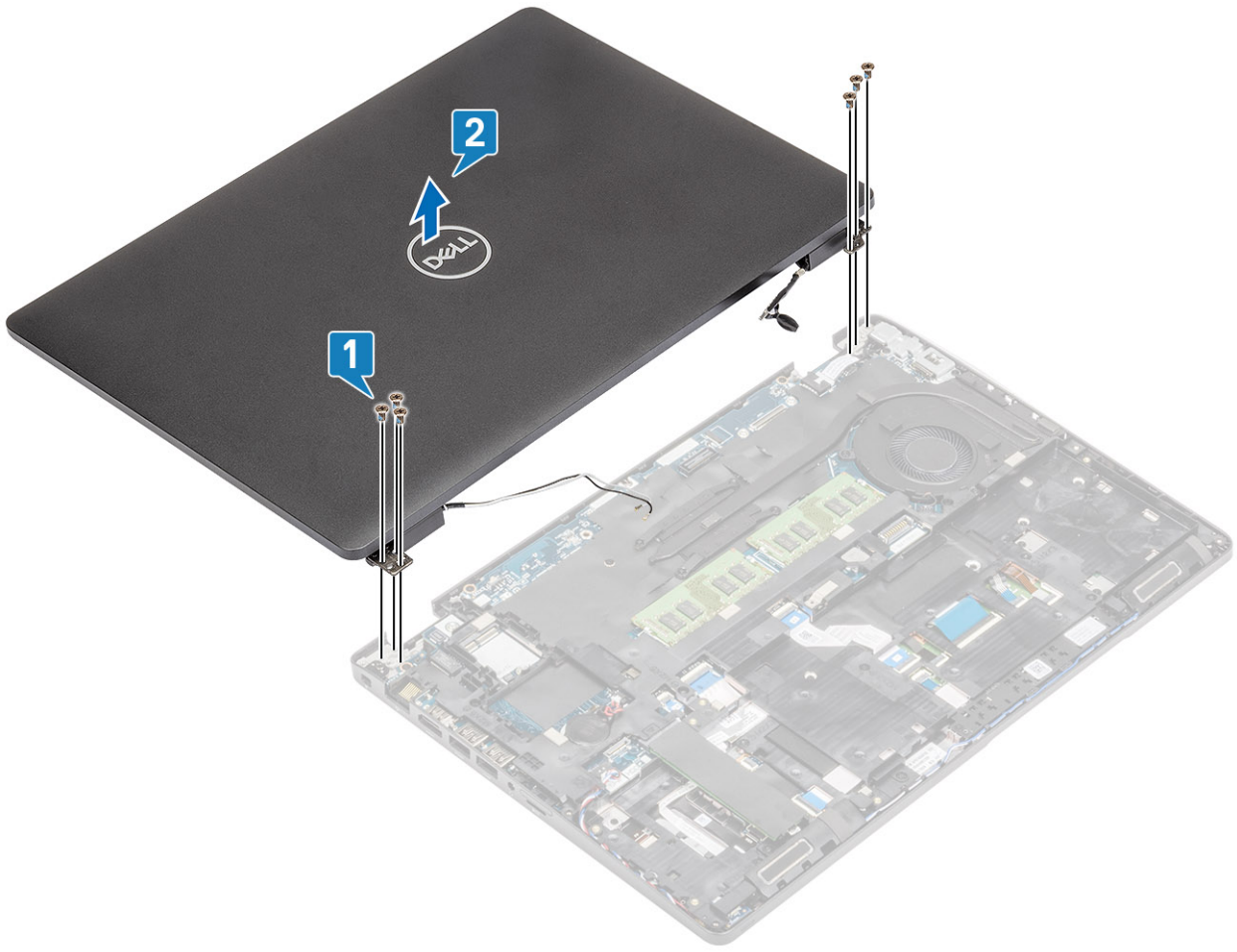
- 4 Remove the [battery](#).
- 5 Remove the [WLAN card](#).
- 1 Unroute the wireless antenna from the routing guides on the system board [1].
- 2 Remove the two (M2x3) screws that secures the eDP cable bracket to the system board [2].
- 3 Lift the eDP cable bracket from the system board [3].
- 4 Disconnect and unroute the eDP cable [4].



- 5 Open the display assembly to a 180-degree angle and flip over the system, then place the system on a flat surface.



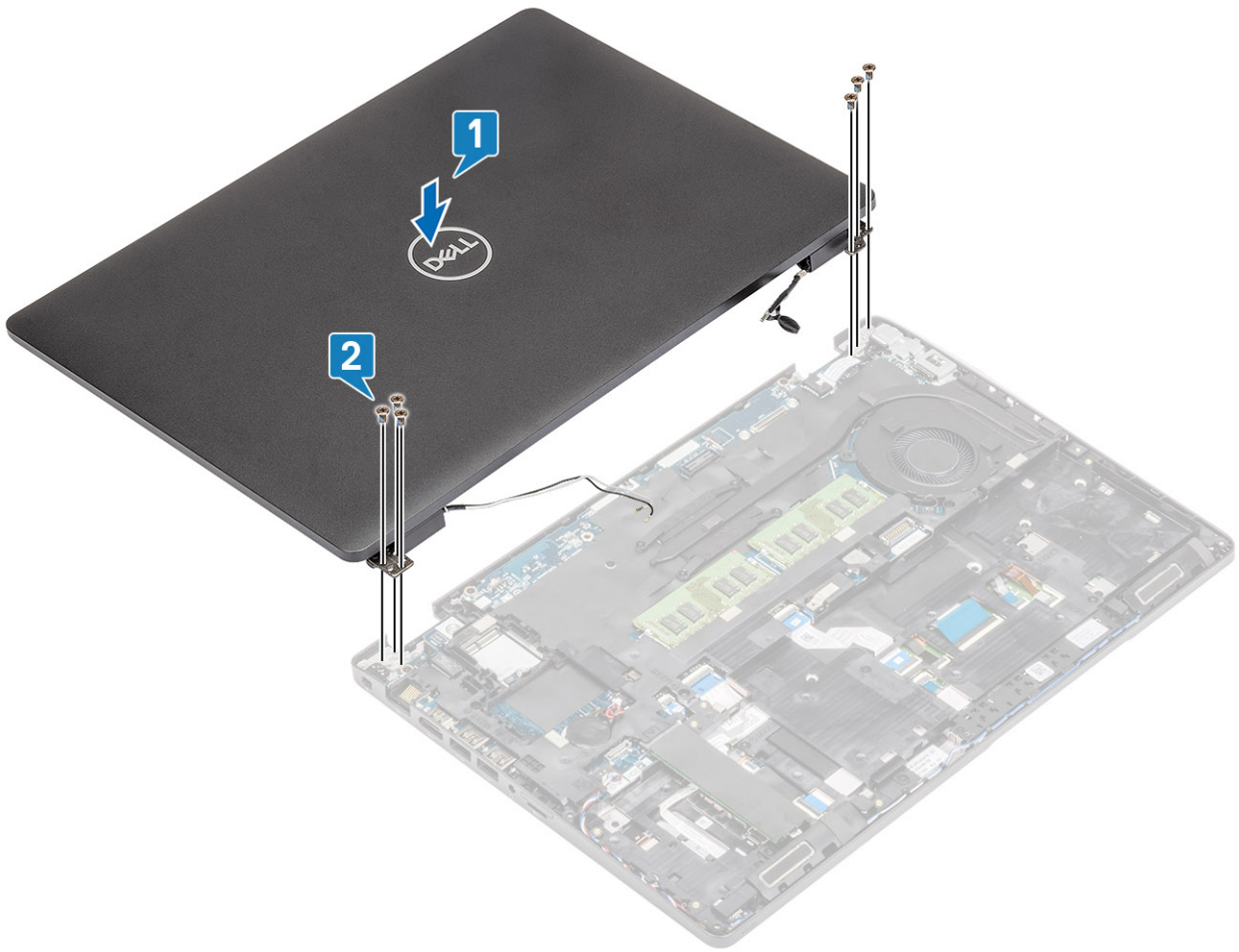
- 6 Remove the six (M2.5x4) screws that secures the display assembly to the system chassis [1].
- 7 Remove the display assembly from the system [2].



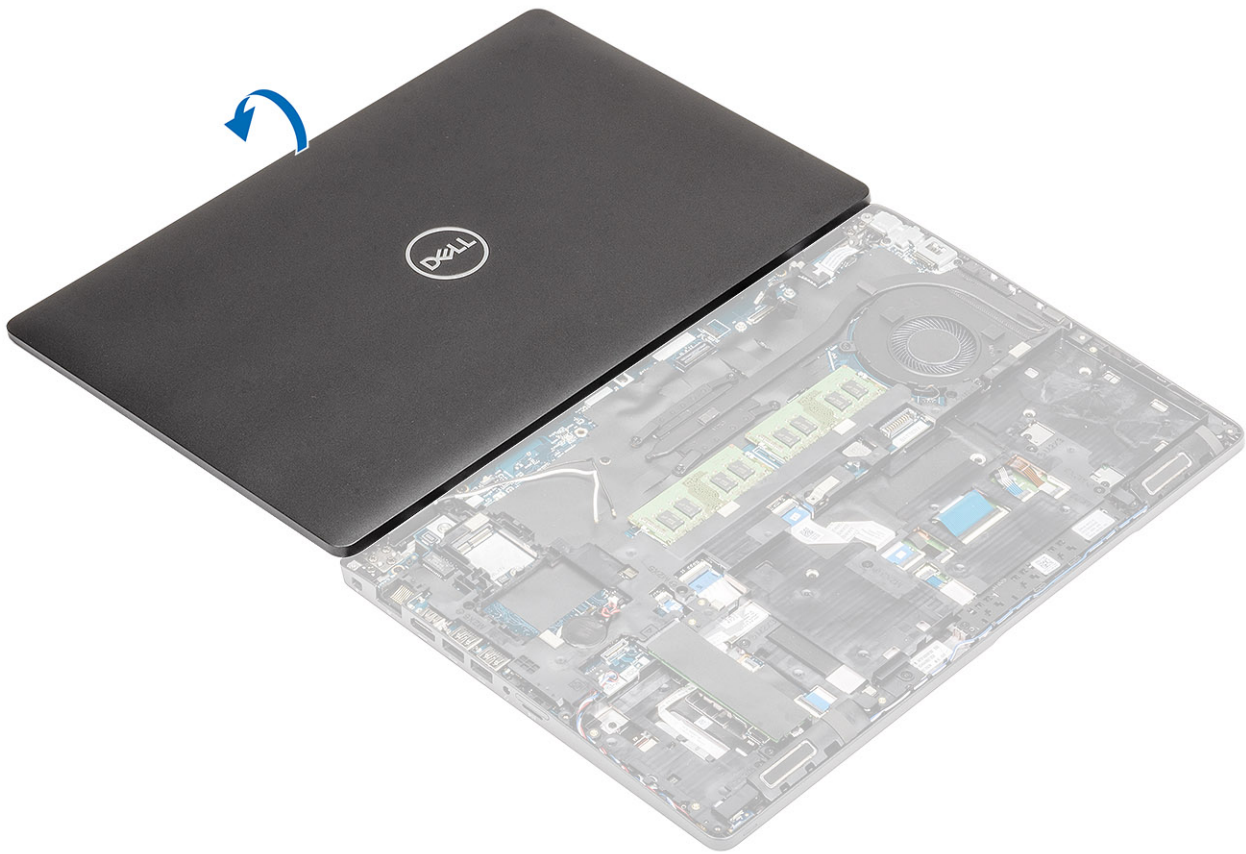
Installing the display assembly

NOTE: Ensure that the hinges are opened to the maximum before replacing the display assembly on the palmrest.

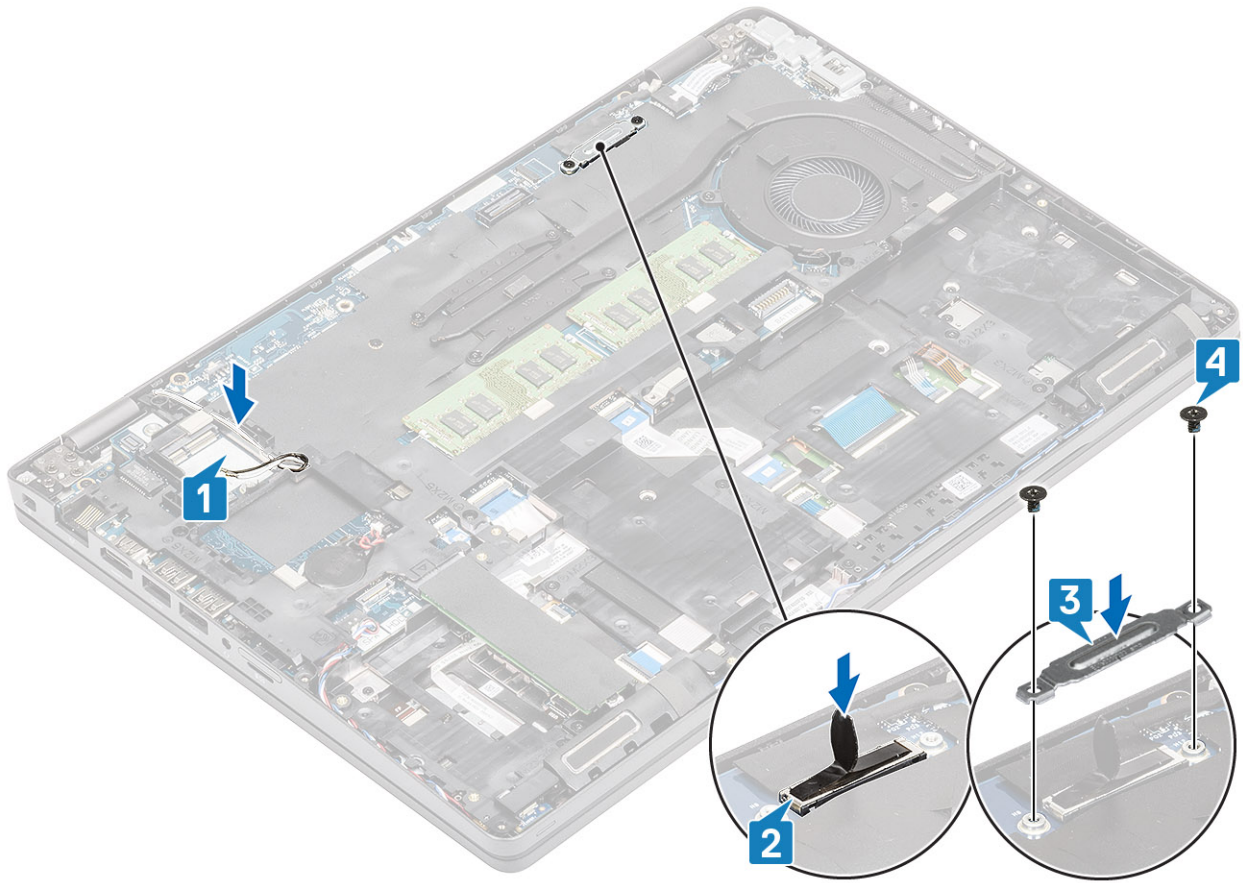
- 1 Align and place the system chassis under the hinges of the display assembly [1].
- 2 Replace the six (M2.5x4) screws that secure the display assembly to the system chassis [2].



- 3 Seat the system chassis on the display assembly.



- 4 Reroute the wireless antenna through the routing guides on the system board [1].
- 5 Connect the eDP cable to the eDP connector on the system board [2].
- 6 Place the eDP cable bracket on the system board [3].
- 7 Replace the two (M2x3) screws that secure the eDP cable bracket to the system board [4].



- 1 Replace the [WLAN card](#).
- 2 Replace the [battery](#).
- 3 Replace the [base cover](#).
- 4 Replace the [microSD card](#).
- 5 Follow the procedure in [after working inside your computer](#).

Display bezel

Removing display bezel

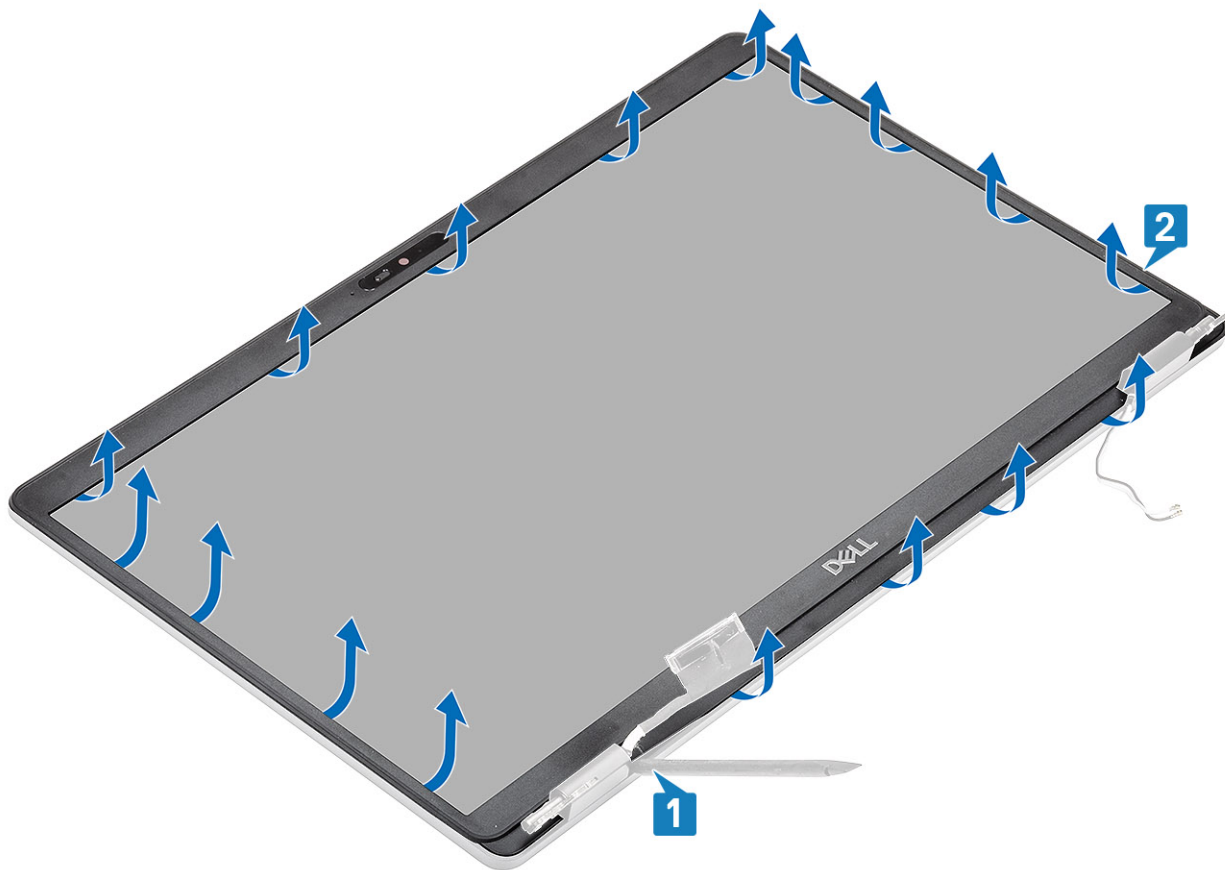
- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 5 Remove the [display assembly](#).

- 1 **NOTE:** Display bezel cannot be reused after being removed.

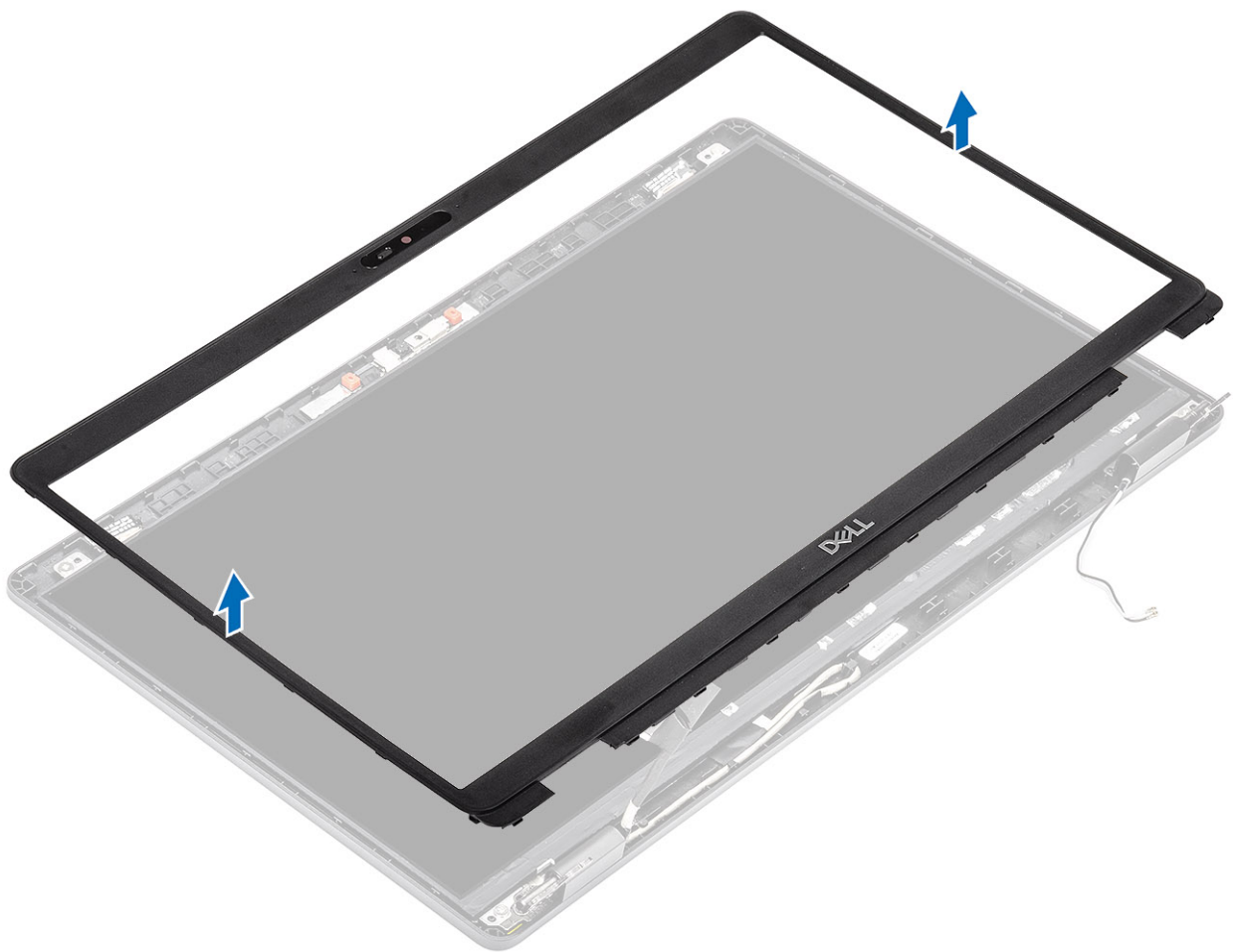
Use a plastic scribe to carefully pry open the recesses near the left and right hinges on the bottom edge of the display bezel [1].

- 2 **CAUTION:** When prying open the display bezel, ensure to pry along the outside edge of the display bezel using your hands or plastic scribes—using a screw driver or other sharp objects may damage the display cover.

Carefully pry open the inside edge of the display bezel and then pry open the inside edge of the left and right sides of the display bezel [2].

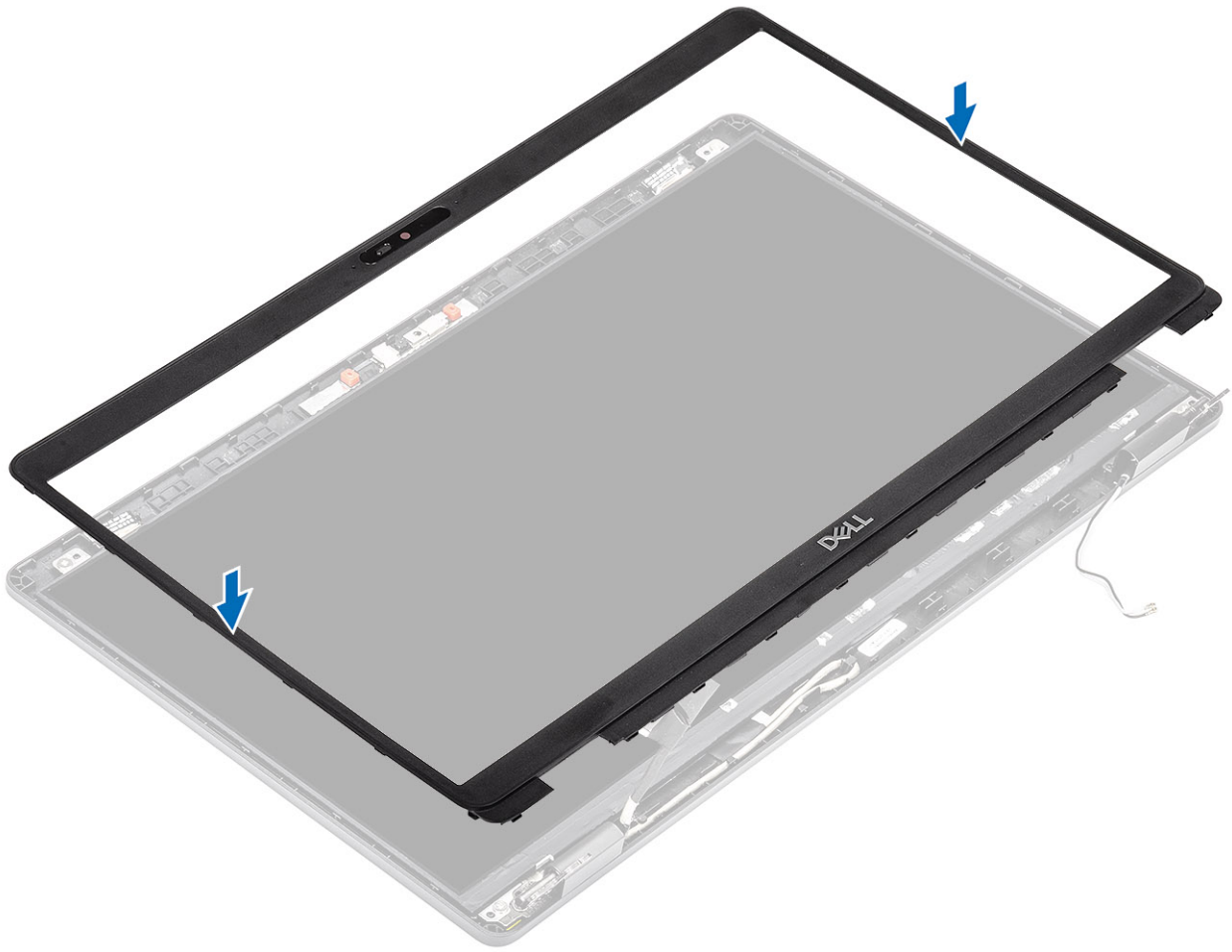


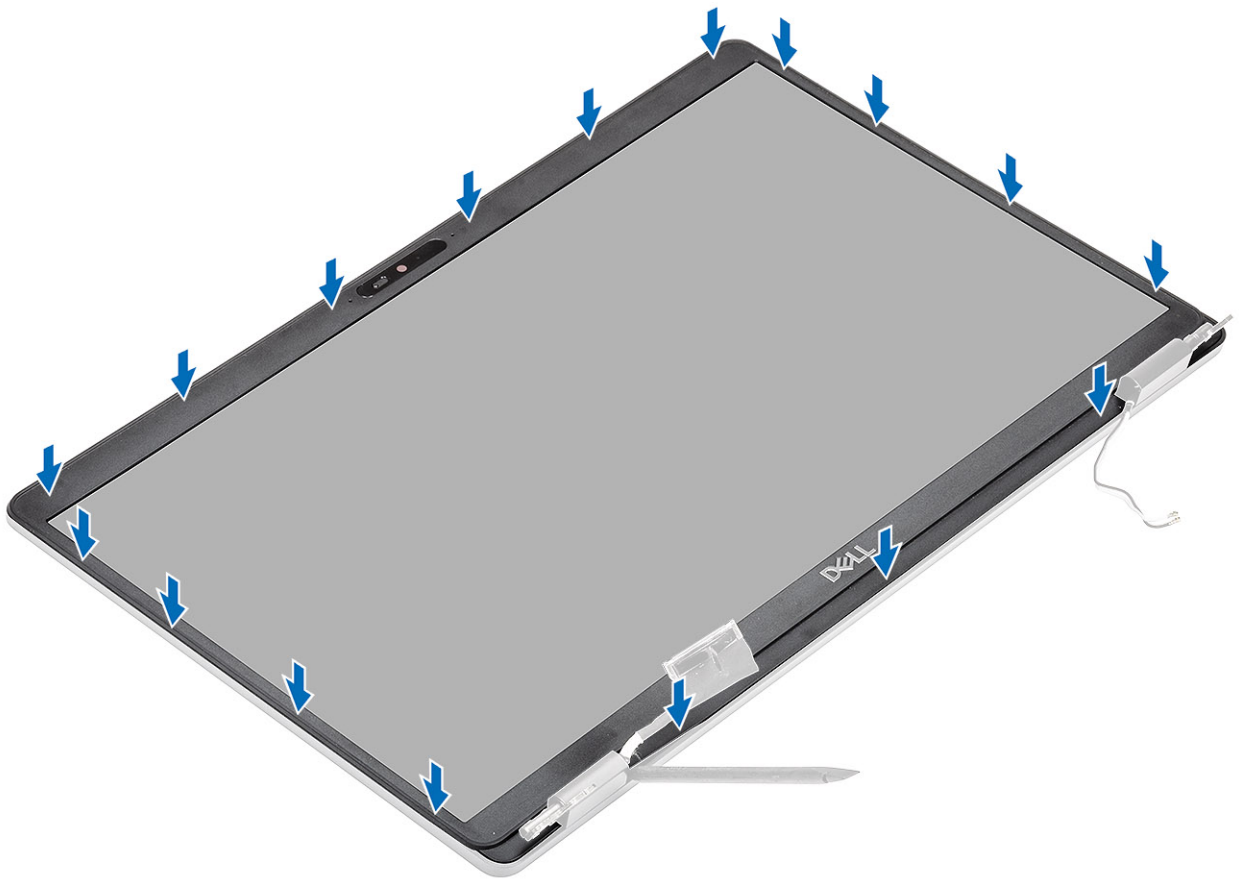
- 3 Lift the display bezel from the display assembly.



Installing the display bezel

Align the display bezel with the display assembly, and then gently snap the display bezel into place.



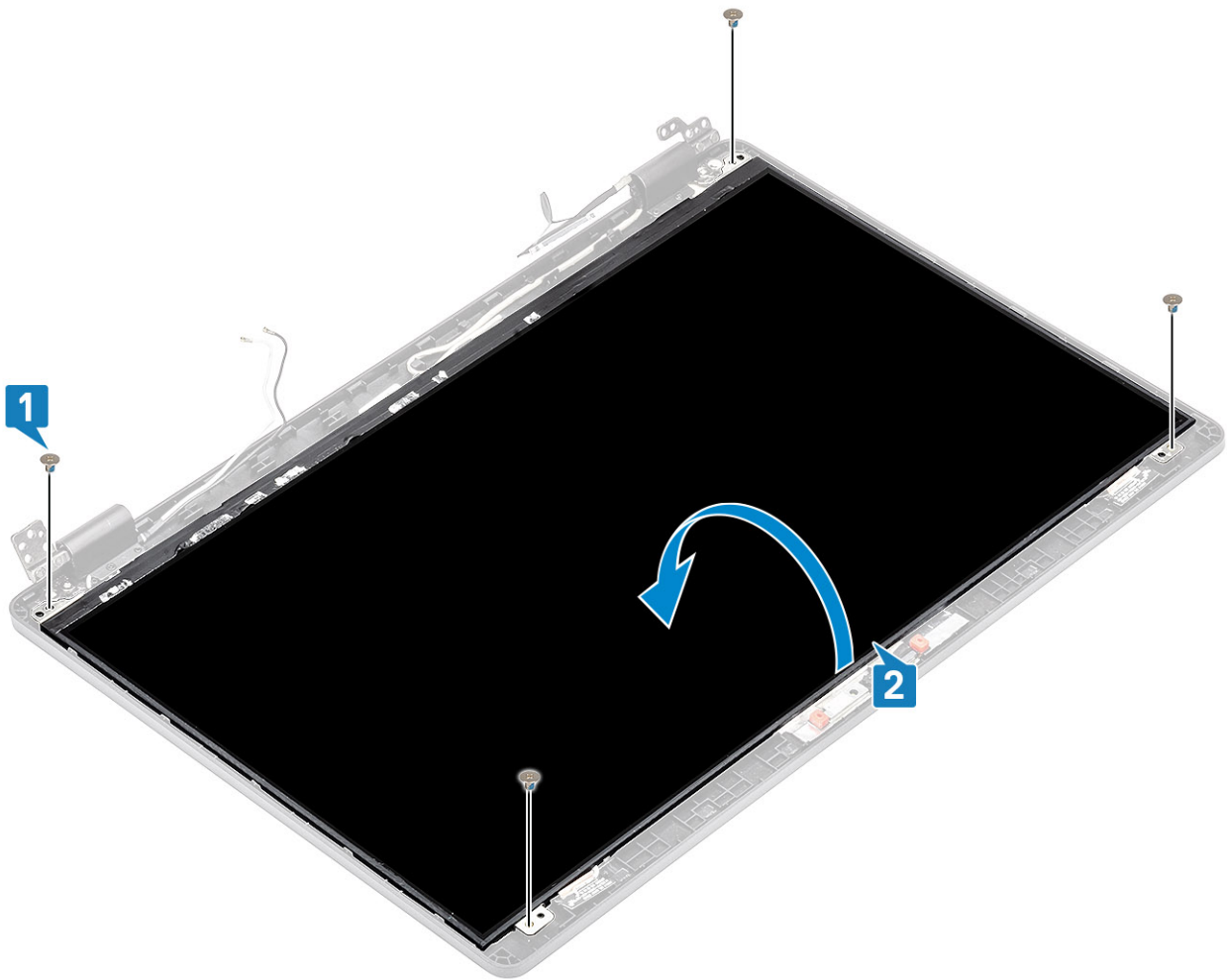


- 1 Replace the [display assembly](#).
- 2 Replace the [battery](#).
- 3 Replace the [base cover](#).
- 4 Replace the [microSD card](#).
- 5 Follow the procedure in [after working inside your computer](#).

Display panel

Removing display panel

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
 - 5 Remove the [display assembly](#).
 - 6 Remove the [display bezel](#).
 - 7 Remove the [hinge caps](#).
 - 8 Remove the [display hinges](#).
- 1 Remove the four (M2.5x3.5) screws that secure the display panel to the display assembly [1] and lift to turn over the display panel to access the display cable [2].



- 2 Peel the conductive tape [1] on the display cable connector.
- 3 Remove the adhesive strip that secures the display cable connector [2].
- 4 Lift the latch and disconnect the display cable from the connector on the display panel [3, 4].

NOTE: Do not pull and release the Stretch (SR) Tapes from the display panel. There is no need to separate the brackets from the display panel.



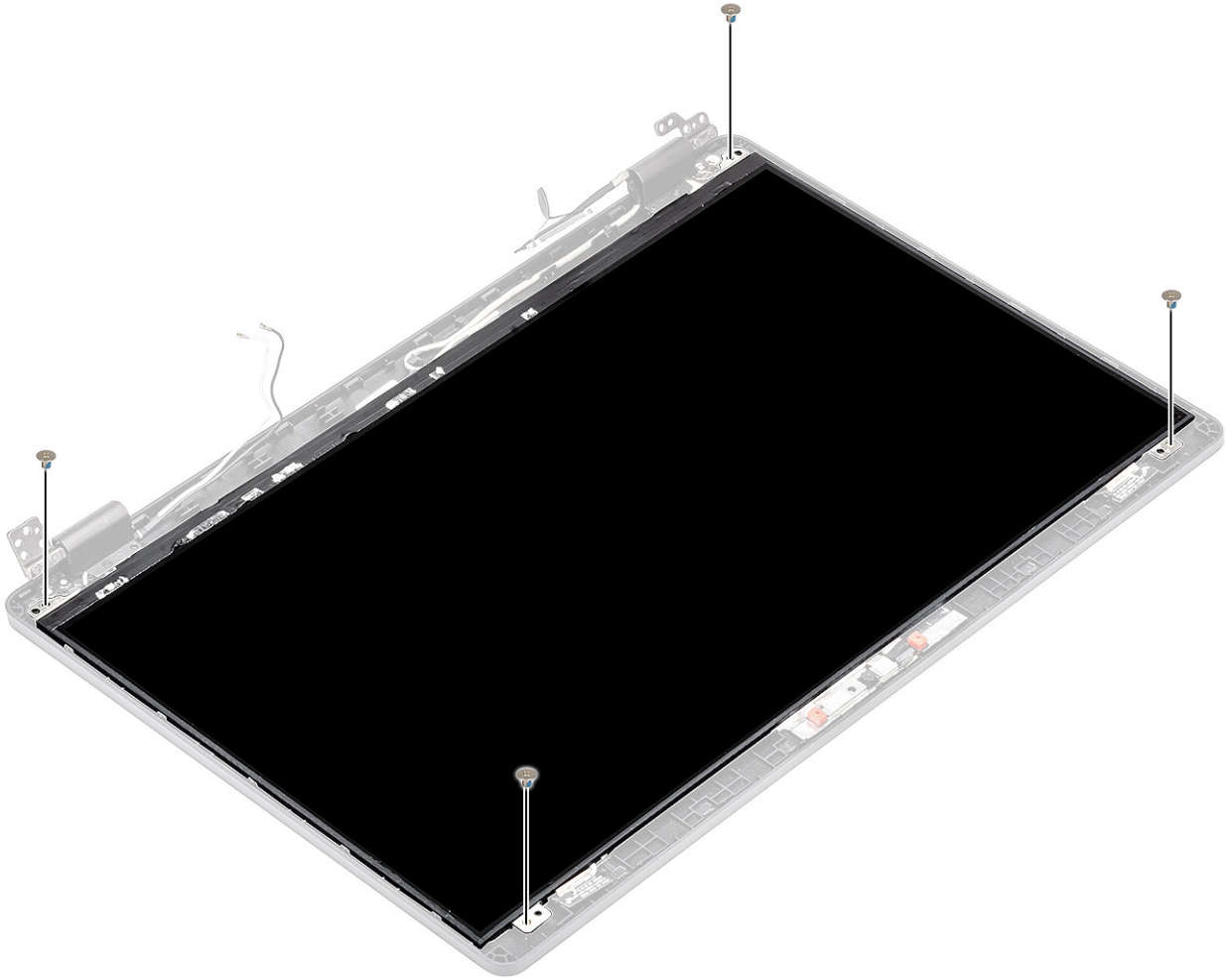
Installing display panel

- 1 Connect the display cable to the connector and close the latch [1, 2].
- 2 Adhere the adhesive strip to secure the display cable connector [3].
- 3 Adhere the conductive tape to secure the display cable connector [4].



- 4 **NOTE:** LCD Panel comes with two (L+R) brackets that needs to toe-in first, then secure two screws located at the base of the LCD panel.

Replace the four (M2.5x3.5) screws that secure the display panel to the display assembly.



- 1 Replace the [display hinges](#).
- 2 Replace the [hinge caps](#).
- 3 Replace the [display bezel](#).
- 4 Replace the [display assembly](#).
- 5 Replace the [battery](#).
- 6 Replace the [base cover](#).
- 7 Replace the [microSD card](#).
- 8 Follow the procedure in [after working inside your computer](#).

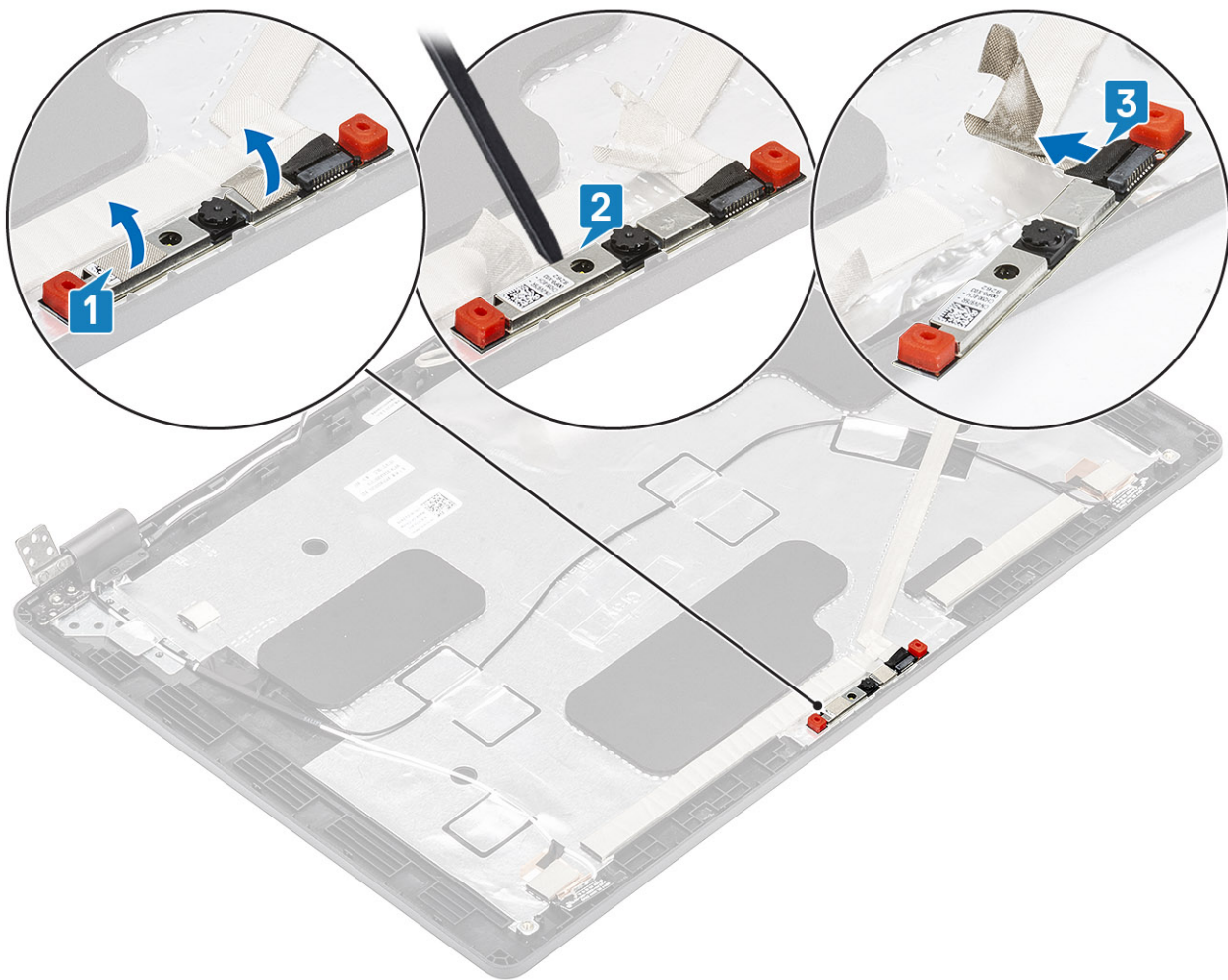
Camera

Removing camera

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 5 Remove the [display assembly](#).
- 6 Remove the [display bezel](#).
- 7 Remove the [hinge caps](#).

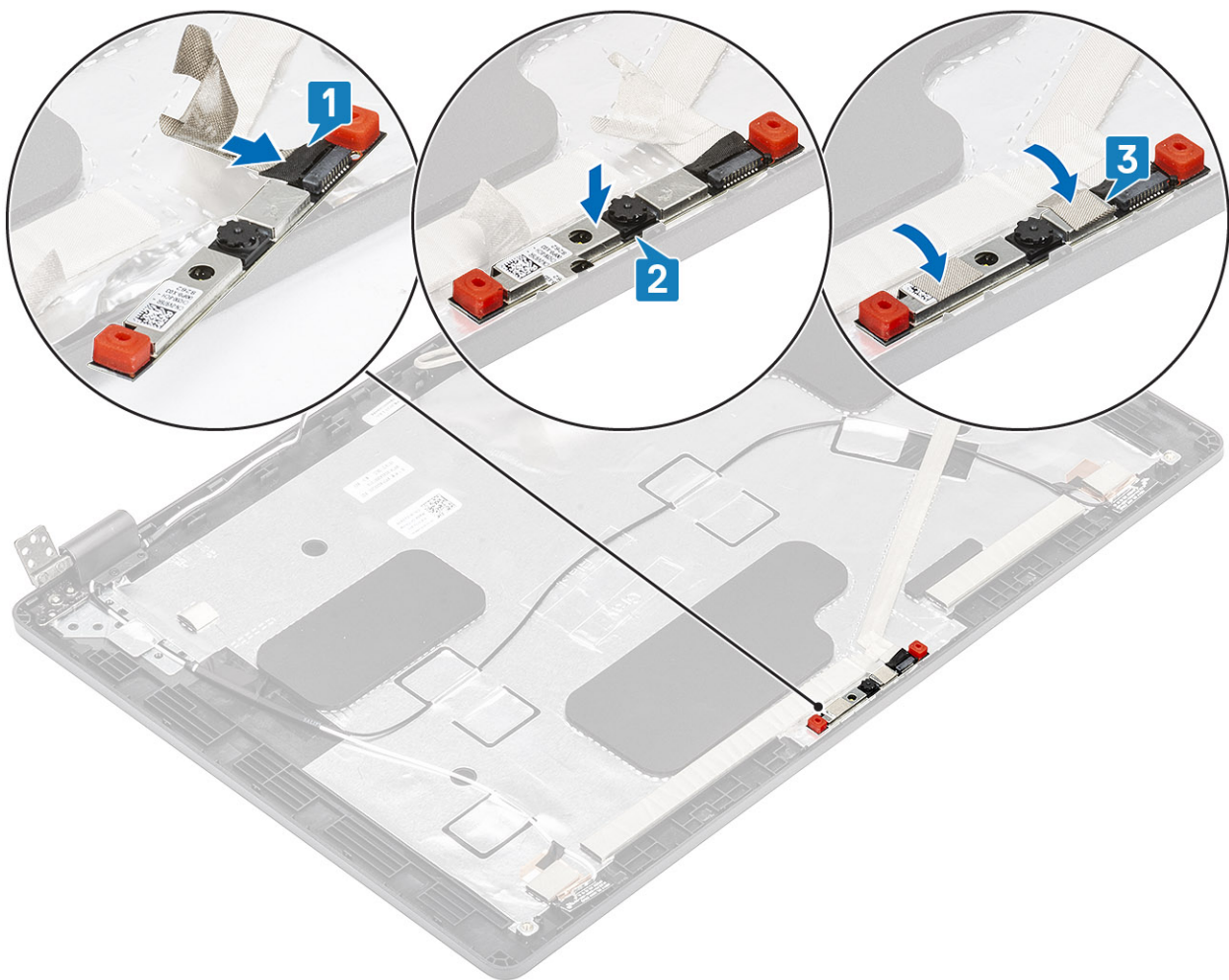
- 8 Remove the [display hinges](#).
- 9 Remove the [display panel](#).

Disconnect the camera cable from the connector on the camera module [3].



Installing camera

- 1 Connect the camera cable to the connector on the camera module [1].
- 2 Insert the camera into the slot on the display back cover [2].
- 3 Affix the two conductive tape above the camera [3].



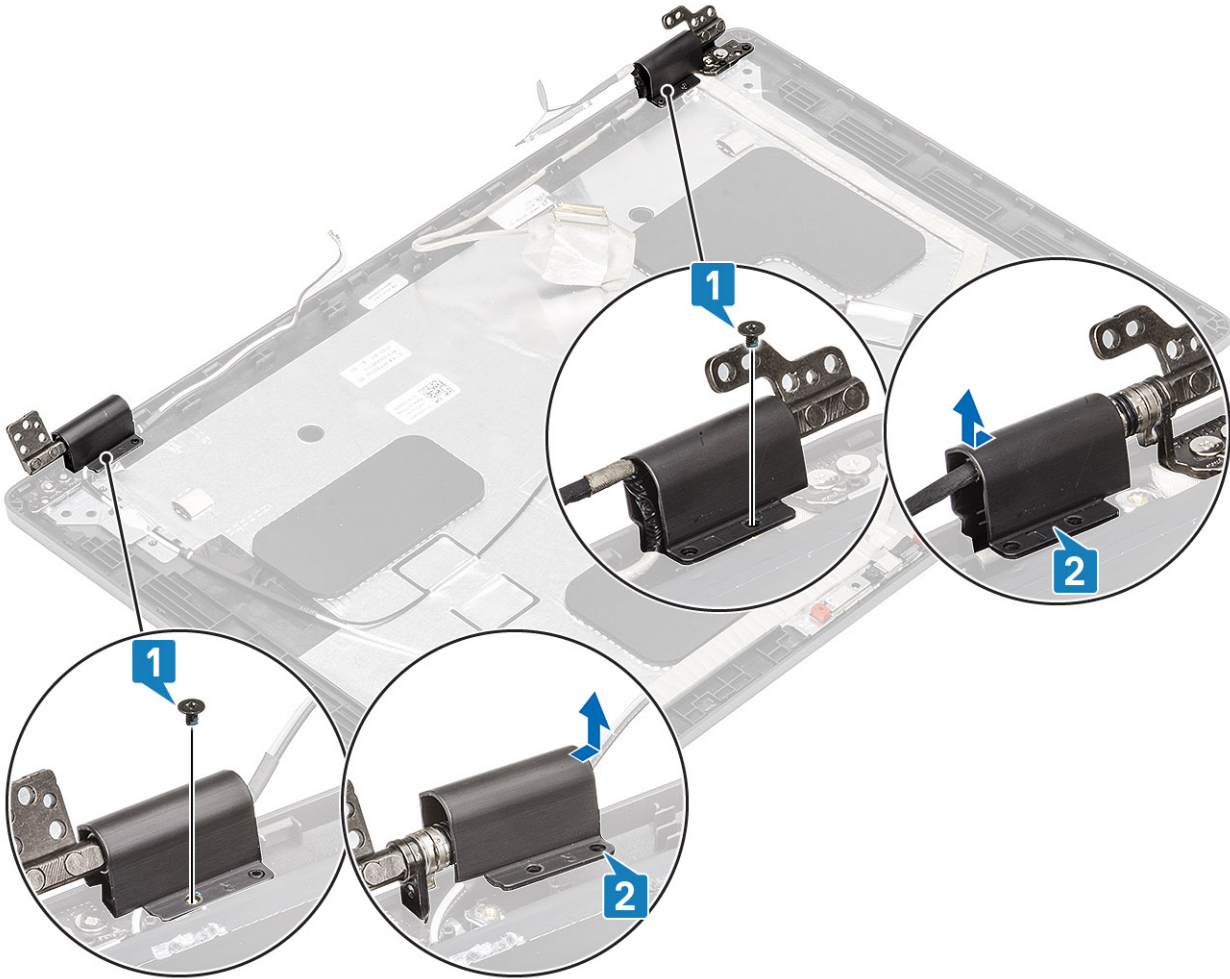
- 1 Replace the [display panel](#).
- 2 Replace the [display hinges](#).
- 3 Replace the [hinge caps](#).
- 4 Replace the [display bezel](#).
- 5 Replace the [display assembly](#).
- 6 Replace the [battery](#).
- 7 Replace the [base cover](#).
- 8 Replace the [microSD card](#).
- 9 Follow the procedure in [after working inside your computer](#).

Hinge caps

Removing hinge caps

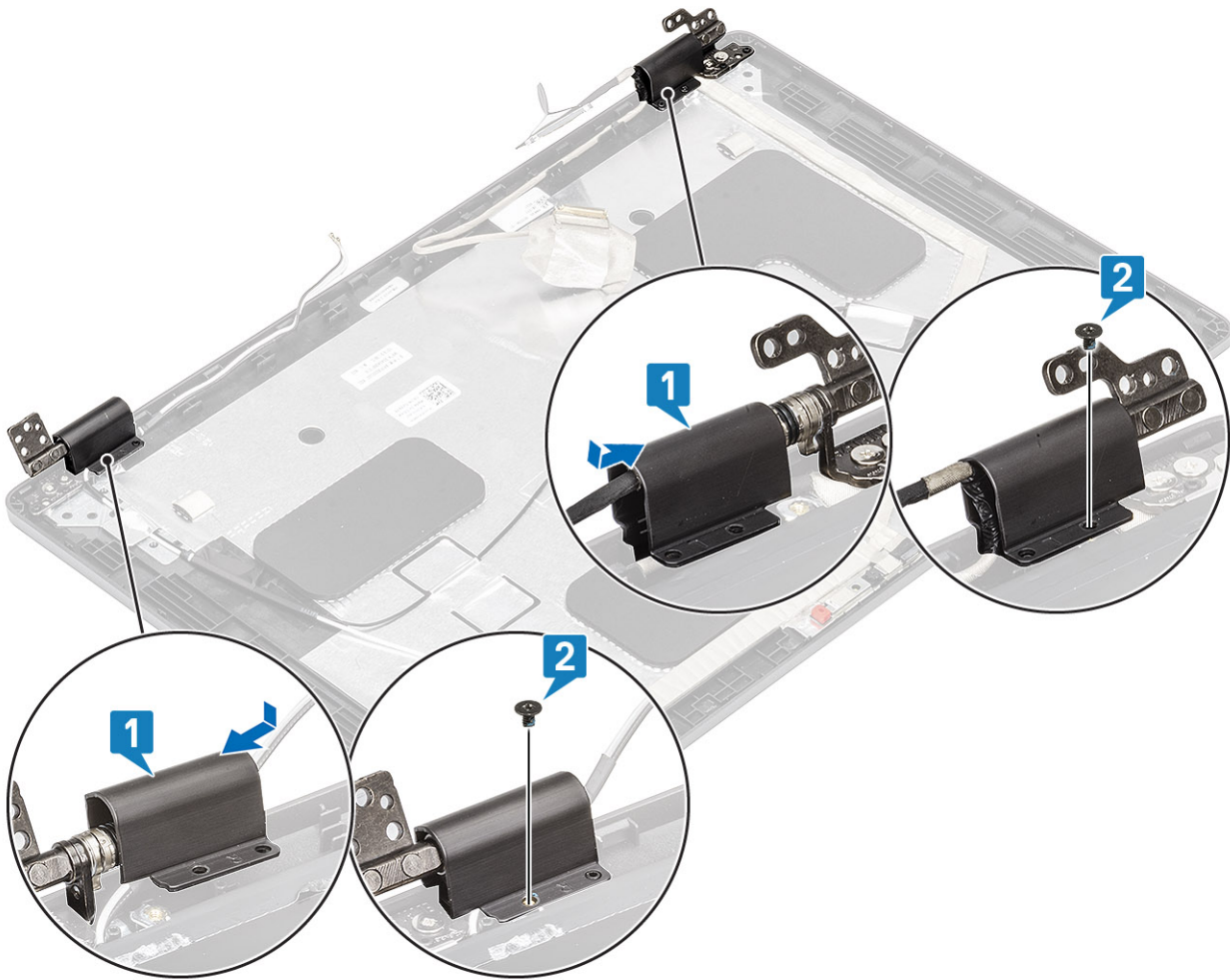
- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 5 Remove the [display assembly](#).

- 6 Remove the [display bezel](#).
- 1 Remove the two (M2x2.5) screws that secure the hinge caps to the chassis [1].
- 2 Pinch the hinge caps to release the hinge caps from the ribs on the display back cover then slide inwards to remove the hinge caps from the display hinge [2].



Installing hinge caps

- 1 Place the hinge caps and slide outward on the display hinges [1].
- 2 Replace the two (M2x2.5) screws to secure the hinge caps to the display hinge.

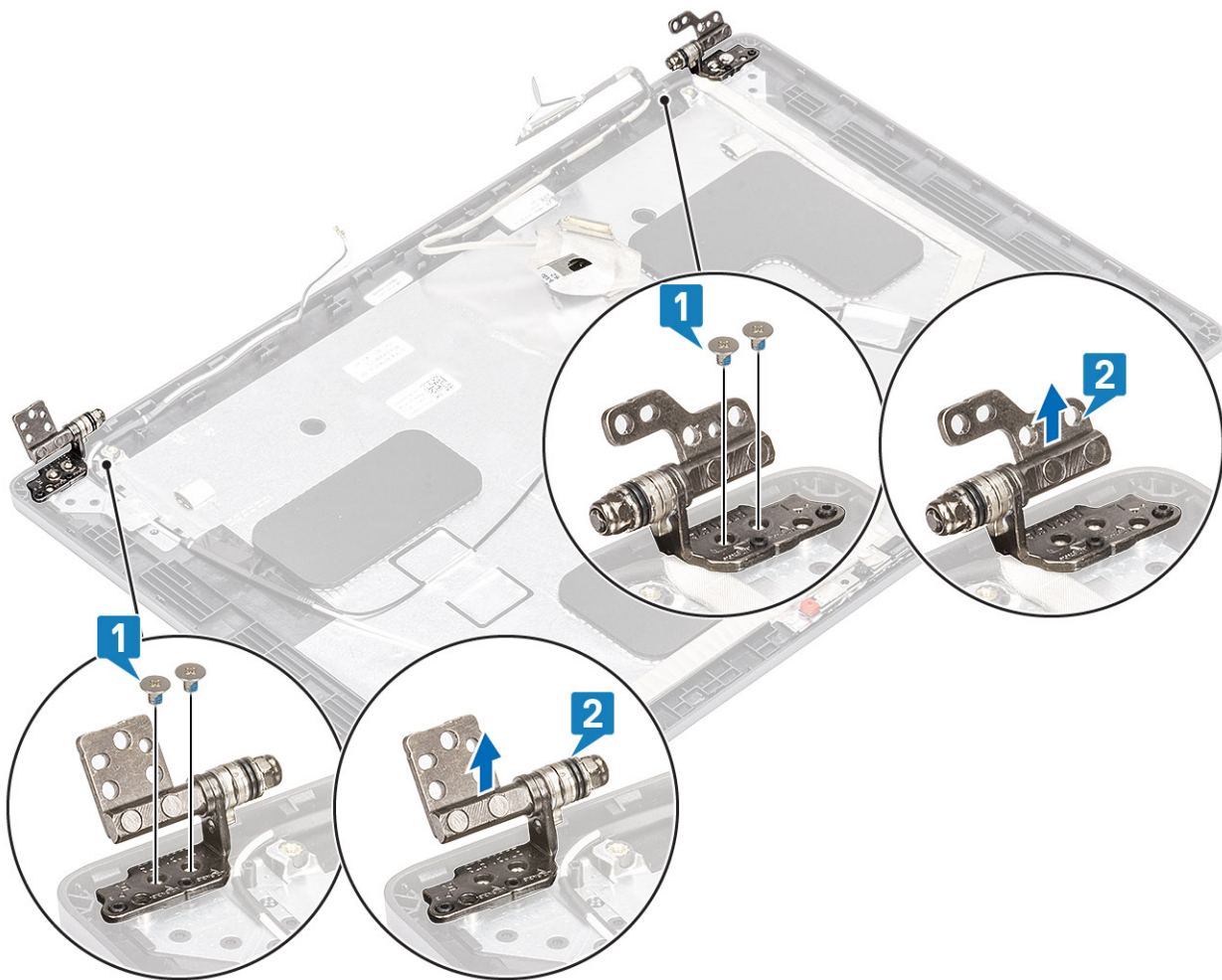


- 1 Replace the [display bezel](#).
- 2 Replace the [display assembly](#).
- 3 Replace the [battery](#).
- 4 Replace the [base cover](#).
- 5 Replace the [microSD card](#).
- 6 Follow the procedure in [after working inside your computer](#).

Display hinges

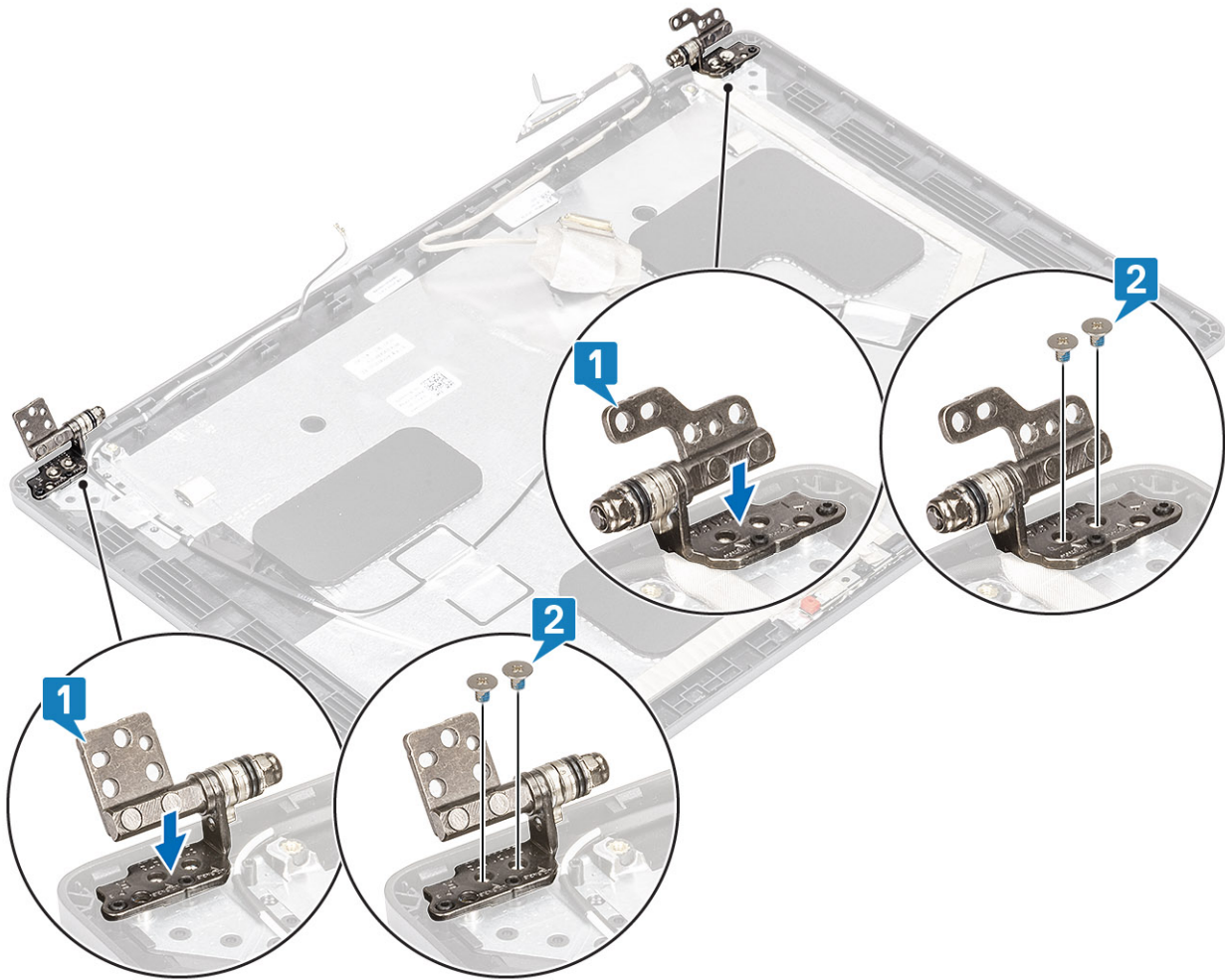
Removing display hinge

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [microSD card](#).
 - 3 Remove the [base cover](#).
 - 4 Remove the [battery](#).
 - 5 Remove the [display assembly](#).
 - 6 Remove the [display bezel](#).
 - 7 Remove the [hinge caps](#).
- 1 Remove the four (M2.5x3.5) screws that secure the display hinge to the display assembly [1].
 - 2 Remove the display hinges from the display back cover [2].



Installing display hinge

- 1 Place the display hinge on the display assembly.
- 2 Replace the four (M2.5x3.5) screws to secure the display hinge to the display assembly.



- 1 Replace the [hinge caps](#).
- 2 Replace the [display bezel](#).
- 3 Replace the [display assembly](#).
- 4 Replace the [battery](#).
- 5 Replace the [base cover](#).
- 6 Replace the [microSD card](#).
- 7 Follow the procedure in [after working inside your computer](#).

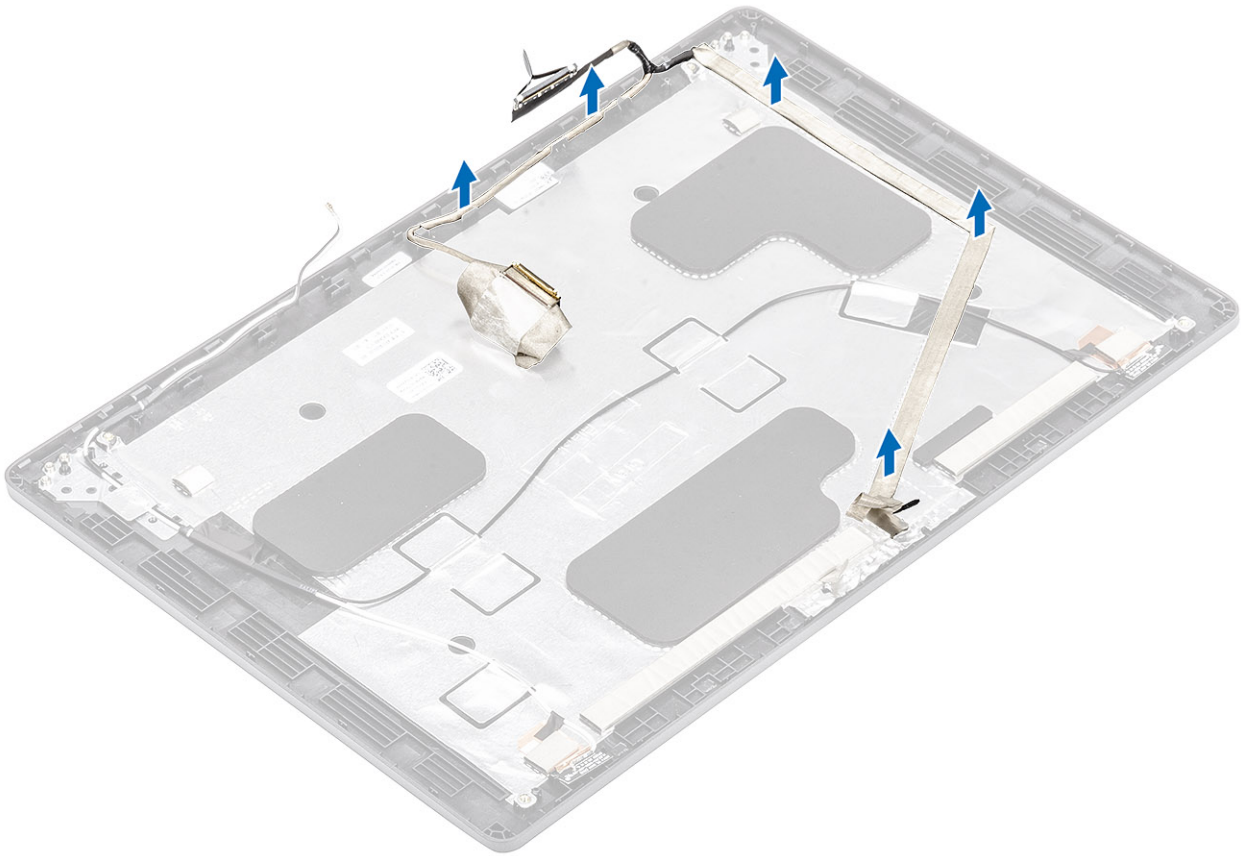
Display (eDP) cable

Removing display cable

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 5 Remove the [display assembly](#).
- 6 Remove the [display bezel](#).
- 7 Remove the [hinge caps](#).
- 8 Remove the [display hinges](#).

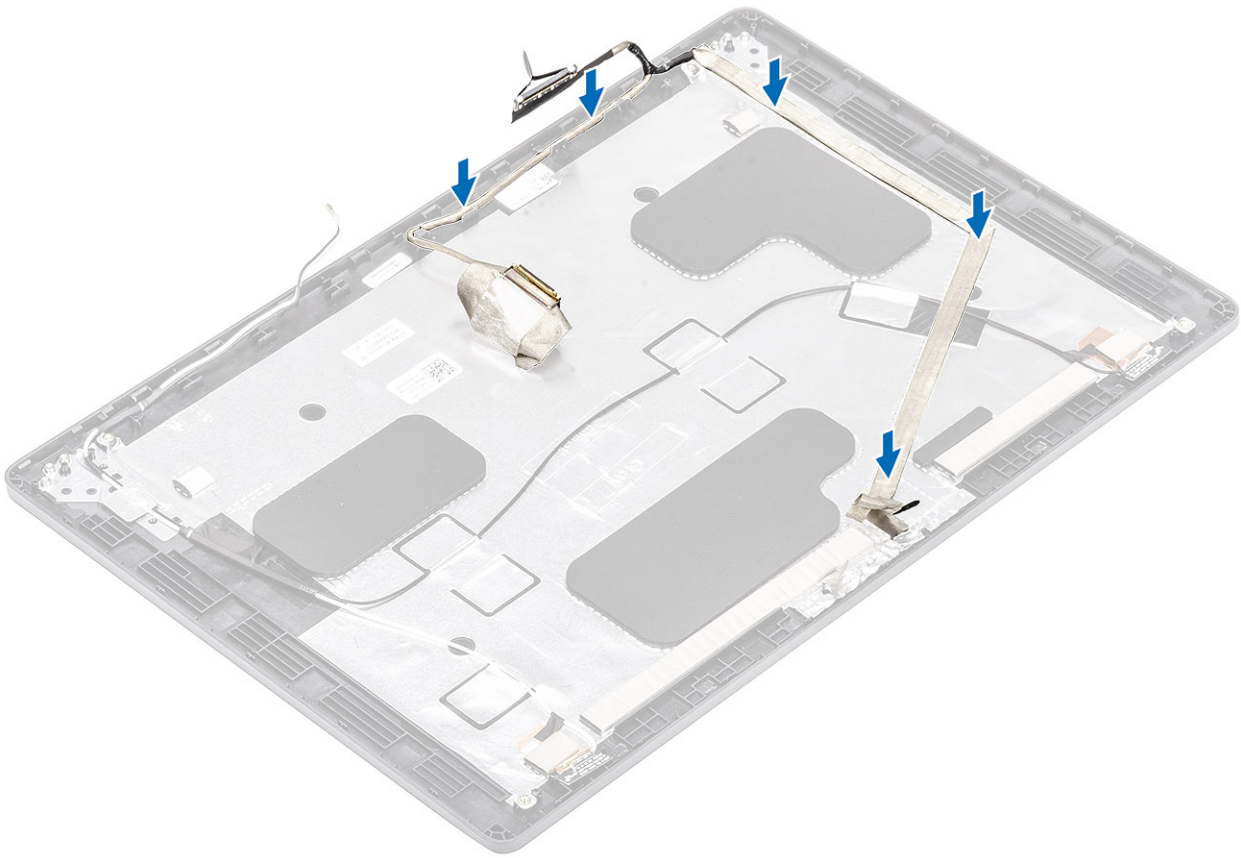
- 9 Remove the [display panel](#).
- 10 Remove the [camera](#).

Peel the conductive tape and unroute the display cable to release it from adhesive and lift the display cable from the display back cover.



Installing display cable

- 1 Adhere the display cable to the display back cover.
- 2 Adhere the conductive tape and route the display cable to the display back cover.



- 1 Replace the [camera](#).
- 2 Replace the [display panel](#).
- 3 Replace the [display hinges](#).
- 4 Replace the [hinge caps](#).
- 5 Replace the [display bezel](#).
- 6 Replace the [display assembly](#).
- 7 Replace the [battery](#).
- 8 Replace the [base cover](#).
- 9 Replace the [microSD card](#).
- 10 Follow the procedure in [after working inside your computer](#).

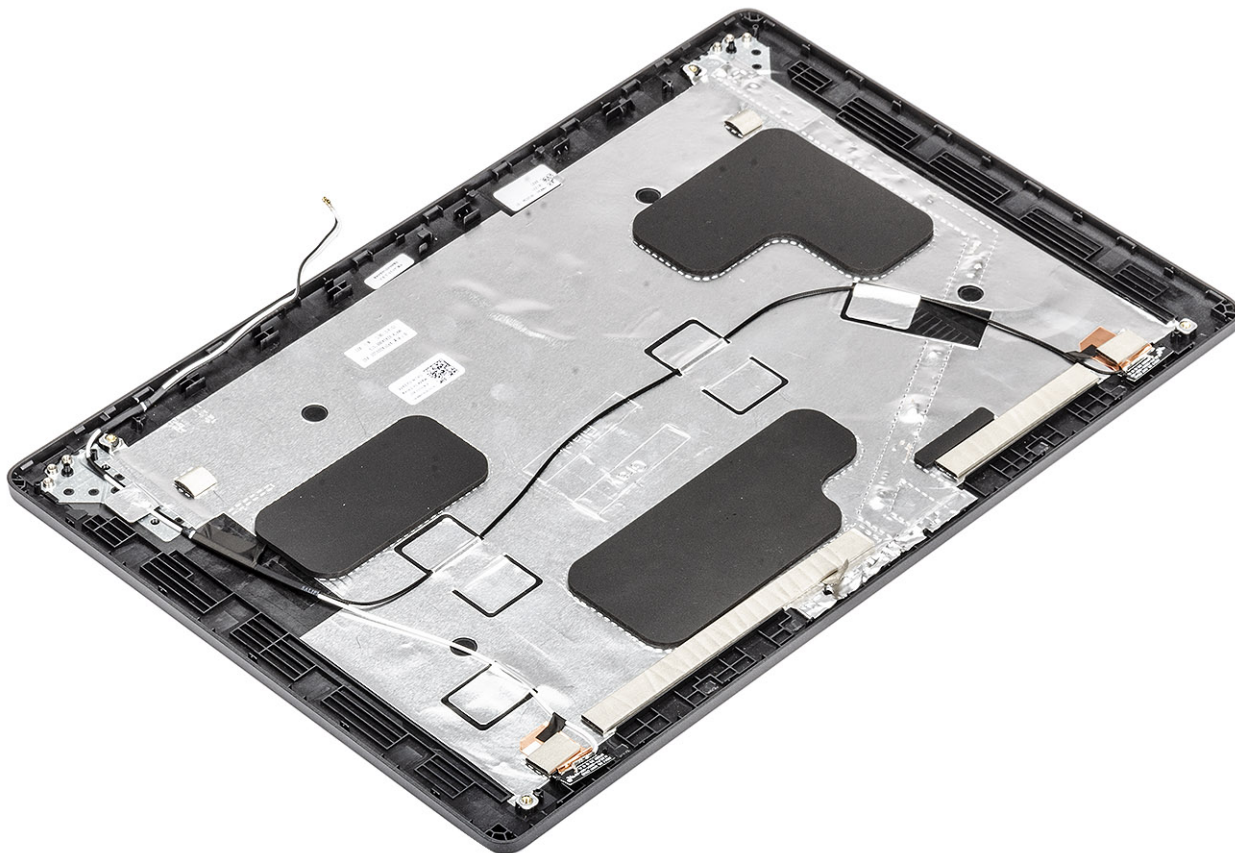
Display back cover assembly

Replacing the display back cover

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).
- 5 Remove the [display assembly](#).
- 6 Remove the [display bezel](#).
- 7 Remove the [hinge caps](#).
- 8 Remove the [display hinges](#).
- 9 Remove the [display panel](#).

- 10 Remove the [camera](#).
- 11 Remove the [display cable](#).

After performing the preceding steps, you are left with the display back cover.



- 1 Replace the [display cable](#).
- 2 Replace the [camera](#).
- 3 Replace the [display panel](#).
- 4 Replace the [display hinges](#).
- 5 Replace the [hinge caps](#).
- 6 Replace the [display bezel](#).
- 7 Replace the [display assembly](#).
- 8 Replace the [battery](#).
- 9 Replace the [base cover](#).
- 10 Replace the [microSD card](#).
- 11 Follow the procedure in [after working inside your computer](#).

Palmrest assembly

Replacing the palmrest and keyboard assembly

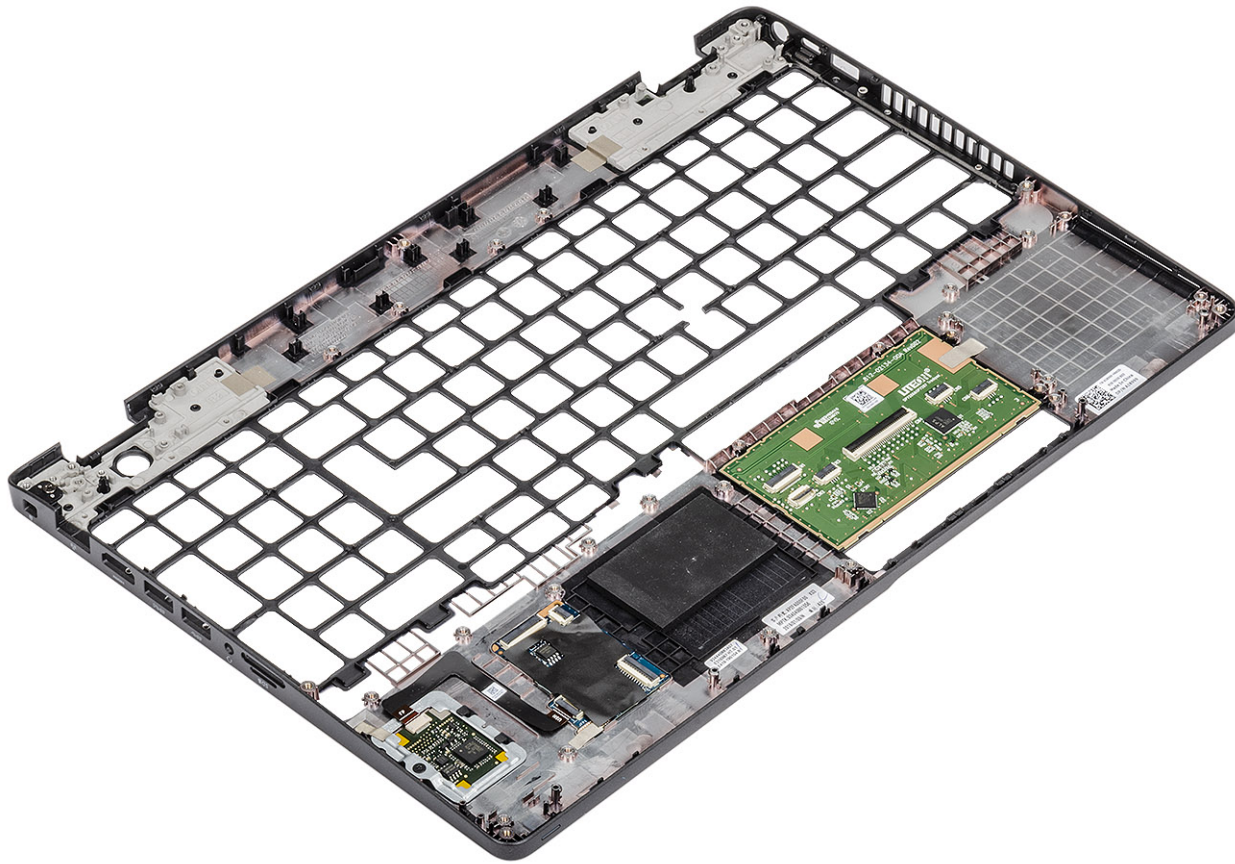
- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [microSD card](#).
- 3 Remove the [base cover](#).
- 4 Remove the [battery](#).

- 5 Remove the [speaker](#).
- 6 Remove the [memory module](#).
- 7 Remove the [system fan](#).
- 8 Remove the [DC-in](#).
- 9 Remove the [WLAN card](#).
- 10 Remove the [system board](#).

NOTE: System board can be removed with heatsink attached.

- 11 Remove the [coin cell battery](#).
- 12 Remove the [keyboard](#).
- 13 Remove the [SmartCard reader](#).

After performing the preceding steps, you are left with the palmrest and keyboard assembly.



- 1 Replace the [SmartCard reader](#).
- 2 Replace the [keyboard](#).
- 3 Replace the [coin cell battery](#).
- 4 Replace the [system board](#).

NOTE: System board can be replaced with heatsink attached.

- 5 Replace the [WLAN card](#).
- 6 Replace the [DC-in](#).
- 7 Replace the [memory module](#).
- 8 Replace the [system fan](#).
- 9 Replace the [speaker](#).
- 10 Replace the [battery](#).

- 11 Replace the [base cover](#).
- 12 Replace the [microSD card](#).
- 13 Follow the procedure in [after working inside your computer](#).

Troubleshooting

Enhanced Pre-Boot System Assessment (ePSA) diagnostics

The ePSA diagnostics (also known as system diagnostics) performs a complete check of your hardware. The ePSA is embedded with the BIOS and is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups allowing you to:

- Run tests automatically or in an interactive mode
- Repeat tests
- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

NOTE: Some tests for specific devices require user interaction. Always ensure that you are present at the computer terminal when the diagnostic tests are performed.

Running the ePSA diagnostics

- 1 Turn on your computer.
- 2 As the computer boots, press the F12 key as the Dell logo appears.
- 3 On the boot menu screen, select the **Diagnostics** option.
- 4 Click the arrow at the bottom left corner.
Diagnostics front page is displayed.
- 5 Click the arrow in the lower-right corner to go to the page listing.
The items detected are listed.
- 6 To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
- 7 Select the device from the left pane and click **Run Tests**.
- 8 If there are any issues, error codes are displayed.
Note the error code and validation number and contact Dell.

System diagnostic lights

Battery-status light

Indicates the power and battery-charge status.

Solid white — Power adapter is connected and the battery has more than 5 percent charge.

Amber — Computer is running on battery and the battery has less than 5 percent charge.

Off

- Power adapter is connected and the battery is fully charged.

- Computer is running on battery and the battery has more than 5 percent charge.
- Computer is in sleep state, hibernation, or turned off.

The power and battery-status light blinks amber along with beep codes indicating failures.

For example, the power and battery-status light blinks amber two times followed by a pause, and then blinks white three times followed by a pause. This 2,3 pattern continues until the computer is turned off indicating no memory or RAM is detected.

The following table shows different power and battery-status light patterns and associated problems.

Table 3. LED codes

Diagnostic light codes	Problem description
2,1	Processor failure
2,2	System board: BIOS or ROM (Read-Only Memory) failure
2,3	No memory or RAM (Random-Access Memory) detected
2,4	Memory or RAM (Random-Access Memory) failure
2,5	Invalid memory installed
2,6	System-board or chipset error
2,7	Display failure
3,1	Coin-cell battery failure
3,2	PCI, video card/chip failure
3,3	Recovery image not found
3,4	Recovery image found but invalid
3,5	Power-rail failure
3,6	System BIOS Flash incomplete
3,7	Management Engine (ME) error

Camera status light: Indicates whether the camera is in use.

- Solid white — Camera is in use.
- Off — Camera is not in use.

Caps Lock status light: Indicates whether Caps Lock is enabled or disabled.

- Solid white — Caps Lock enabled.
- Off — Caps Lock disabled.

WiFi power cycle

If your computer is unable to access the internet due to WiFi connectivity issues a WiFi power cycle procedure may be performed. The following procedure provides the instructions on how to conduct a WiFi power cycle:

NOTE: Some ISPs (Internet Service Providers) provide a modem/router combo device.

- 1 Turn off your computer.
- 2 Turn off the modem.
- 3 Turn off the wireless router.
- 4 Wait for 30 seconds.
- 5 Turn on the wireless router.
- 6 Turn on the modem.

7 Turn on your computer.

Getting help

Contacting Dell

 **NOTE:** If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

- 1 Go to **Dell.com/support**.
- 2 Select your support category.
- 3 Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
- 4 Select the appropriate service or support link based on your need.