Dell Latitude 7400

Service Manual

Notes, cautions, and warnings

(i) **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.**

Contents

Working on your computer

Topics:

•   Safety instructions

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: 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:** 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.

⚠ **CAUTION: Exercise caution when handling Lithium-ion batteries in laptops. Swollen batteries should not be used and should be replaced and disposed properly.**

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

Before working inside your computer

1. Save and close all open files and exit all open applications.

2. Shut down your computer. Click **Start** > ⏻ **Power** > **Shut down**.

   ⓘ **NOTE:** If you are using a different operating system, see the documentation of your operating system for shut-down instructions.

3. Disconnect your computer and all attached devices from their electrical outlets.

4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.

5. Remove any media card and optical disc from your computer, if applicable.

6. After the computer is unplugged, press and hold the power button for 5 seconds to ground the system board.

⚠️ **CAUTION: Place the computer on a flat, soft, and clean surface to avoid scratches on the display.**

7. Place the computer face down.

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 20 seconds should discharge residual power in the system board. Remove the battery from 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

ⓘ **NOTE:** Leaving stray or loose screws inside your computer may severely damage your computer.

1. Replace all screws and ensure that no stray screws remain inside your computer.
2. Connect any external devices, peripherals, or cables you removed before working on your computer.
3. Replace any media cards, discs, or any other parts that you removed before working on your computer.
4. Connect your computer and all attached devices to their electrical outlets.
5. Turn on your computer.

Technology and components

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

Topics:

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 drivers, and printers.

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	SuperSpeed	2010
USB 3.1 Gen 2	10 Gbps	SuperSpeed	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 4.8 Gbps. 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 480 Mbps and 12 Mbps 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.
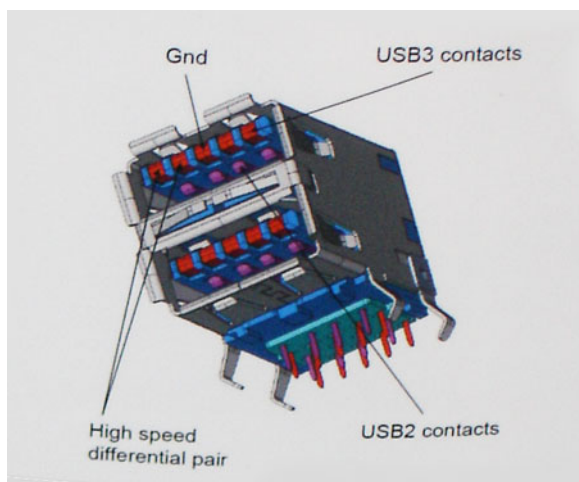
With today's ever increasing demands placed on data transfers with high-definition video content, terabyte storage devices, high megapixel count digital cameras etc., USB 2.0 may not be fast enough. Furthermore, no USB 2.0 connection could ever come close to the 480Mbps theoretical maximum throughput, making data transfer at around 320 Mbps (40 MB/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.

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.
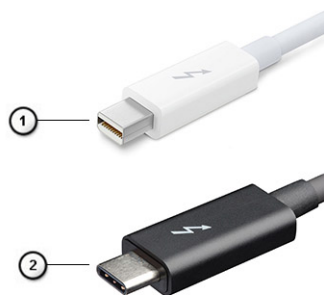
Figure 1. Thunderbolt 1 and Thunderbolt 3

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 1.4 – 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
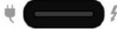
Protocol	USB Type-A	USB Type-C	Notes
Thunderbolt	Not Applicable	⚡	Will use industry standard icon regardless of port style (i.e., mDP or USB Type-C)
Thunderbolt w/ Power Delivery	Not Applicable	⚡▮⚡	Up to 130 Watts via USB Type-C

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 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.

Major components of your system
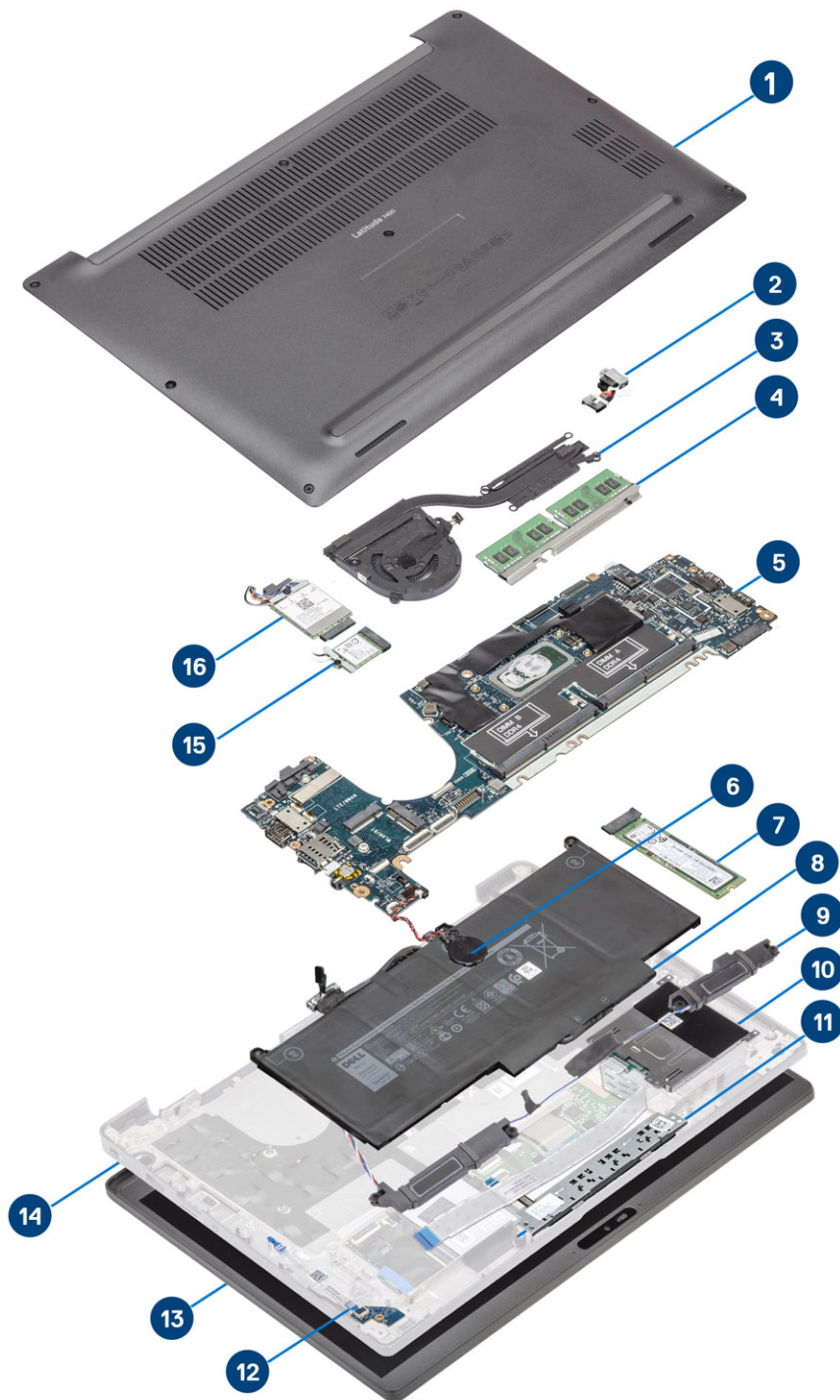
1. Base cover
2. Power adaptor port

3. Heatsink assembly
4. Memory
5. System board
6. Coin-cell
7. Solid state drive
8. Battery
9. Speakers
10. Smart card reader
11. Touchpad button board
12. LED daughterboard
13. Display assembly
14. Palmrest assembly
15. WLAN card
16. WWAN card

ⓘ **NOTE:** Dell provides a list of components and their part numbers for the original system configuration purchased. These parts are available according to warranty coverages purchased by the customer. Contact your Dell sales representative for purchase options.

Removing and installing components

ⓘ **NOTE:** The images in this document may differ from your computer depending on the configuration you ordered.

Topics:

Base cover

Removing the base cover

Follow the procedure in before working inside your computer.

1. Loosen the eight captive screws that secure the base cover to the computer.

2. Use a plastic scribe to pry the base cover at the indents near the left and right hinges [1].
3. Work along the edges to separate the base cover from the computer [2].

4. Lift and remove the base cover from the computer.

Installing the base cover

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

2. Press along the edges of the base cover until it clicks into the palmrest assembly.
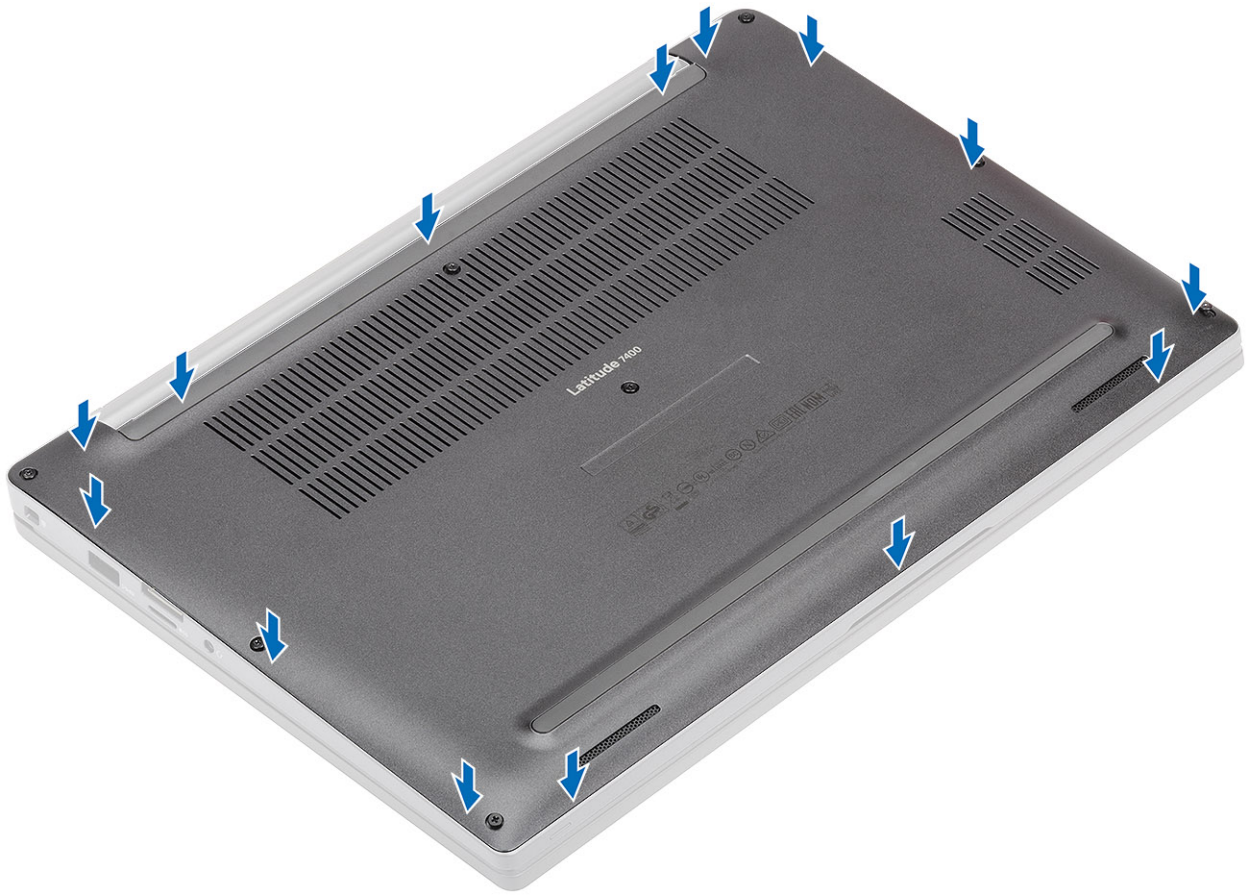
3. Tighten the eight captive screws to secure the base cover to the computer.

Follow the procedure after working inside your computer.

Battery

Lithium-ion battery precautions

⚠️ **CAUTION:**
- **Exercise caution when handling Lithium-ion batteries.**
- **Discharge the battery completely before removing it. Disconnect the AC power adapter from the system and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.**
- **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.**
- **Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other system components.**
- **If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a lithium-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See www.dell.com/contactdell.**
- **Always purchase genuine batteries from www.dell.com or authorized Dell partners and resellers.**
- **Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen Lithium-ion batteries, see Handling swollen Lithium-ion batteries.**
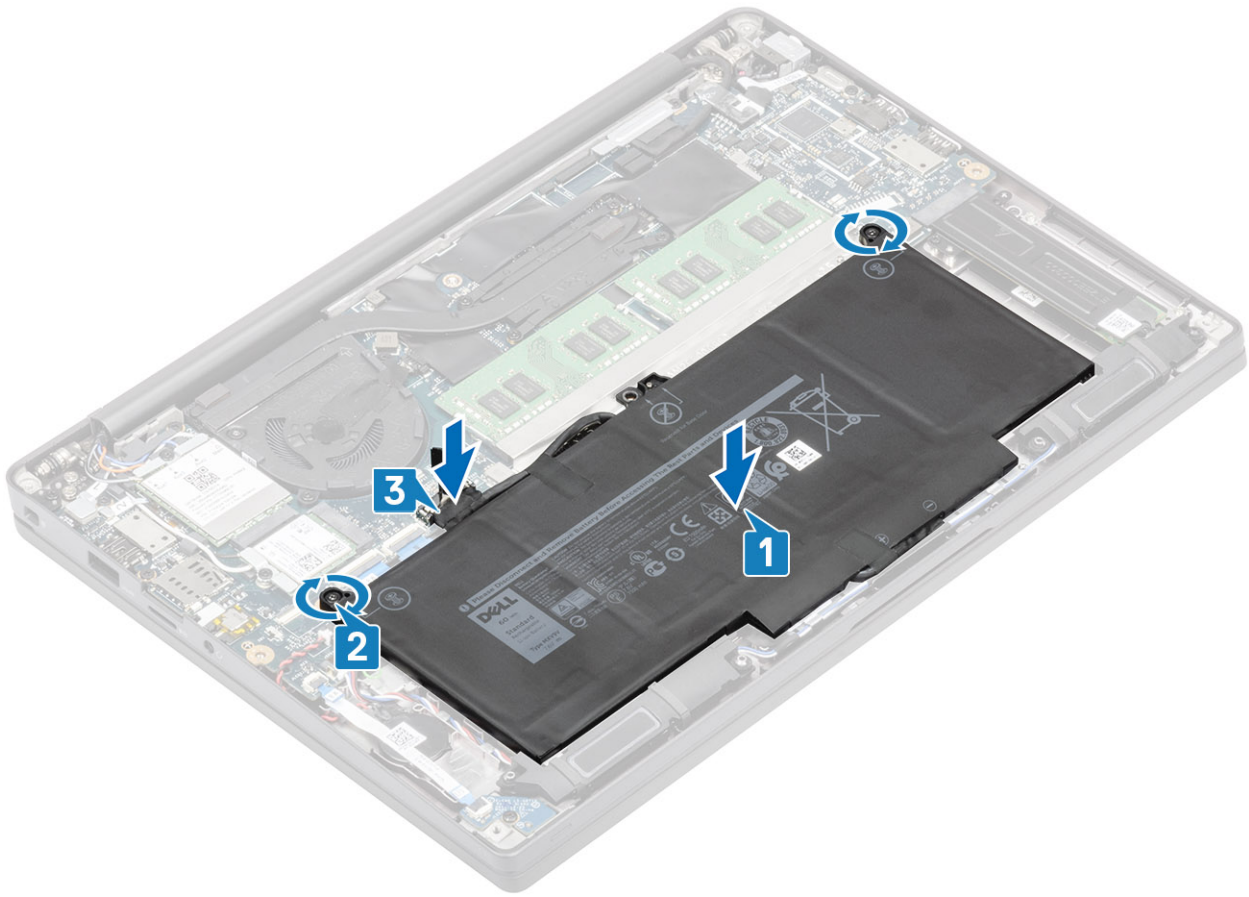
Removing the battery

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
1. Pull the tag to disconnect the battery cable from its connector on the system board [1].
2. ⓘ **NOTE:** This procedure illustrates a 4-cell battery. A 3-cell battery has single captive screw securing it to the computer.

   Loosen the two captive screws [2] that secure the battery to the computer.
3. Lift and remove the battery from the computer [3].
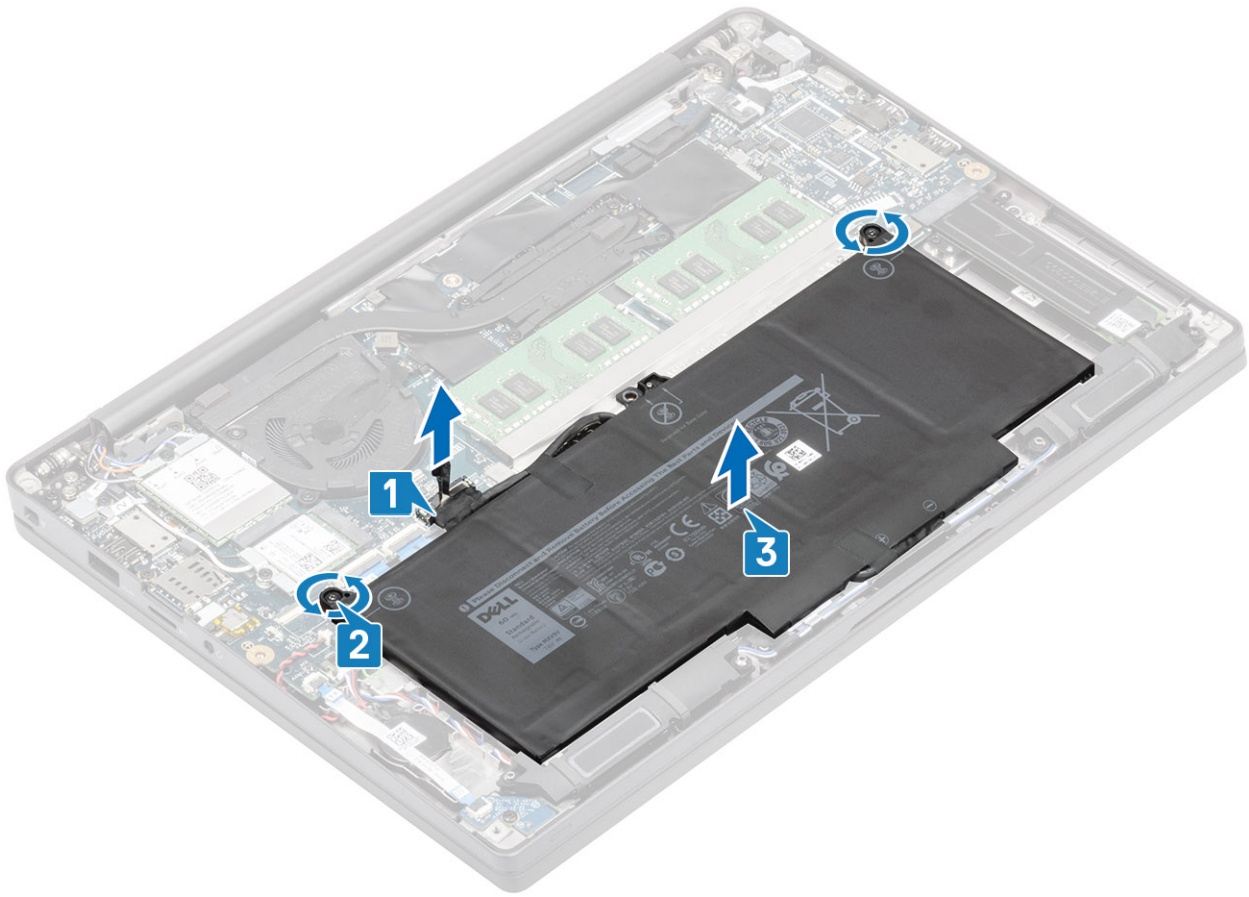
Installing the battery

1. Align and place the battery in the computer [1].
2. Tighten the two captive screws [2] to secure the battery (4-Cell) to the computer.

   ⓘ **NOTE:** A 3-Cell battery has single captive screw that secures the battery to the computer.

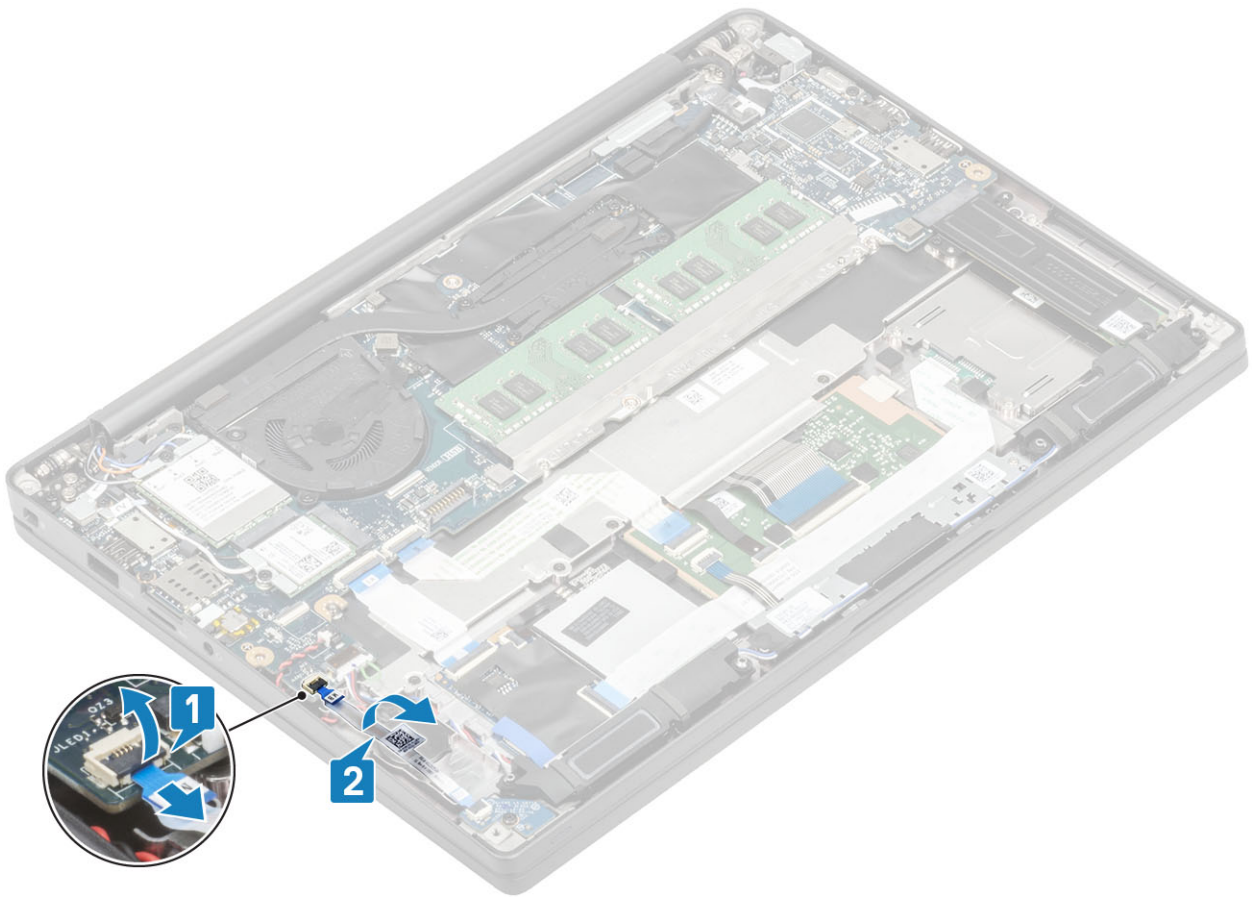3. Connect the battery cable to its connector on the system board [3].

1. Install the base cover.
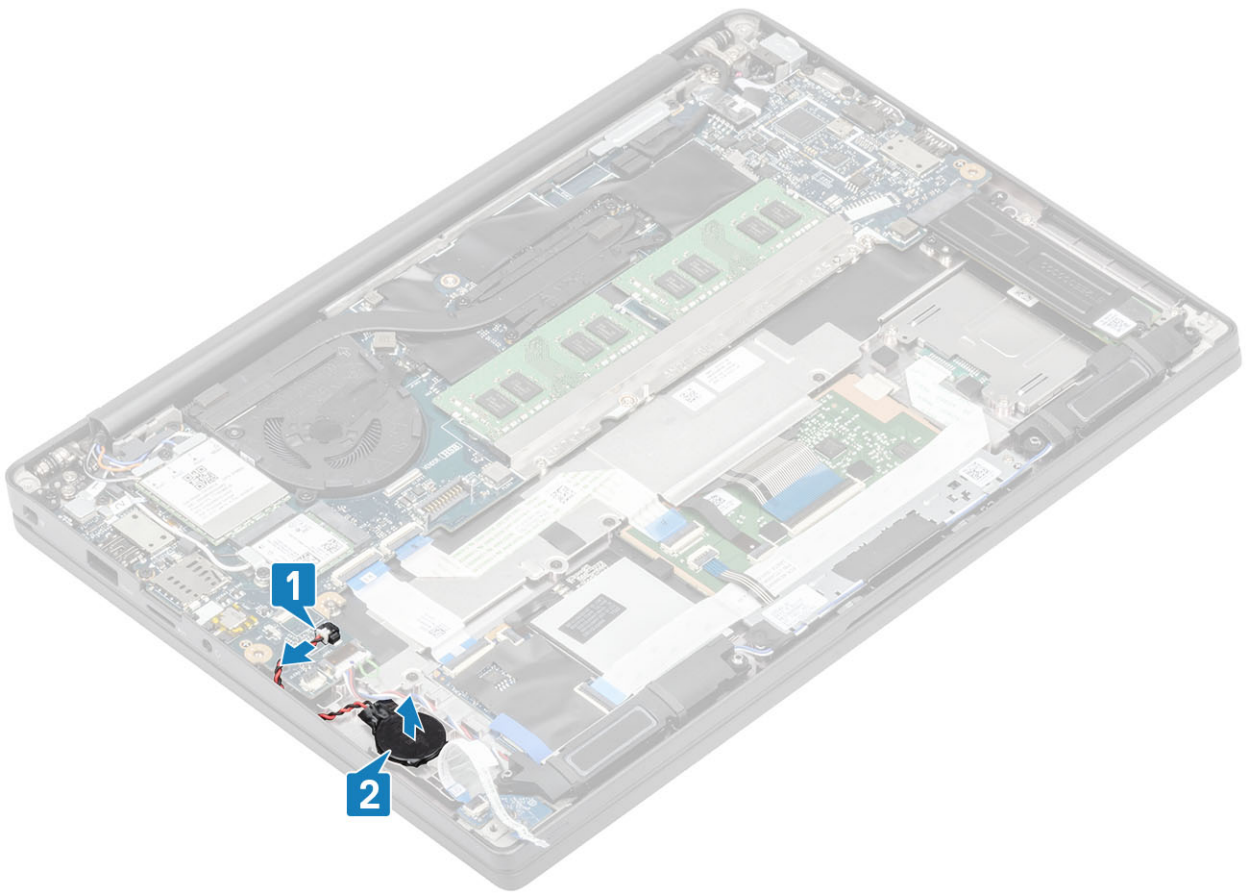2. Follow the procedure after working inside your computer.

Coin cell
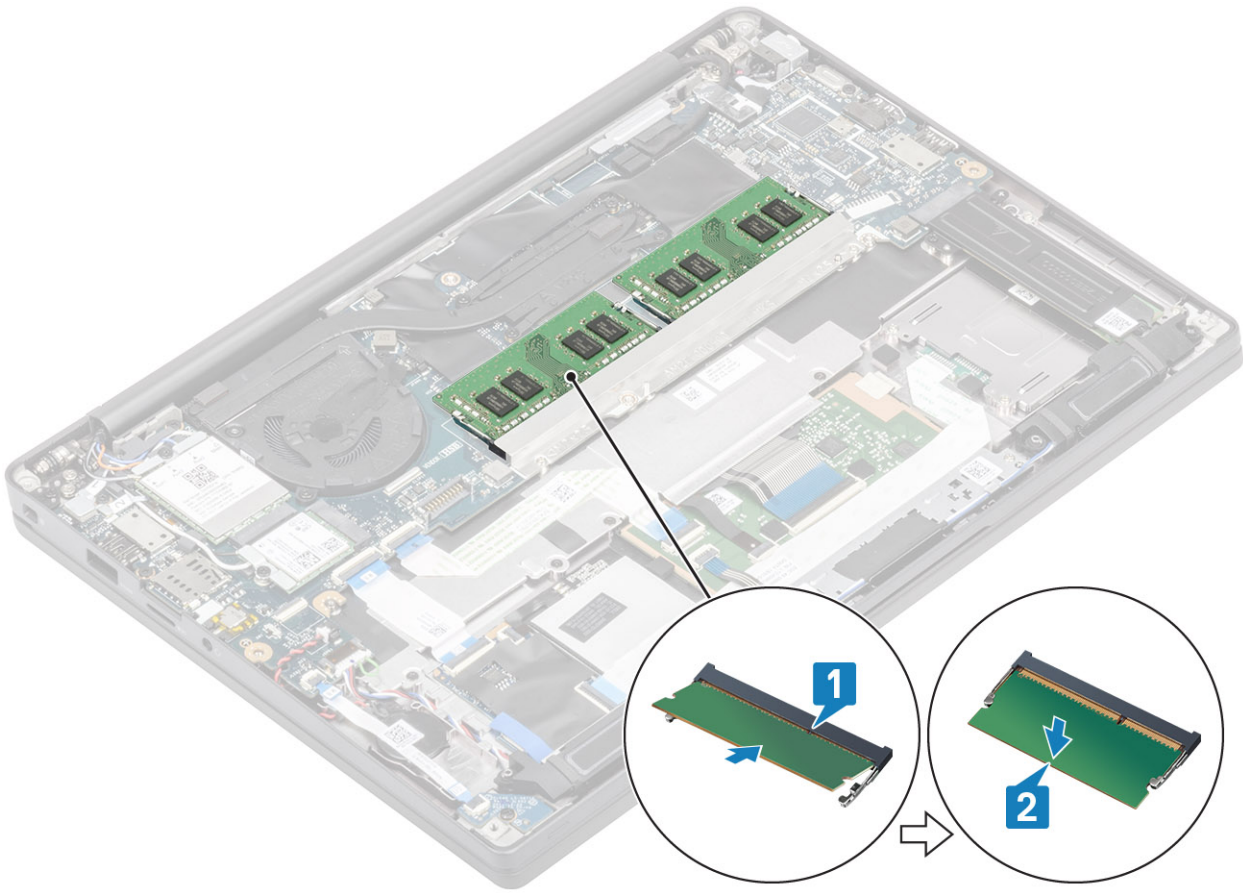
Removing the coin cell

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
1. Disconnect the LED daughterboard cable from the connector on the system board [1].
2. Peel back the LED daughterboard cable from over the coin cell [2].

3. Disconnect the coin cell cable from the connector on the system board [1].

4. Remove the coin cell from the computer [2].

Installing the coin cell

1. Connect the coin cell cable to its connector on the system board [1] and adhere the coin cell to the palmrest [2].
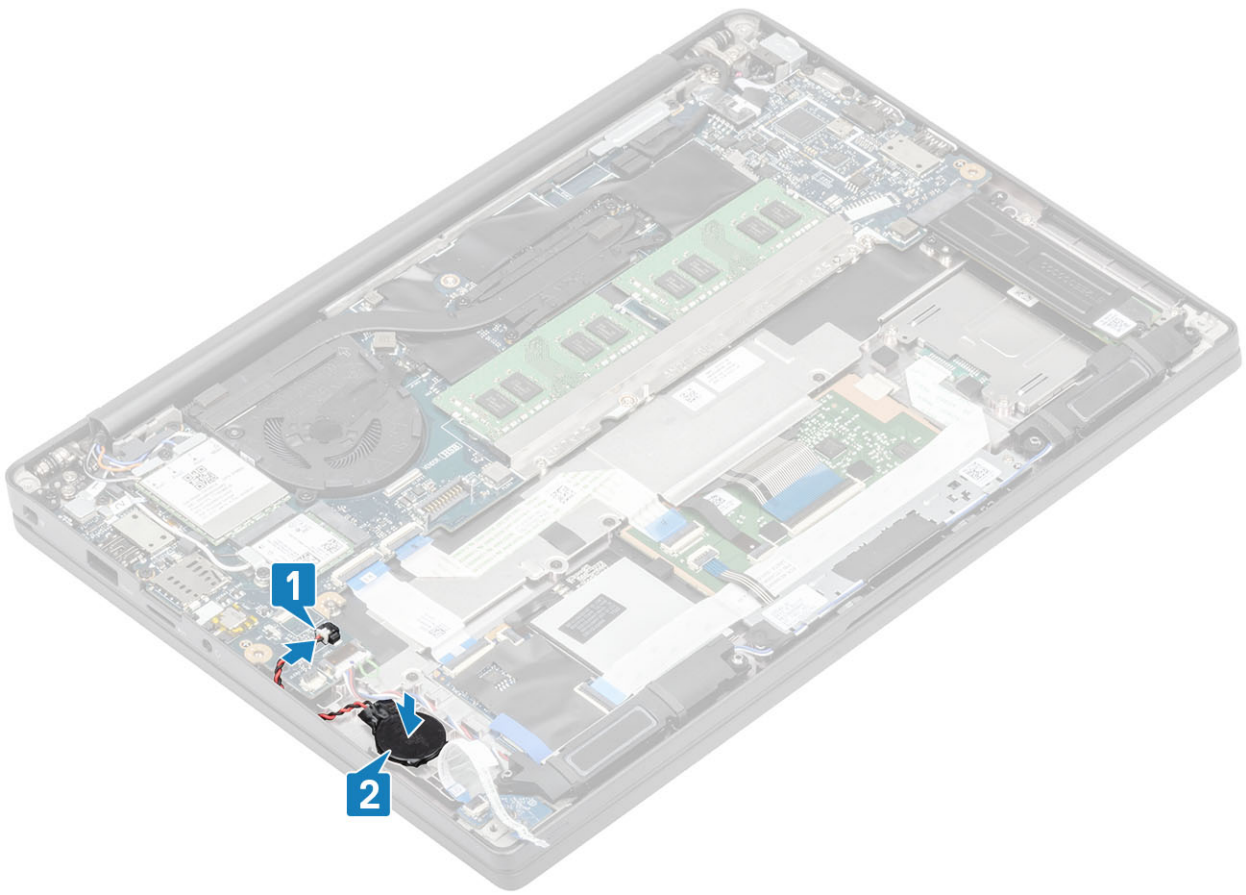
2. Connect the LED board cable to the system board [1] and route the ribbon cable over the coin cell [2].
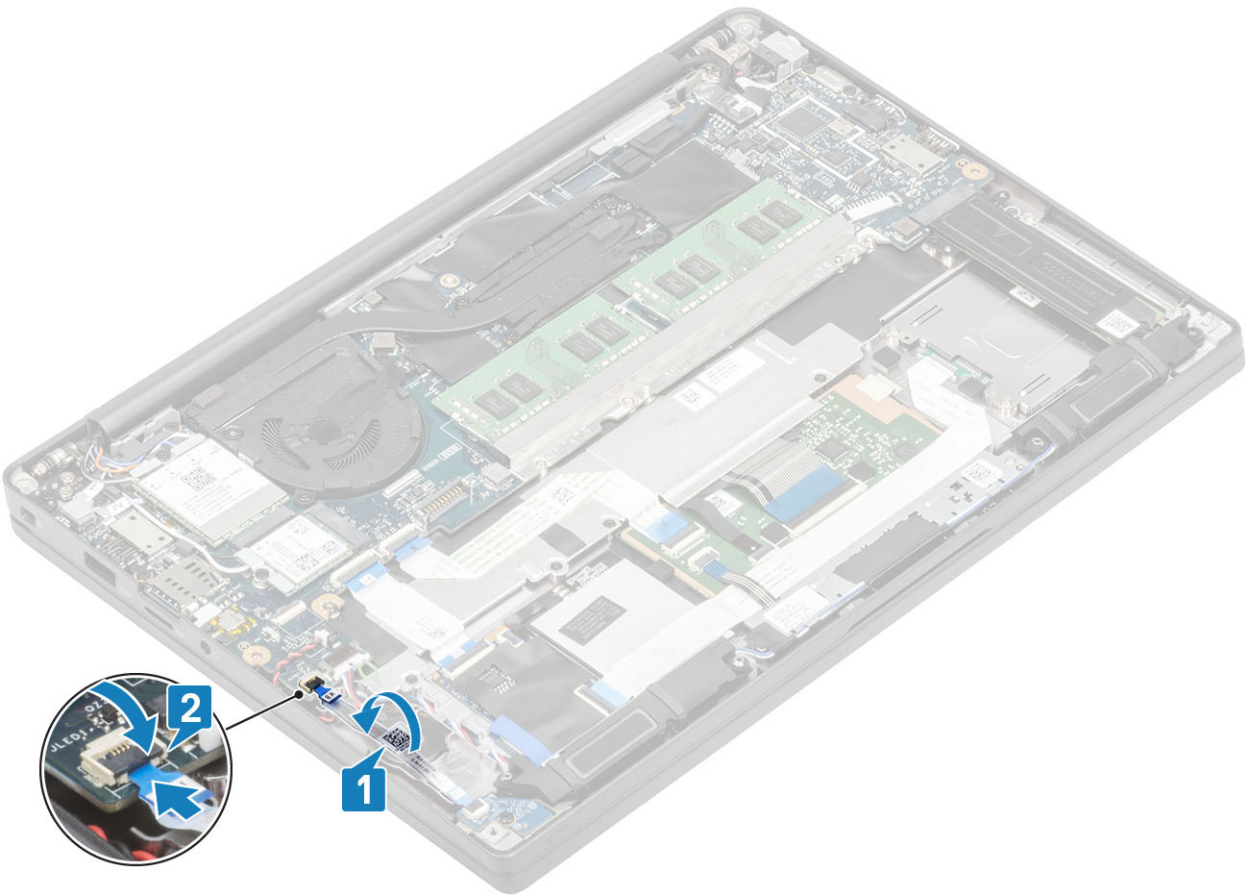
1. Install the battery.
2. Install the base cover.
3. Follow the procedure after working inside your computer.

Memory

Removing the memory

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
1. Pry the clips securing the memory module until the memory module pops-up [1].
2. Lift the memory module away from the connector [2].
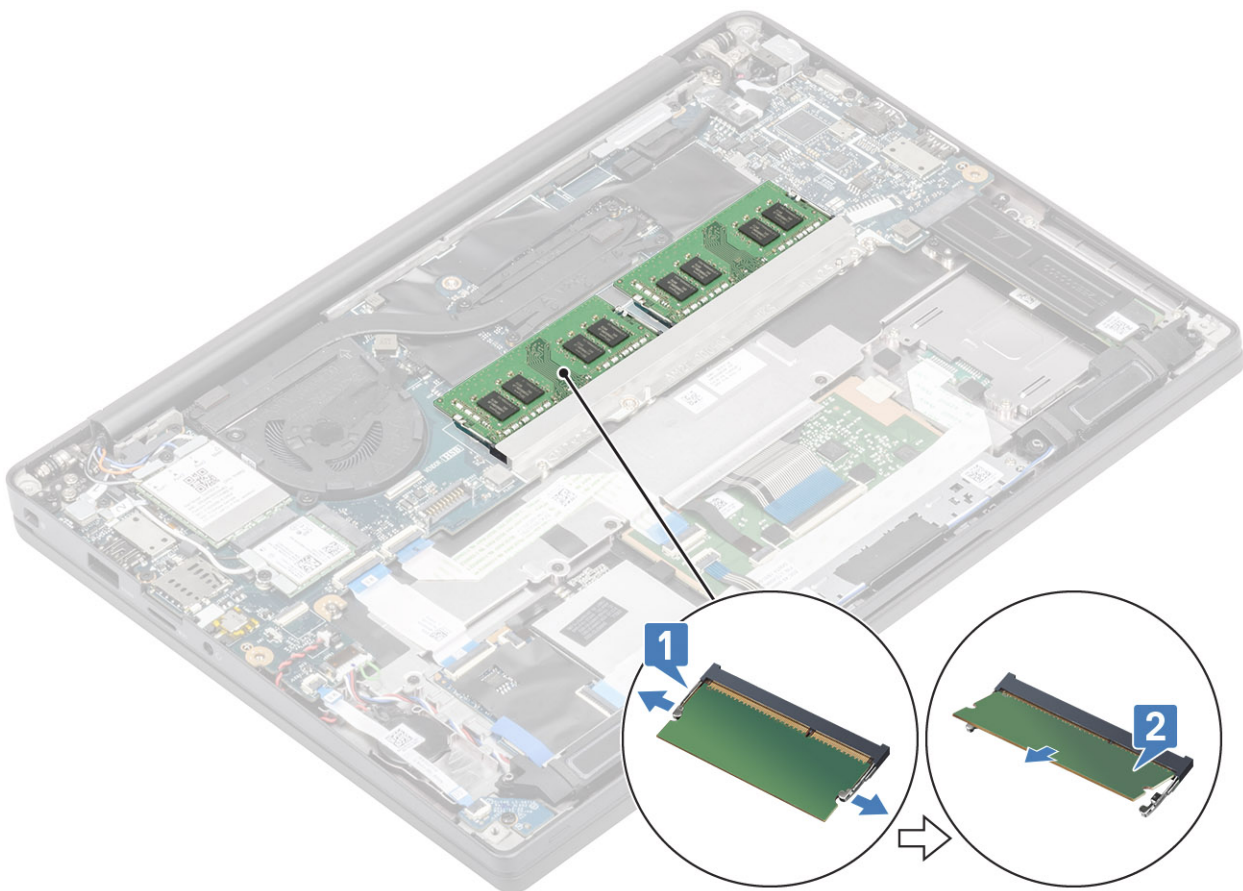
Installing the memory

Insert the memory module on the memory connector until the clips secure the memory module.

1. Install the battery.
2. Install the base cover.
3. Follow the procedure after working inside your computer.

Solid state drive

Removing the solid state drive

1. Follow the procedure in before working inside your computer.
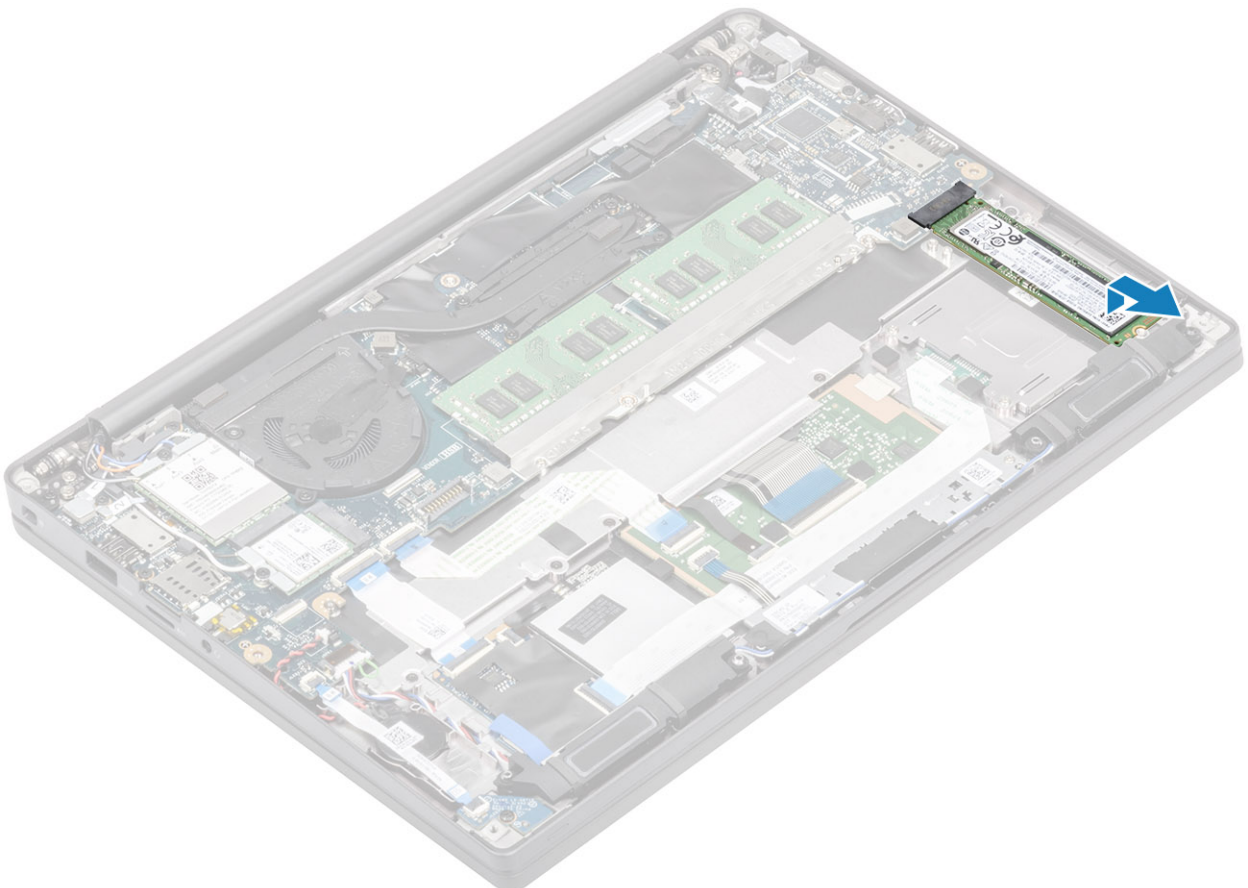2. Remove the base cover.
3. Remove the battery.
1. ⓘ **NOTE:** This procedure illustrates a M.2 2280 SSD. M.2 2230 SSD is secured to the palmrest with special bracket and plate.

   Loosen the three captive screws that secure the SSD bracket to the palmrest [1].
2. Remove the SSD plate from the top of the SSD [2].
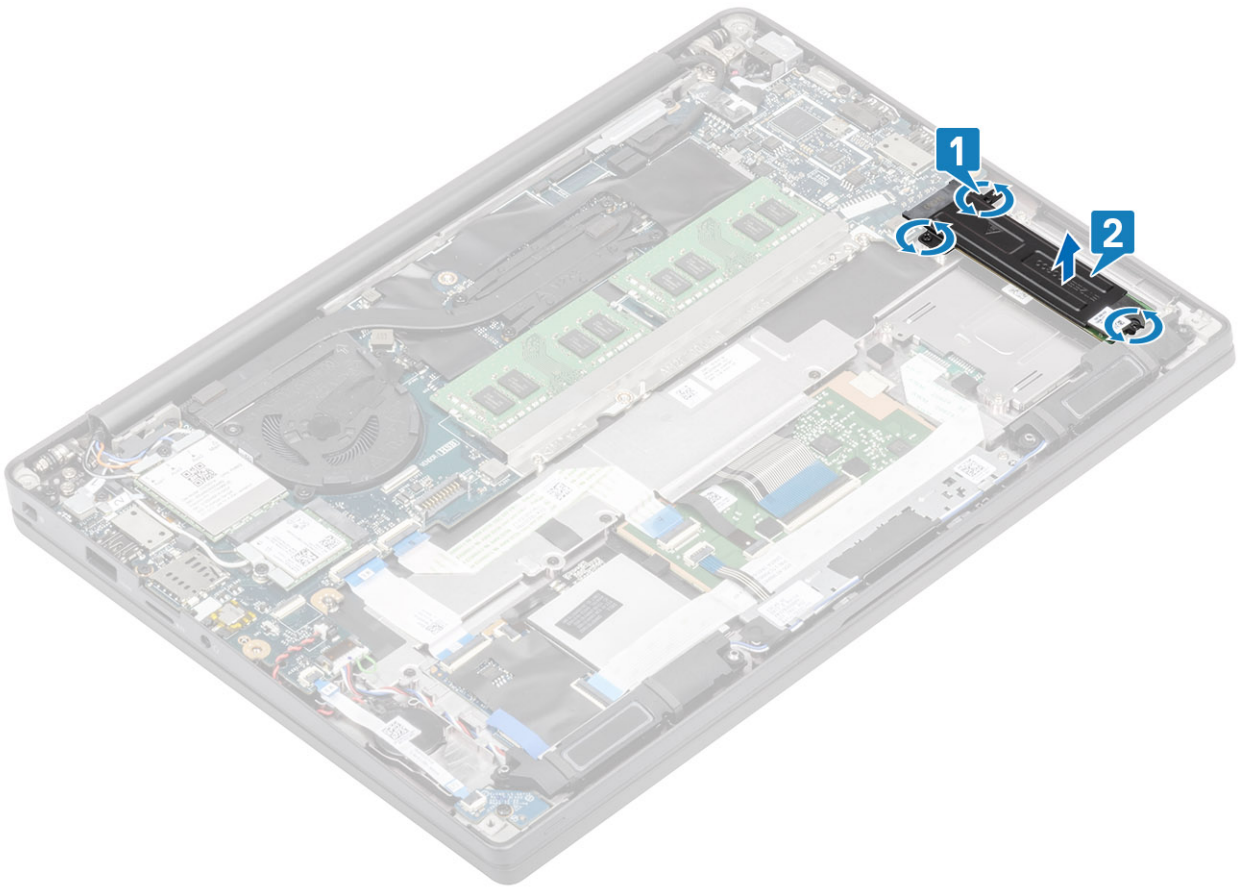
3. Slightly lift and remove the SSD out from its connector on the system board.
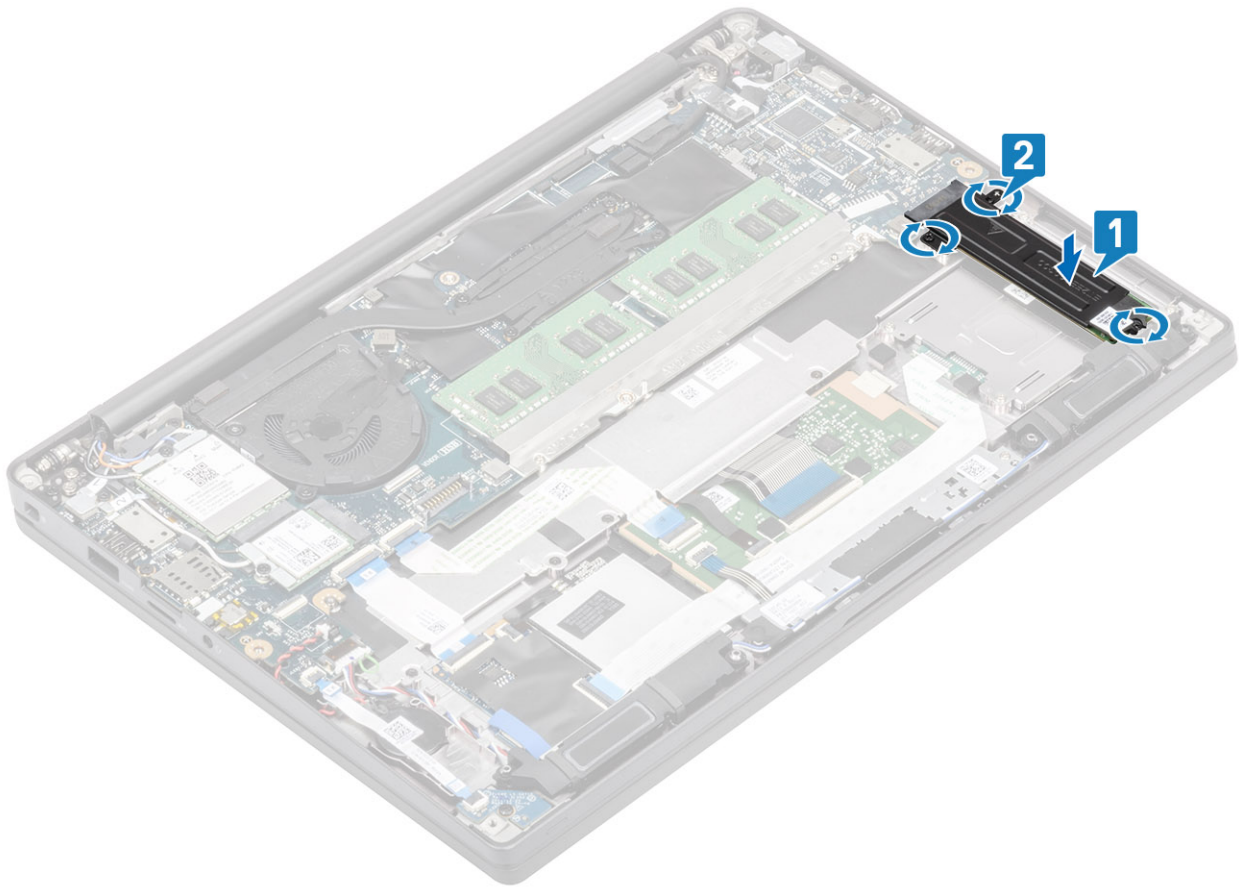
Installing the solid state drive

1. Place the SSD on its slot and slide it to its connector on the system board.
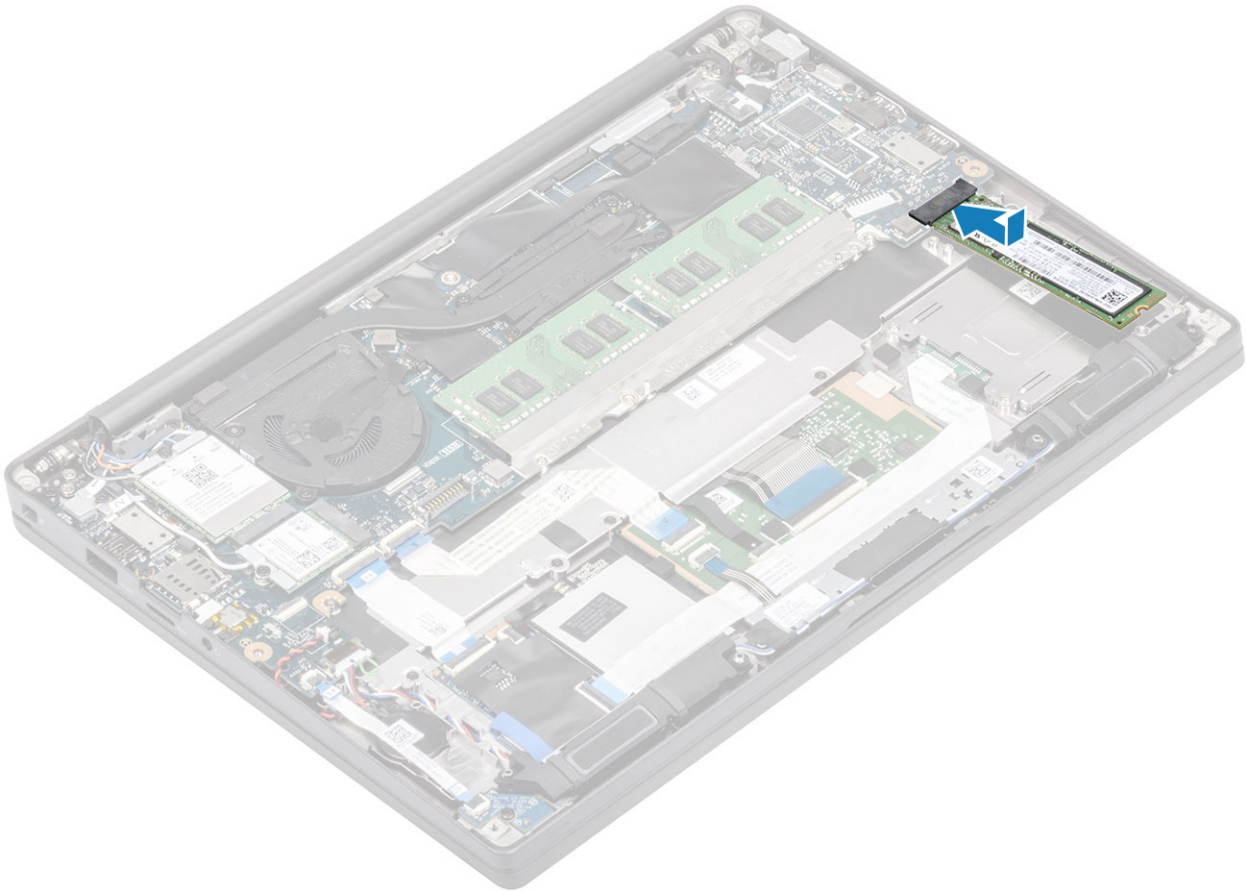
2. Place the SSD plate pre-installed with thermal sticker on the underside over the SSD [1].
3. Tighten the three captive screws to secure the SSD bracket to the palmrest [2].

ⓘ **NOTE:** This procedure illustrates a M.2 2280 SSD. M.2 2230 SSD requires a special bracket and plate to secure it to the palmrest assembly.

1. Install the battery.
2. Install the base cover.
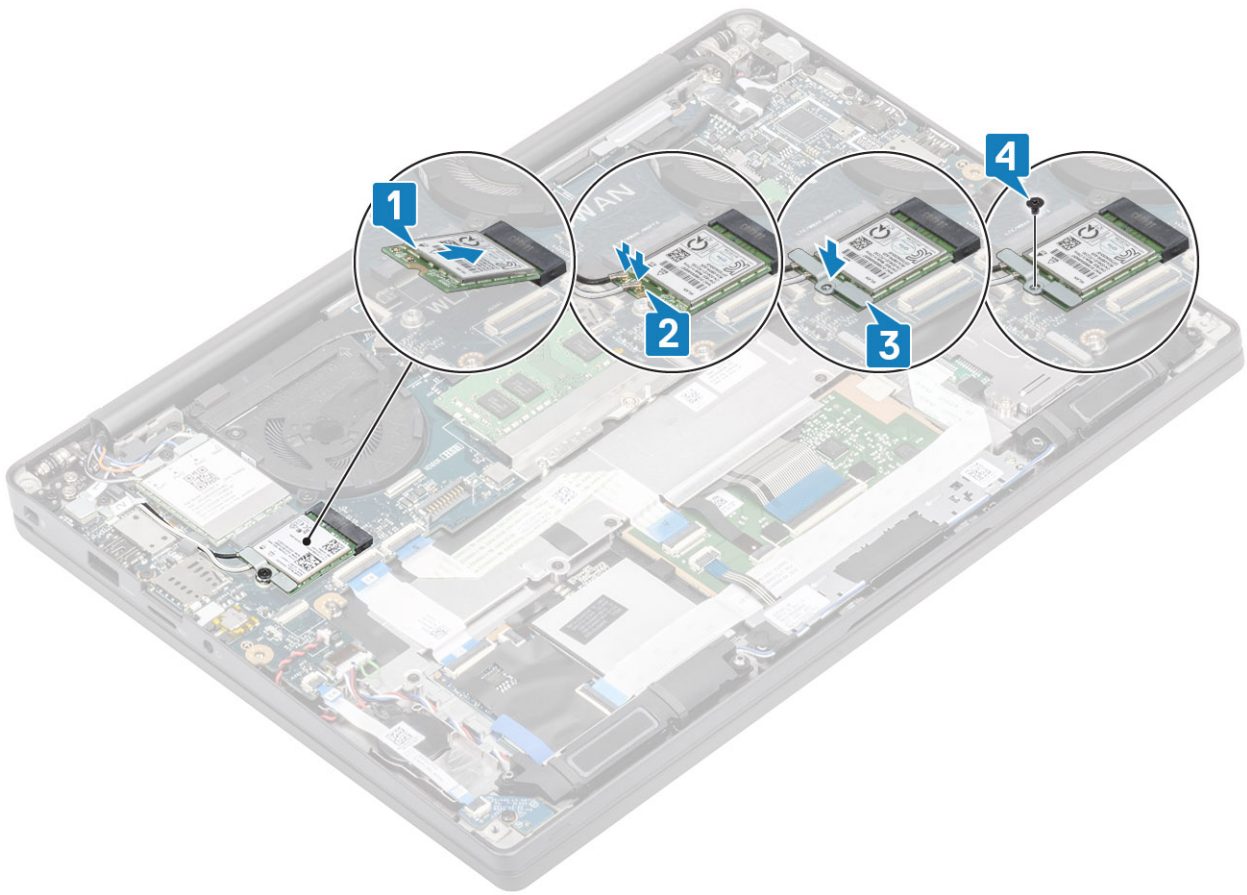3. Follow the procedure after working inside your computer.

WLAN card

Removing the WLAN card

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
1. Remove the single (M2x3) screw that secures the metal bracket to the WLAN card [1].
2. Remove the metal bracket from over the WLAN card antennae connector [2].
3. Disconnect the WLAN antennae cables from its connectors on the WLAN card [3].
4. Sightly lift and slide the WLAN card from the slot on the system board [4].
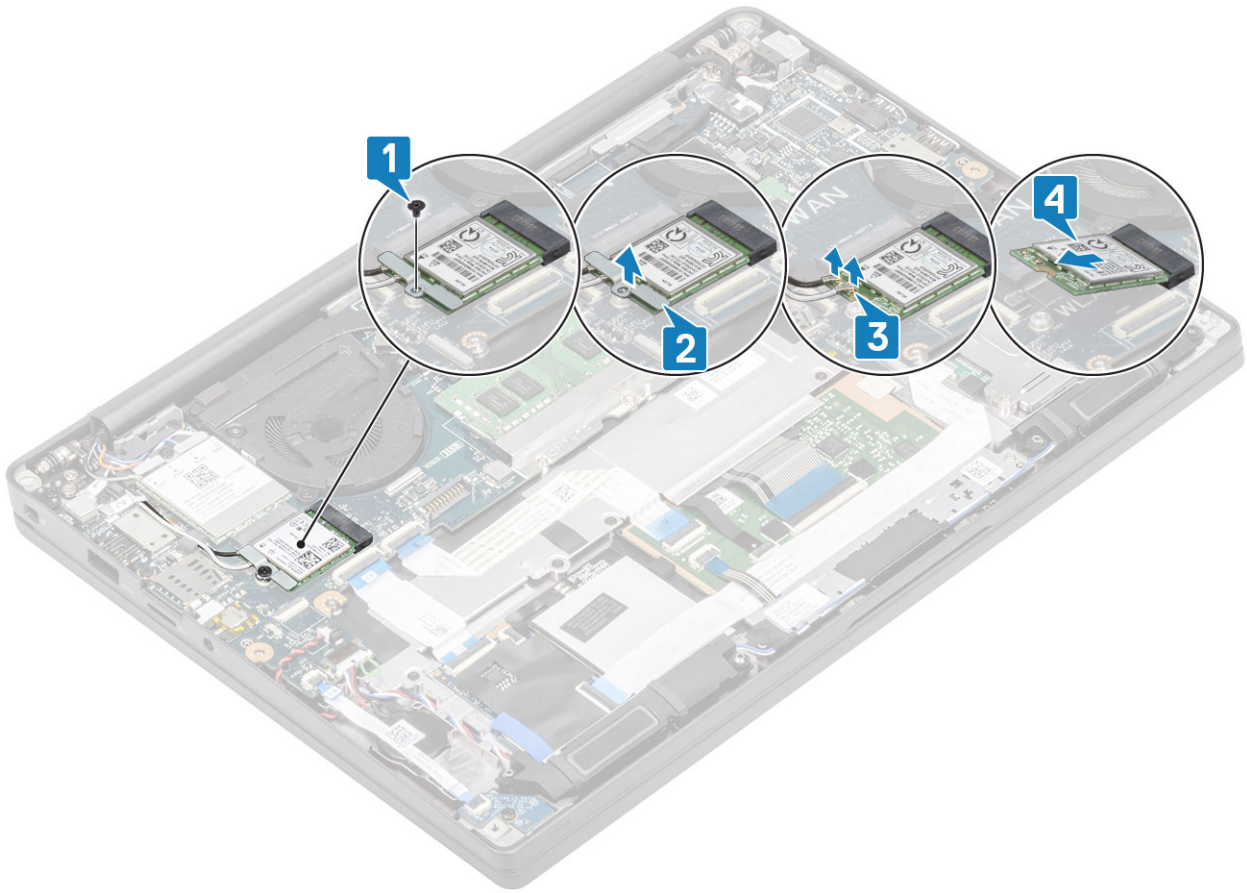
Installing the WLAN card

1. Insert the WLAN card into its slot on the system board [1].
2. Connect the antennae cables to the connectors on the WLAN card [2].
3. Place the metal bracket over the antennae connectors [3].
4. Replace the single (M2x3) screw to secure the metal bracket to the WLAN card and the system board [4].
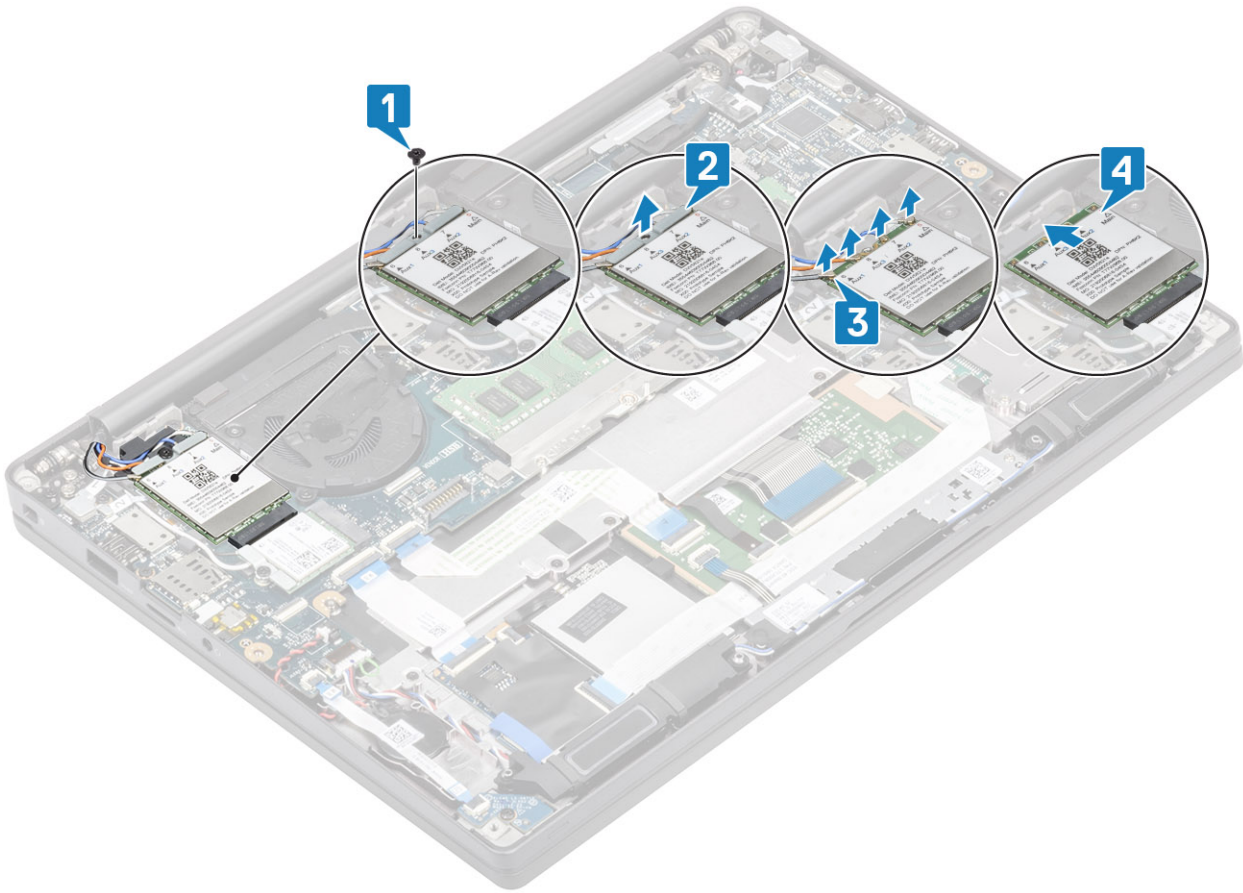
1. Install the battery.
2. Install the base cover.
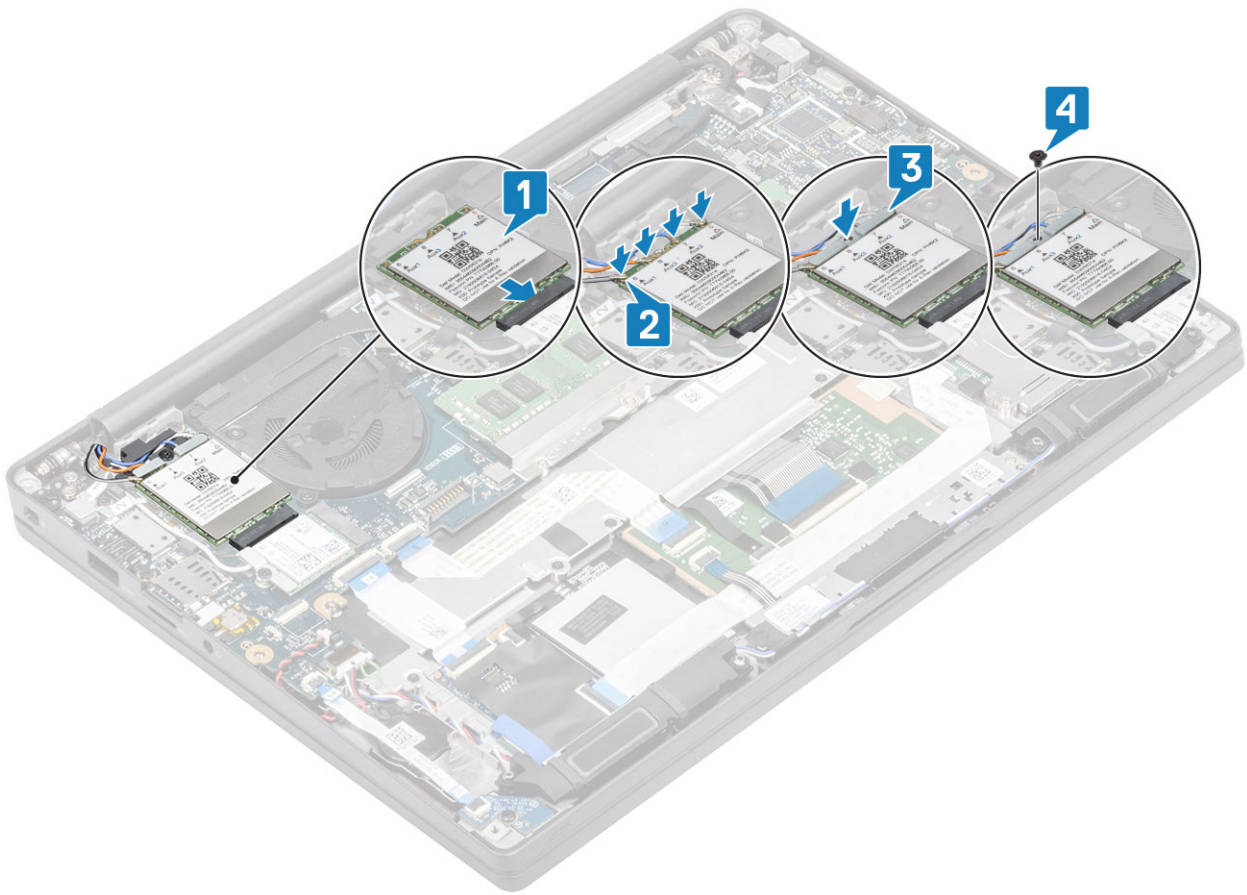3. Follow the procedure after working inside your computer.

WWAN card

Removing the WWAN card

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
1. Remove the single (M2x3) screw that secures the metal bracket to the WWAN card [1].
2. Remove the metal bracket [2] and disconnect the antennae cables from the connectors on the WWAN card [3].
3. Remove the WWAN card from its connector on the system board [4].

Installing the WWAN card

1. Place the WWAN card into its connector on the system board [1].
2. Connect the antennae cables to the connectors on WWAN card [2].
3. Place the metal bracket over the antennae connectors on the WWAN card [3].
4. Replace the single (M2x3) screw to secure the metal bracket to the WWAN card and the system board [4].

1. Install the battery.
2. Install the base cover.
3. Follow the procedure after working inside your computer.

Heatsink

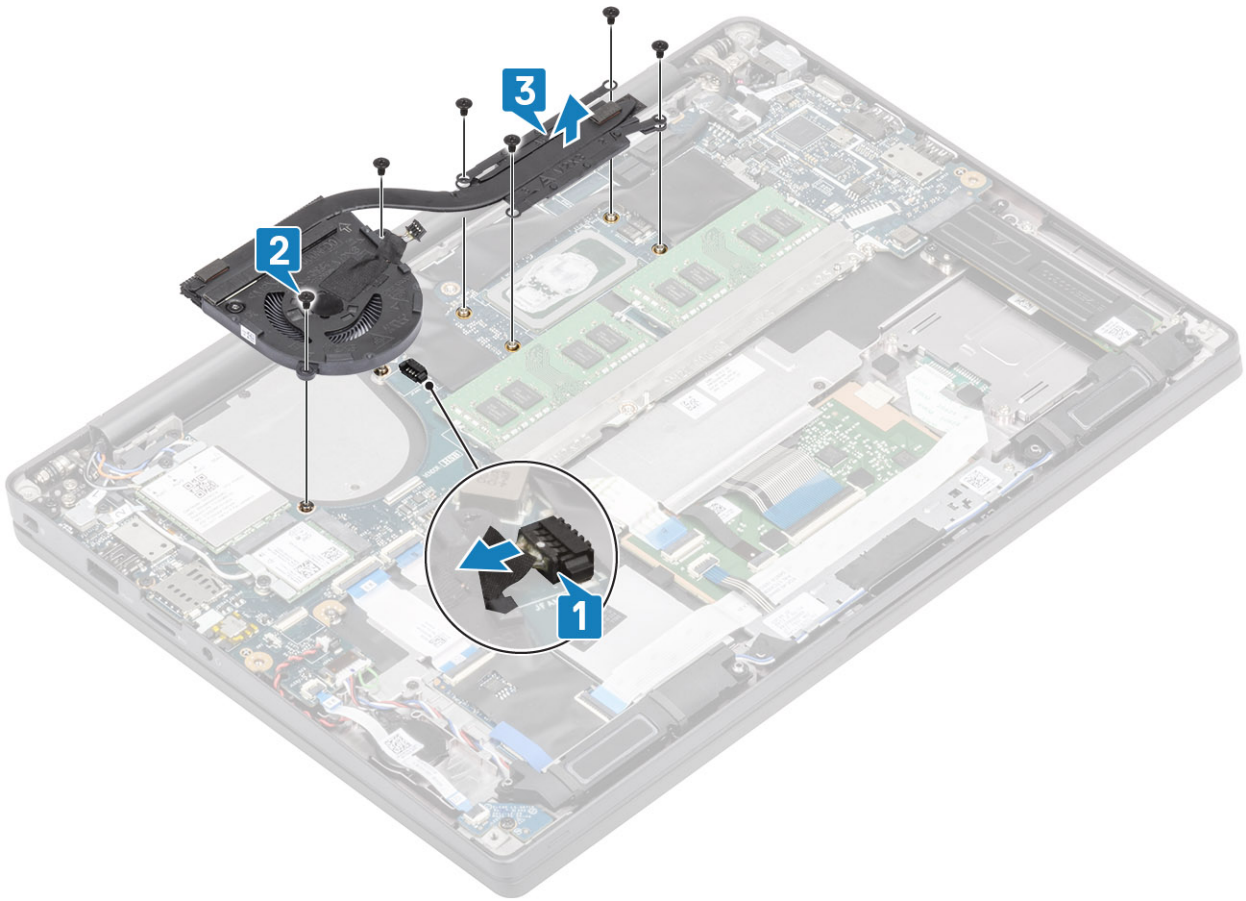## Removing the heatsink fan assembly

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the WWAN card.
1. (i) **NOTE:** Heatsink and Fan are separately orderable parts.

   Disconnect the fan cable from the connector on the system board [1].
2. Remove the two (M2x3) screws in sequence (2 > 1) on the fan case and four (M2x3) screws in sequence (4 > 3 > 2 > 1) from the heatsink [2].
3. Lift and remove the heatsink fan assembly from the computer [3].

4. Remove the single screw securing the fan to heatsink.

Installing the heatsink assembly

1. (i) **NOTE:** Heatsink and Fan are separately orderable parts.

   Install the single screw securing the fan to the heatsink.

2. Place the heatsink fan assembly in the computer [1].
3. Replace the two (M2x3) screws in sequence (2 > 1) on fan case and four (M2x3) screws in sequence (4 > 3 > 2 > 1) on the heatsink fan assembly [1].
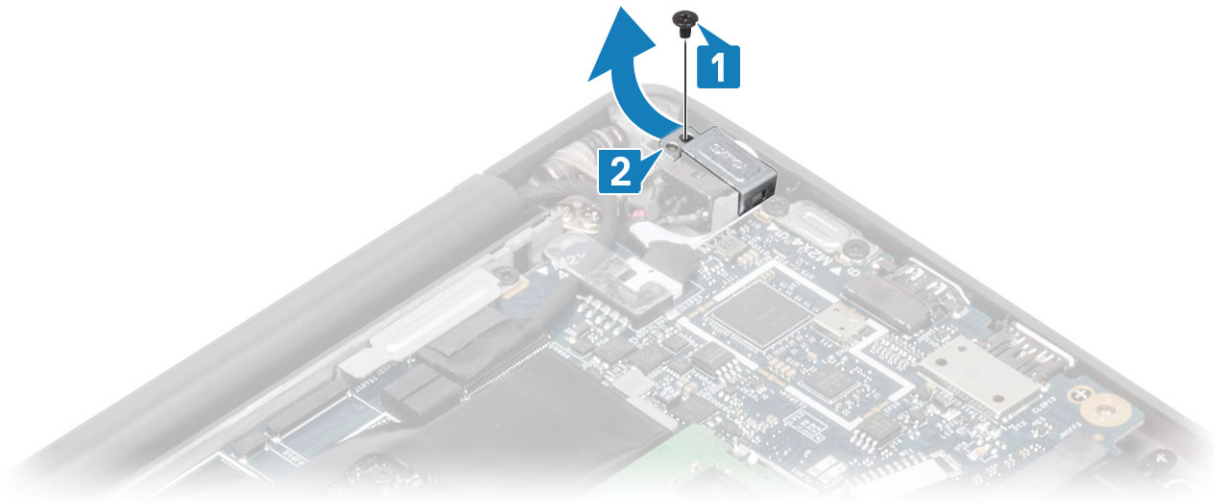4. Connect the fan cable to the system board [2].
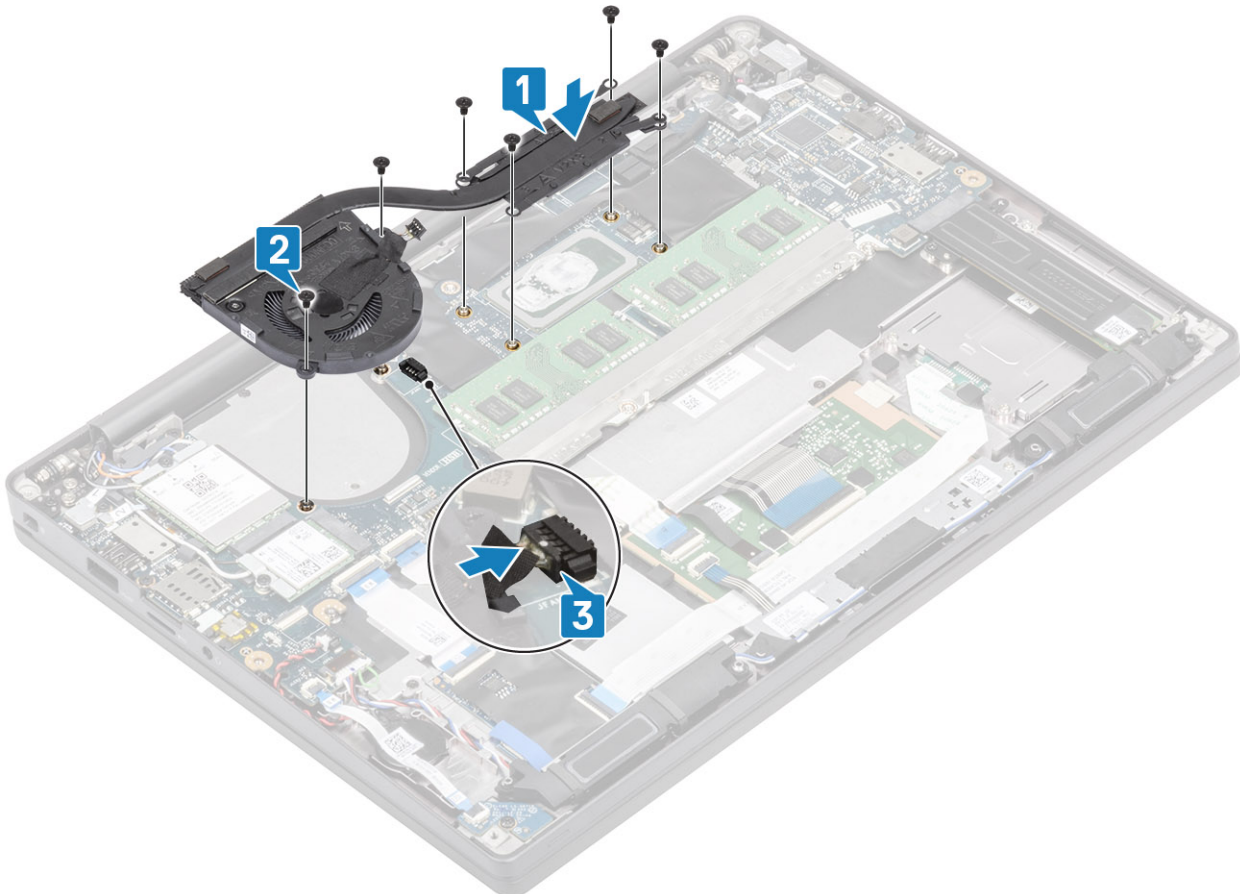
1. Install the WWAN card.
2. Install the battery.
3. Install the base cover.
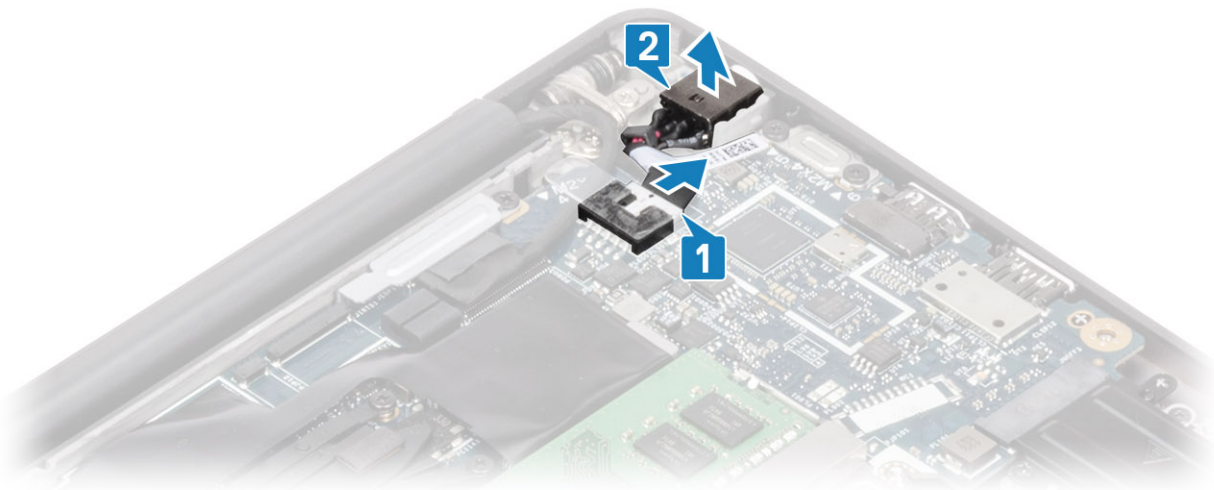4. Follow the procedure after working inside your computer.

Power adapter port

Removing the power adapter port

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
1. Remove the single (M2x3) screw from the metal bracket on the power adapter port [1].
2. Remove the metal bracket that secures the power adapter port [2].

3. Disconnect the power adapter port cable from the system board [1].
4. Lift and remove the power adapter port from its slot in the palmrest [2].
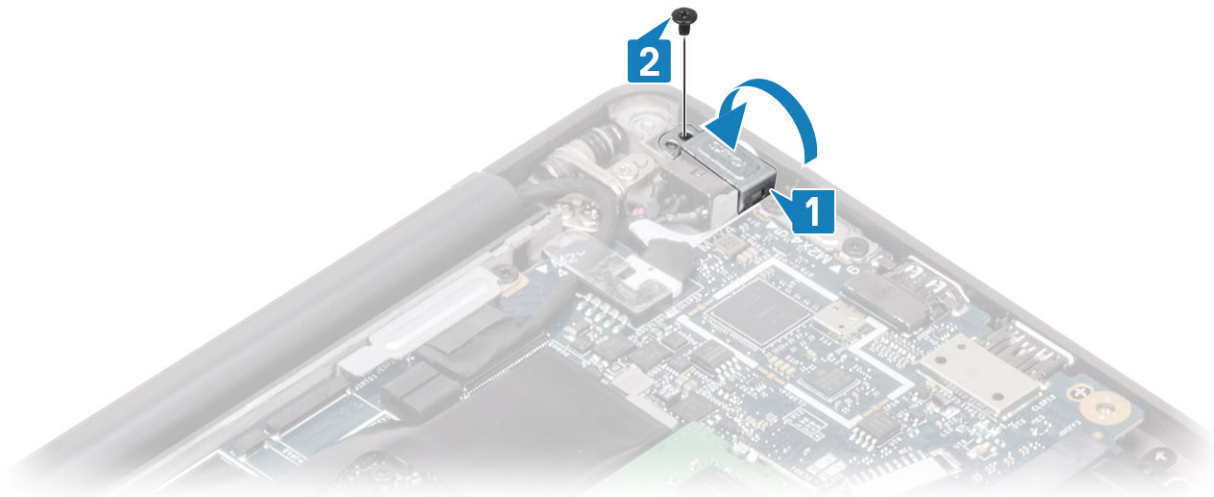
Installing the power adapter port

1. Connect the power adapter port cable to its connector on the system board [1].
2. Place the power adapter port into its slot on the palmrest [2].
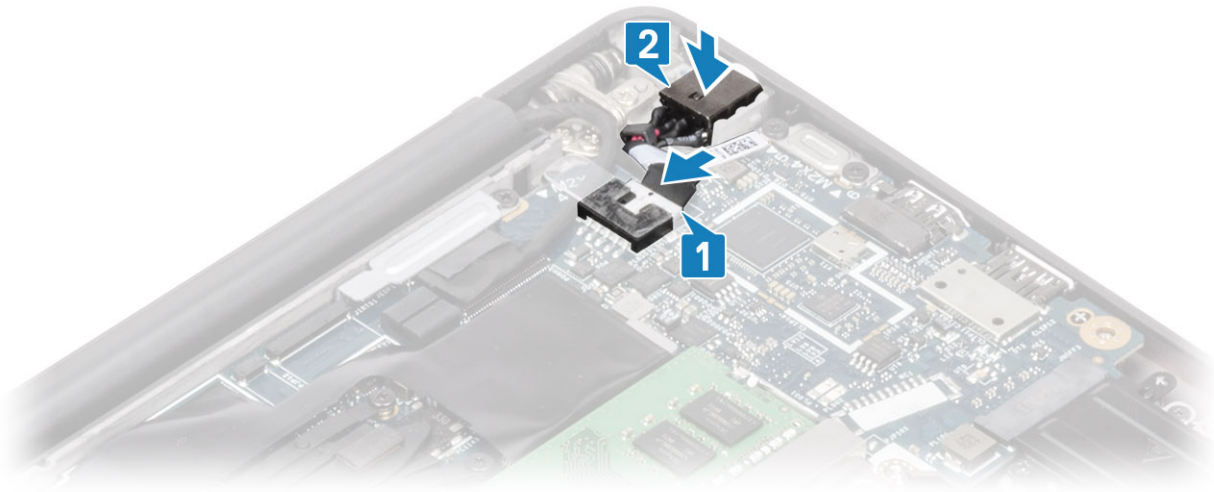
3. Replace the metal bracket over the power adapter port [1].
4. Replace the single (M2x3) screw to secure the power adapter port to the palmrest assembly [2].
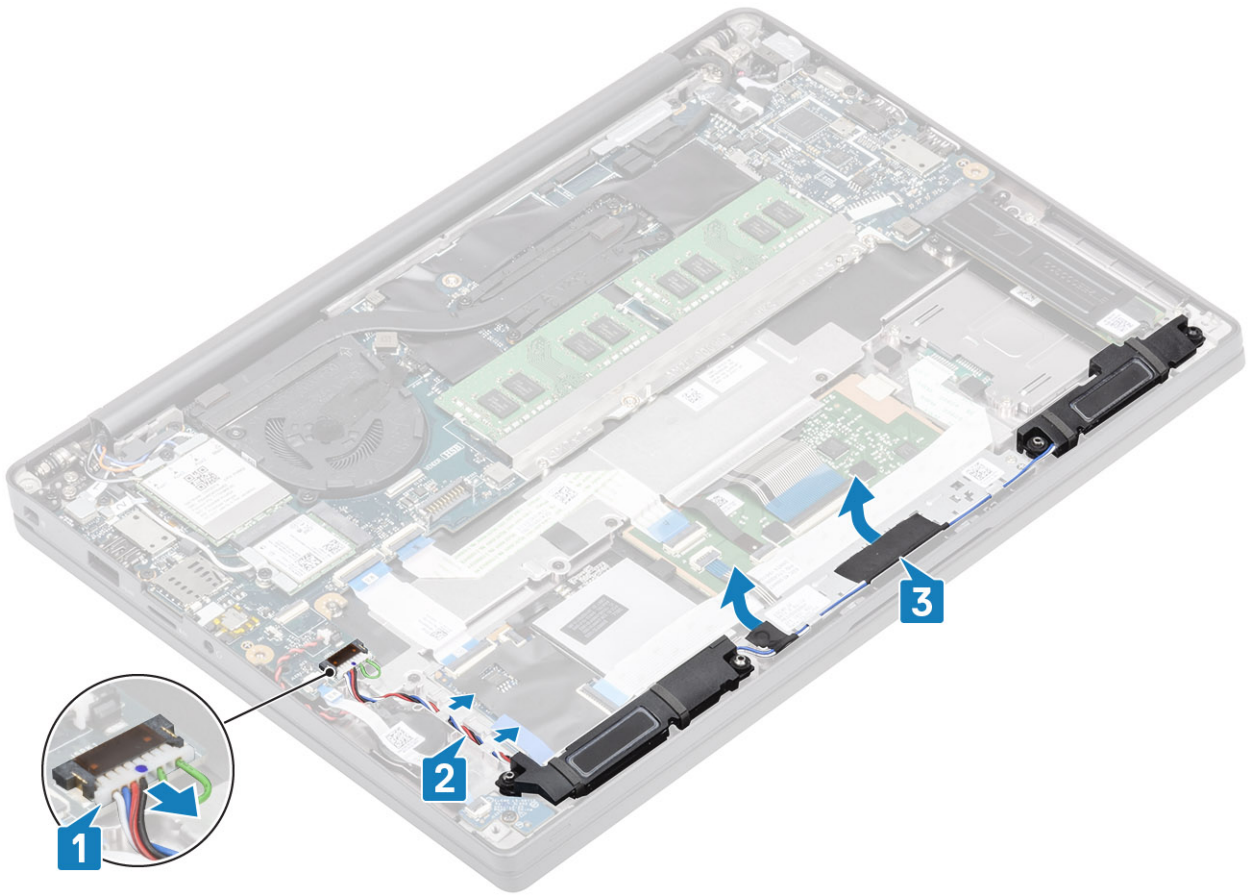

1. Install the battery.
2. Install the base cover.
3. Follow the procedure after working inside your computer.

Speakers
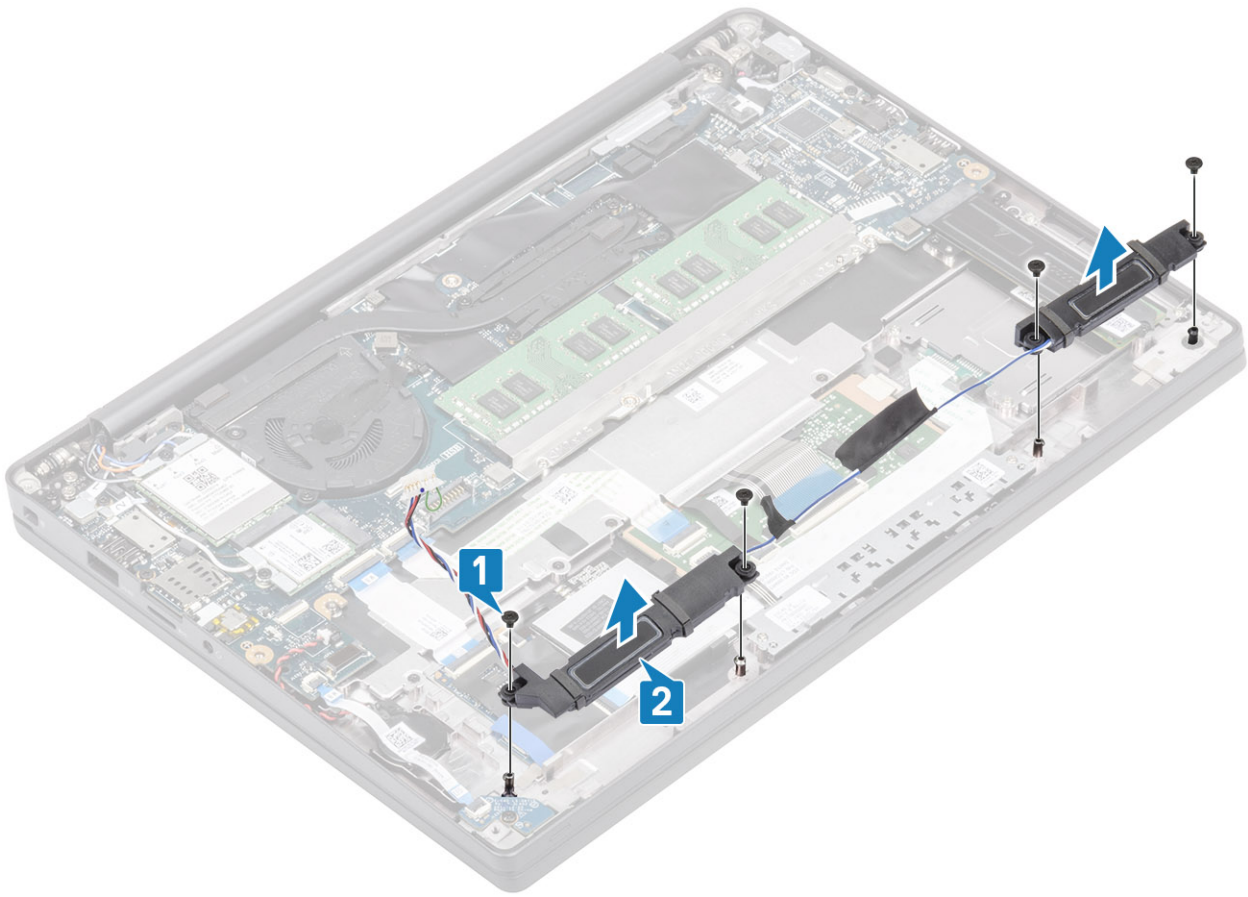
Removing the speakers

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
1. Disconnect the speaker cable from its connector on the system board [1].
2. Unroute the speaker cable from the routing channel near the coin cell [2].
3. Peel back the tape securing the speaker cable to the touchpad button board [3].
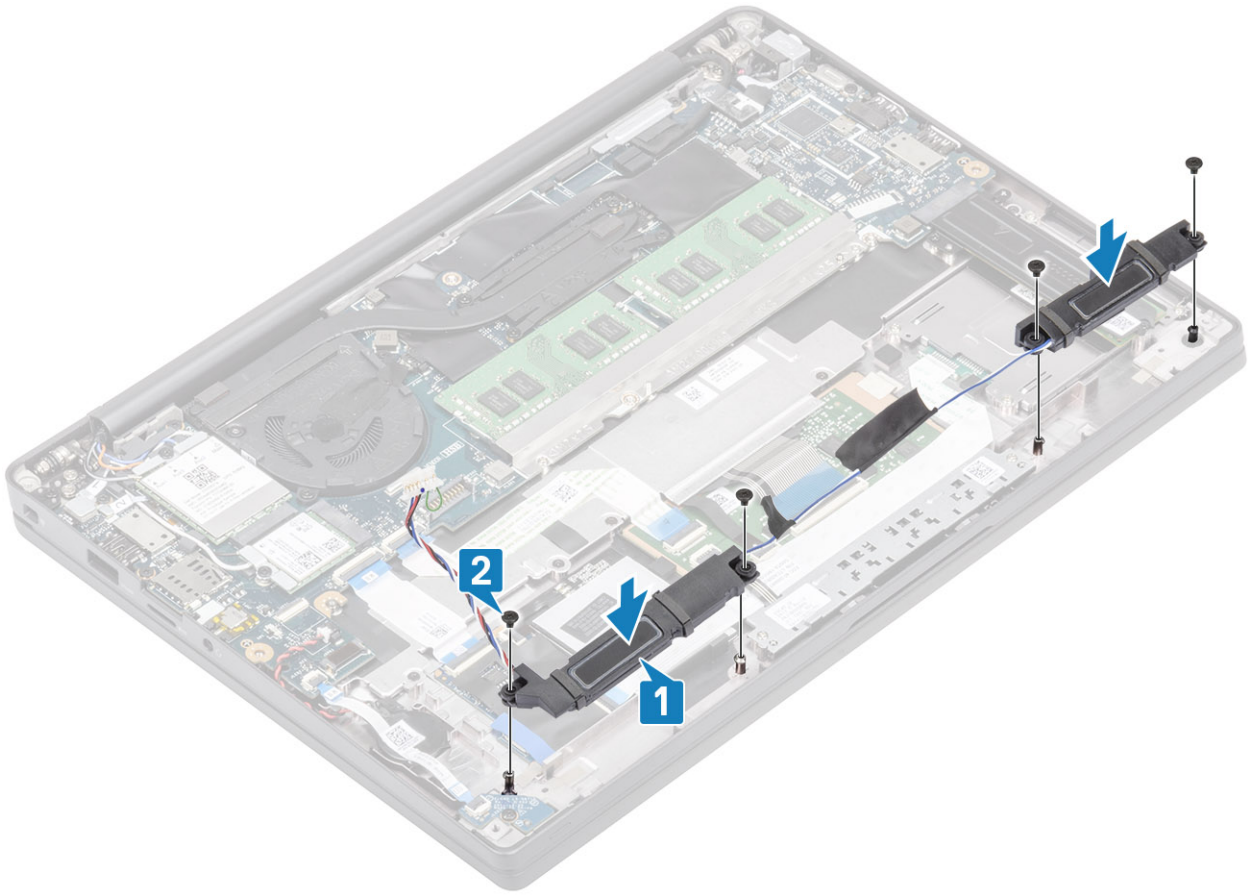
4. Remove the four (M2x3) screws securing the speakers to the palmrest assembly [1].
5. Lift and remove the speakers from the palmrest assembly [2].

Installing the speakers

1. Align and place the speakers into the palmrest assembly [1].
2. Replace the four (M2x3) screws to secure the speakers to the palmrest assembly [2].

3. Adhere the tape to secure the speaker cable on the touchpad button board [1].
4. Route the speaker cable [2] and connect the speaker cable to the connector on the system board [3].
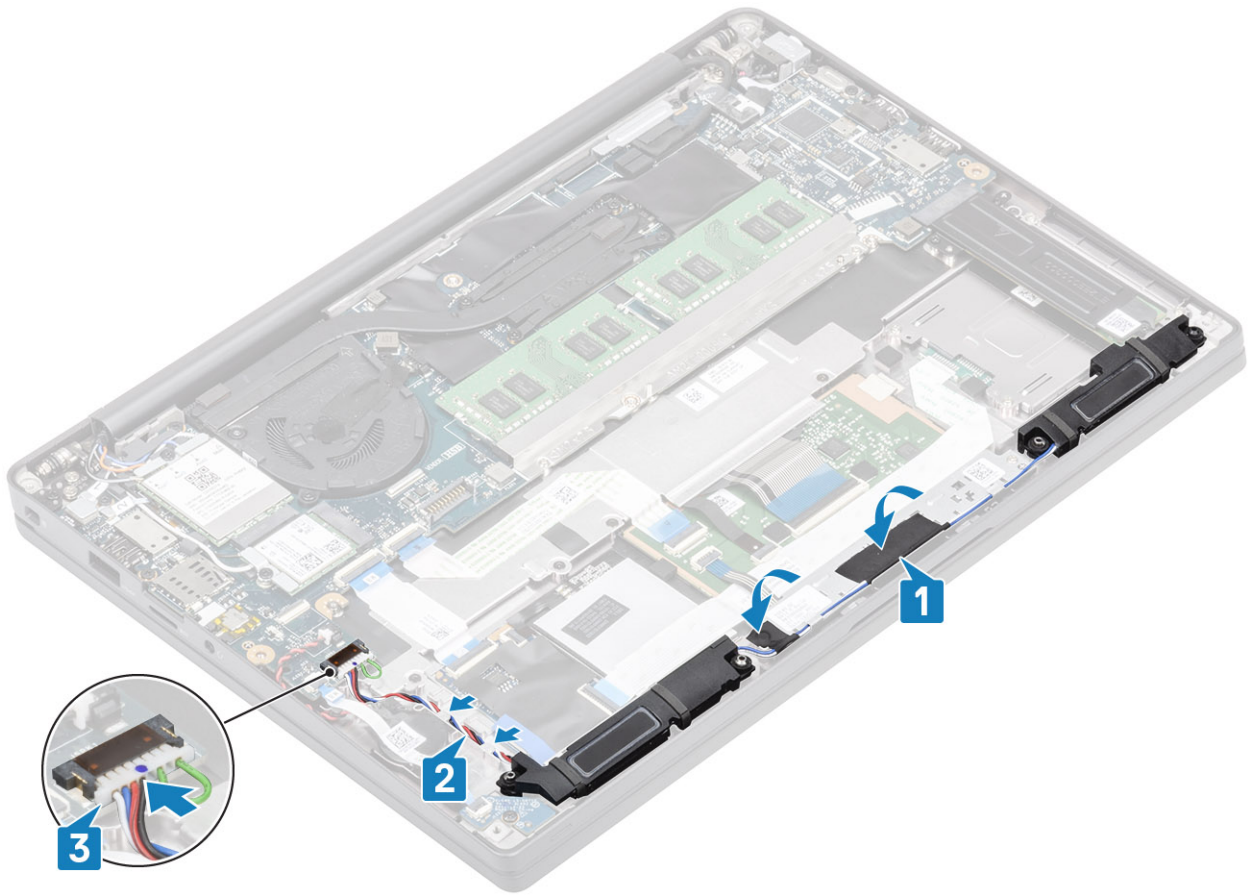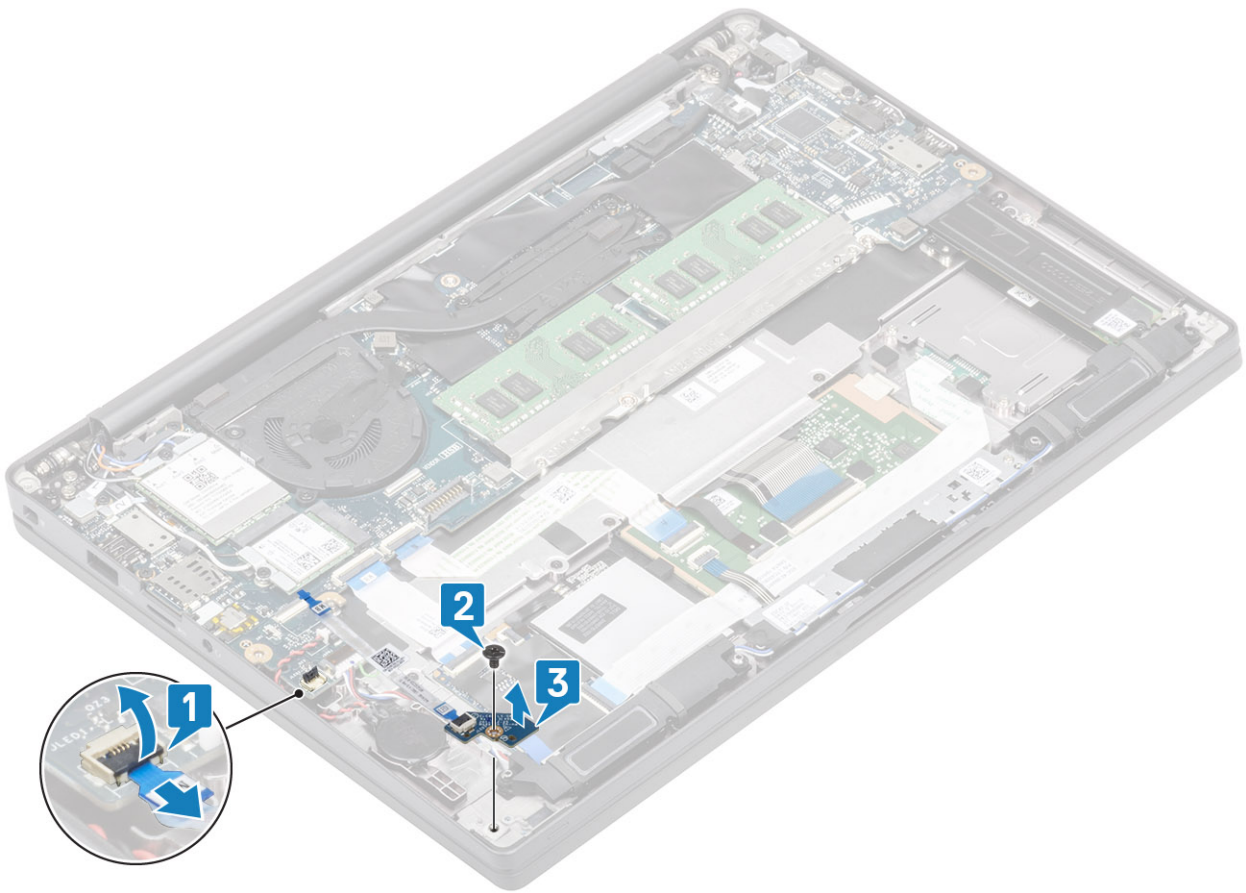
1. Install the battery.
2. Install the base cover.
3. Follow the procedure after working inside your computer.

LED board
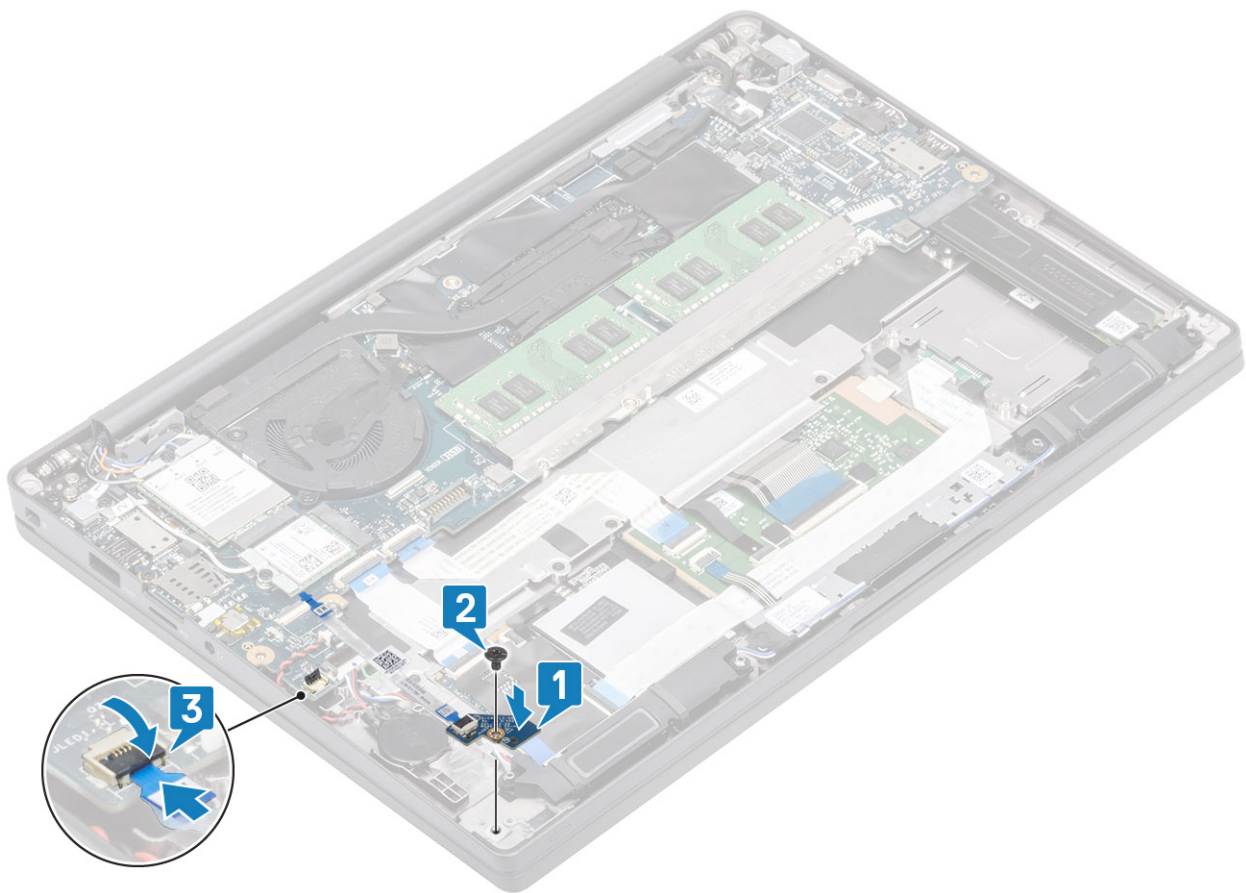
Removing the LED daughterboard

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
1. Disconnect the LED board ribbon cable from the connector on the system board [1].
2. Remove the single (M2x3) screw [2] and lift the LED daughterboard from the palmrest assembly [3].

Installing the LED daughterboard

1. Align and place the LED daughterboard on the palmrest assembly [1].
2. Replace the single (M2x3) screw securing the LED daughterboard to the palmrest assembly [2].
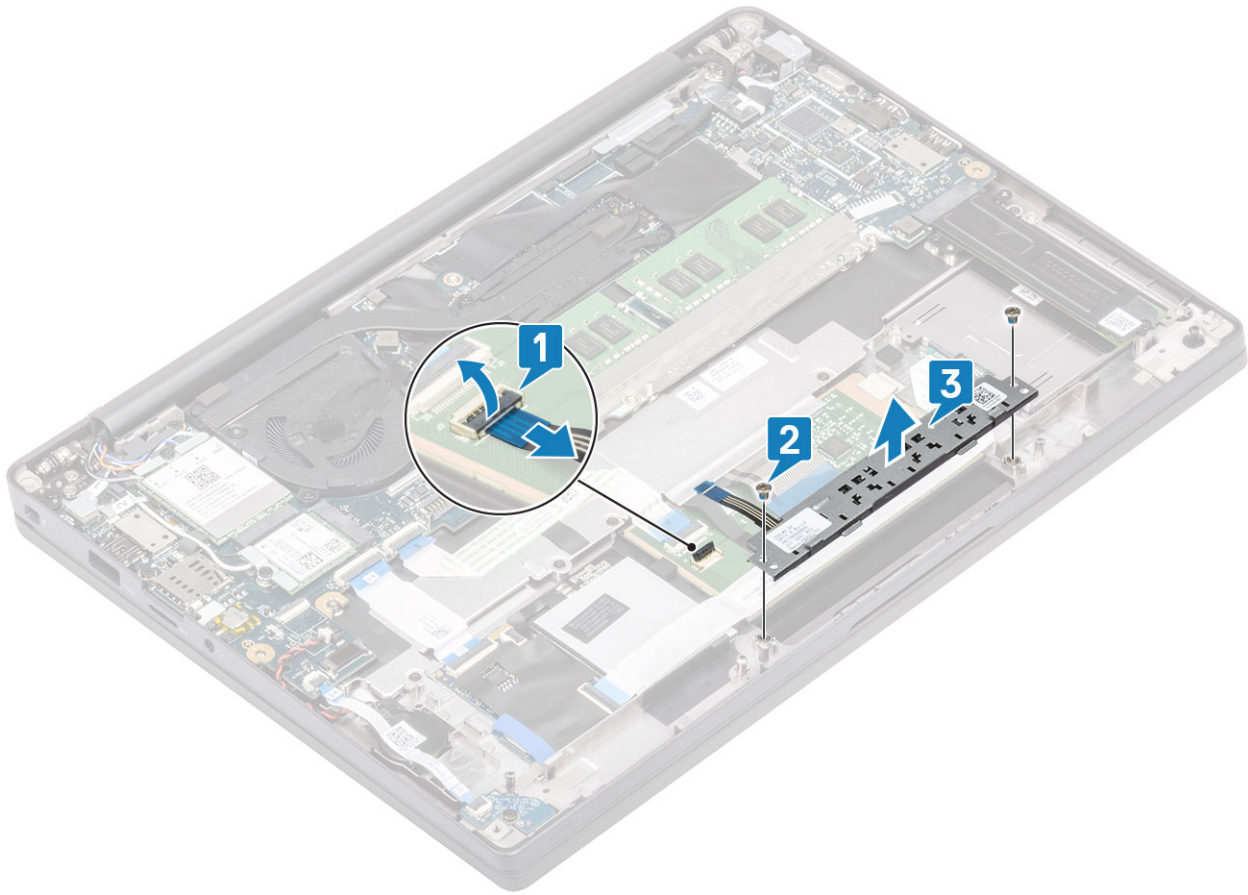3. Connect the LED daughterboard ribbon cable to the system board [3].

1. Connect the speaker cable
2. Install the battery.
3. Install the base cover.
4. Follow the procedure after working inside your computer.

Touchpad button board

Removing the touchpad button board

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the speaker.
1. Disconnect the touchpad button board cable from the touchpad module [1].
2. Remove the two (M2x2.5) screws that secures touchpad button board to the palmrest assembly [2].
3. Remove the touchpad button board from the palmrest assembly [3].

Installing the touchpad button board

1. Place the touchpad button board on the palmrest assembly [1].
2. Replace the two (M2x2.5) screws to secure it to the palmrest assembly [2].
3. Connect the touch pad button board cable to the touchpad module [3].

1. Install the speaker.
2. Install the battery.
3. Install the base cover.
4. Follow the procedure after working inside your computer.

Smart card reader
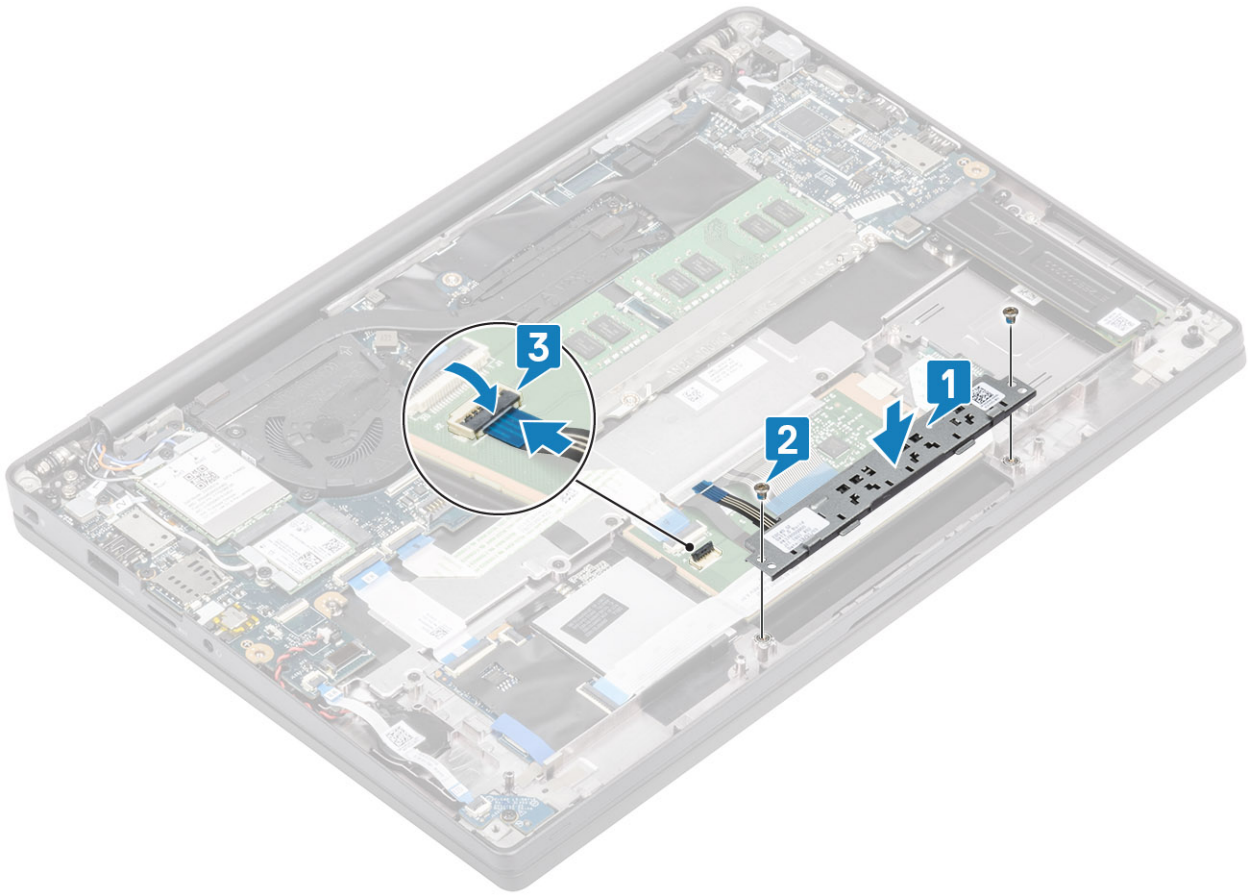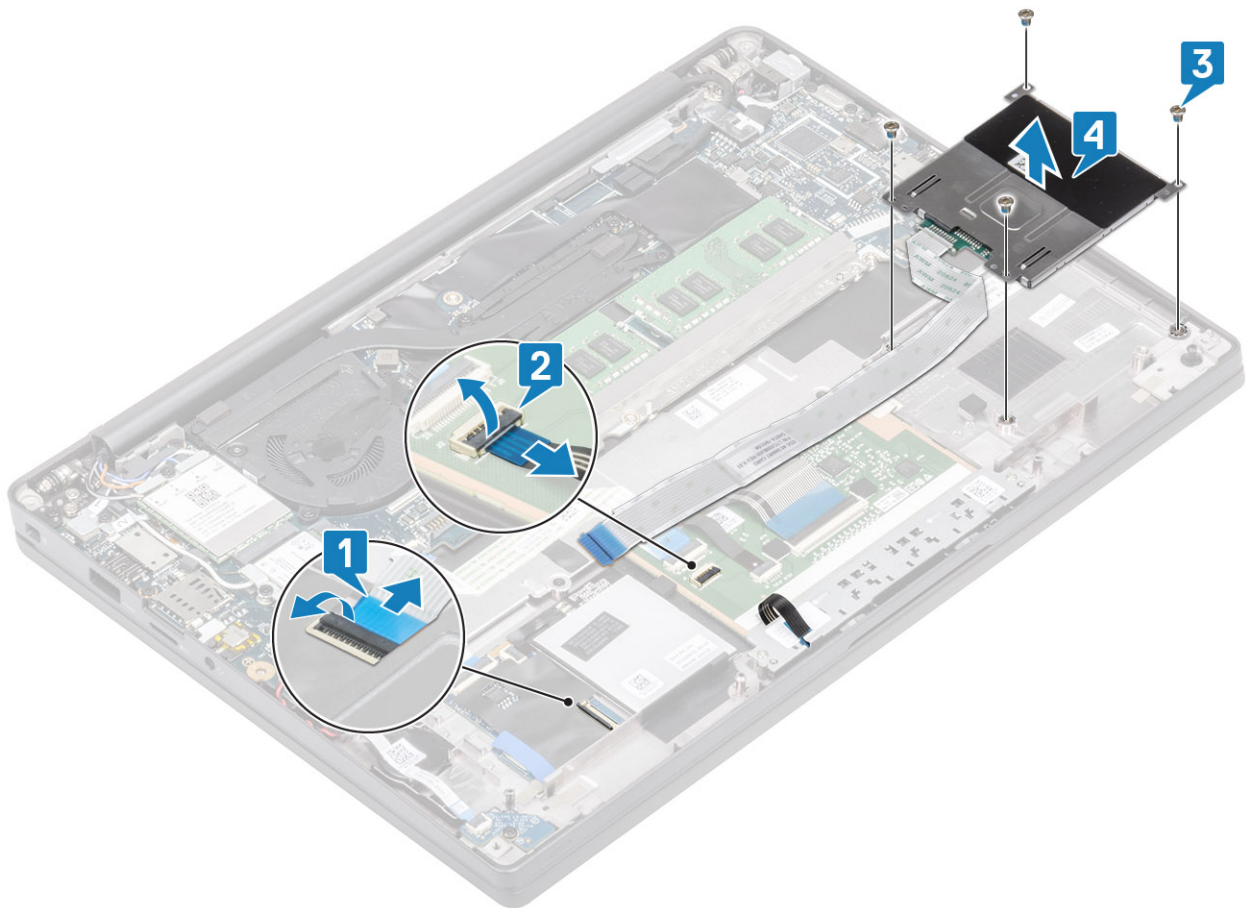
Removing the smart card reader

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the SSD.
5. Remove the speaker.
1. Disconnect the smart card reader cable from the USH board [1].
2. Disconnect the touchpad button cable from the tocuhpad module [2].
3. Remove the four (M2x2.5) screws securing the smart card reader to the palmrest assembly [3].
4. Remove the smart card reader from the computer [4].

Installing the smart card reader

1. Replace the smart card reader into its slot on the palmrest assembly [1].
2. Replace the four (M2x2.5) screws securing it to the palmrest assembly [2].
3. Connect the touchpad button board cable to the touchpad module [3].
4. Connect the smart card reader cable to the USH board [4].

1. Install the speakers.
2. Install the SSD.
3. Install the battery.
4. Install the base cover.
5. Follow the procedure after working inside your computer.

Display assembly

Removing the display assembly
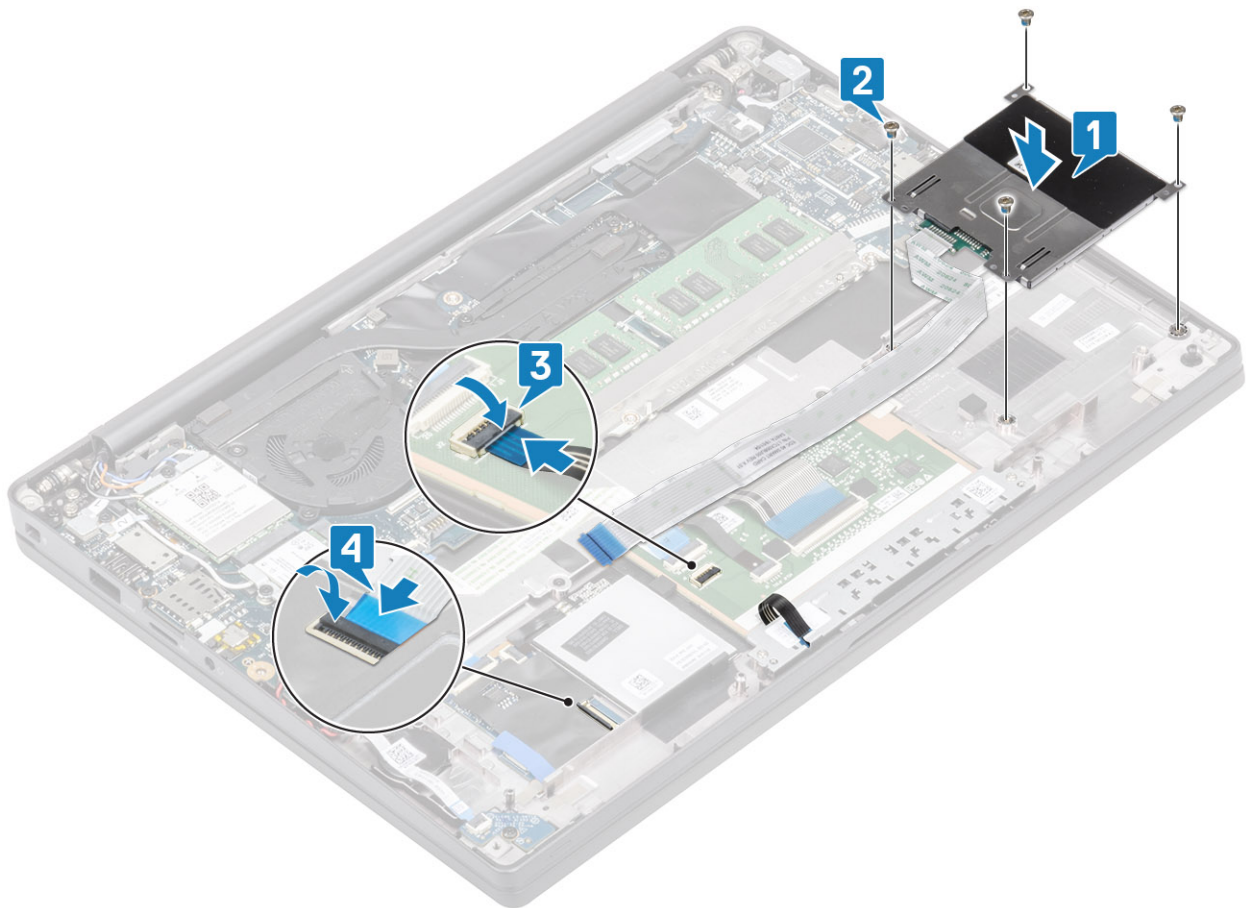
1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
1. Remove the single (M2x4) screw [1] that secures the display cable metal bracket to the system board.
2. Lift and remove the metal bracket [2] to disconnect the display cable from the connector on the system board [3].
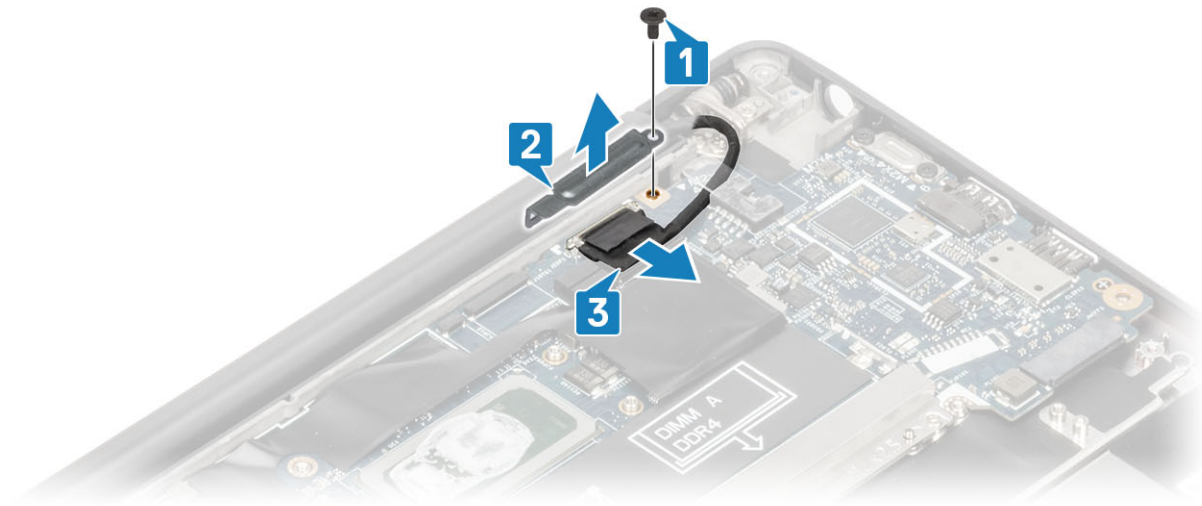
3. Lift the display cable [1] and unroute it from the metal bracket on the system board [2].
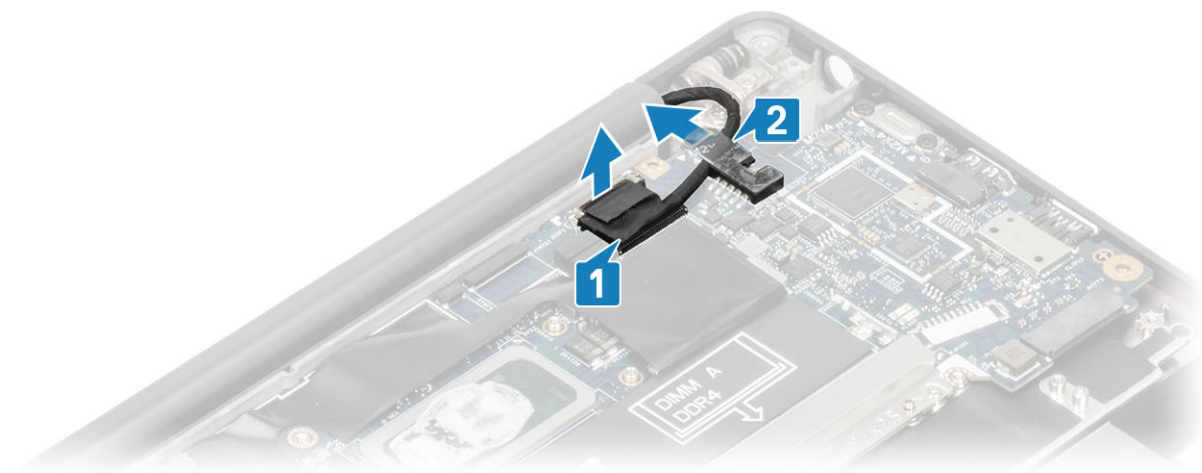
4. Open the display lid 180 degrees.
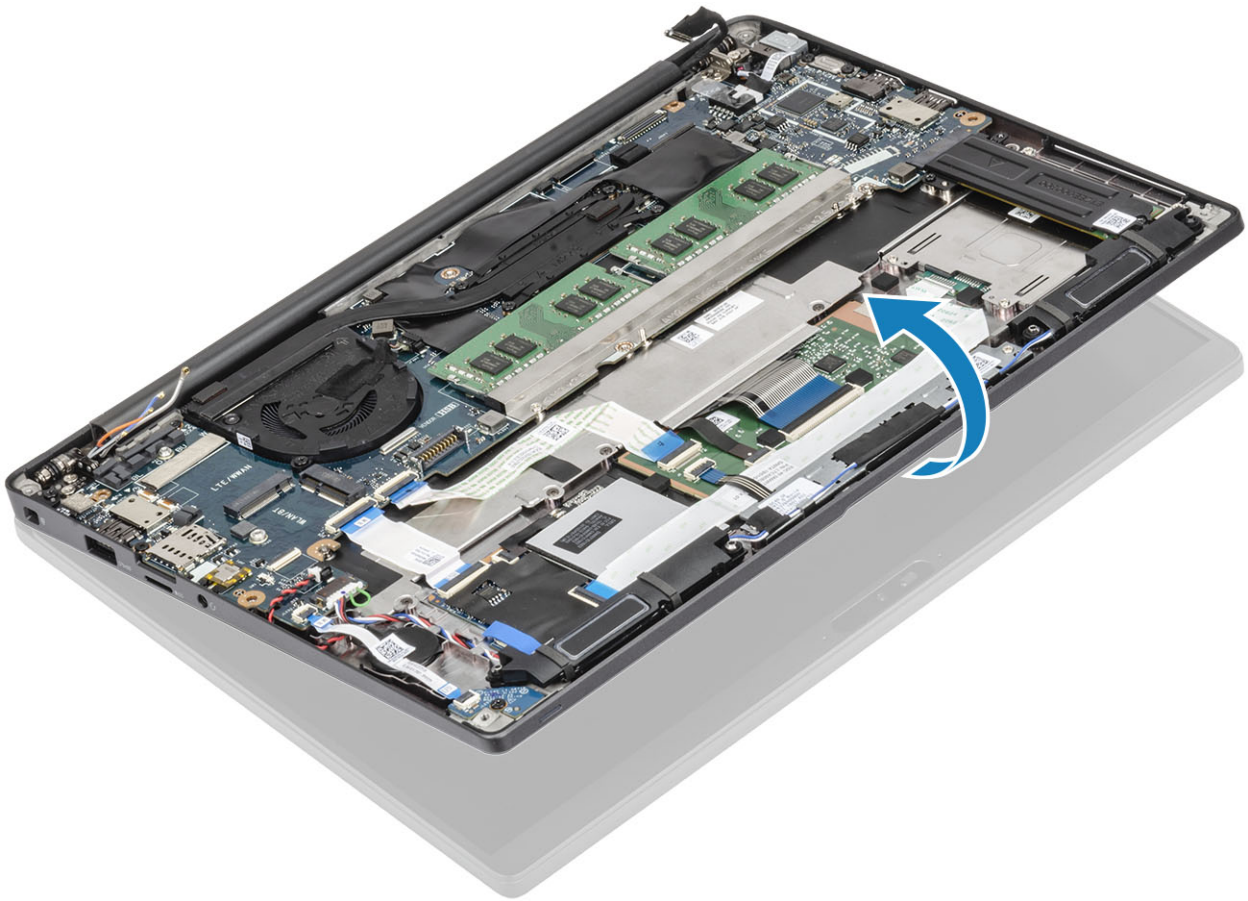
5. Remove the six (M2.5x4) screws [1] and remove the display assembly from the palmrest assembly [2].
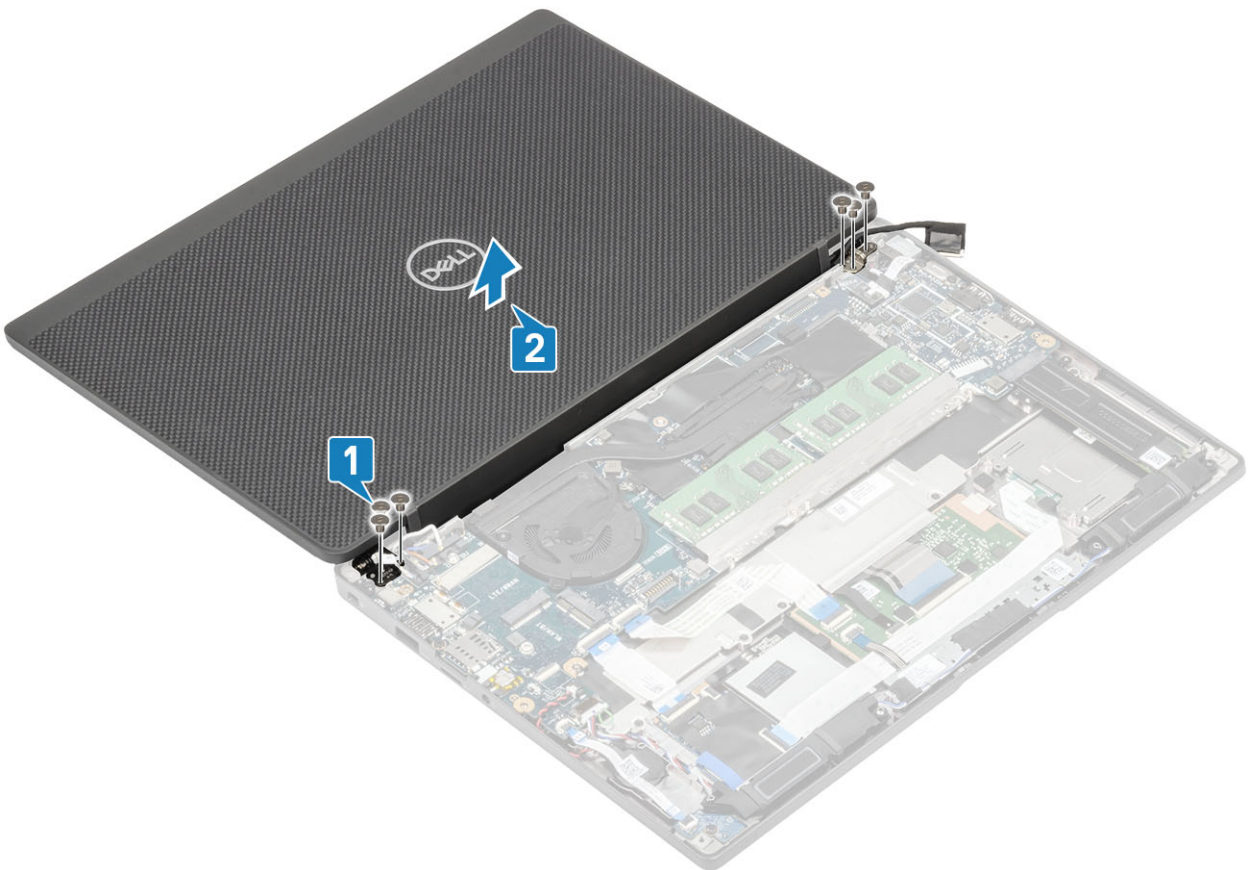
Installing the display assembly

1. Replace the display assembly aligning the screw holes on the hinges with the screw holes on the palmrest assembly [1].
2. Replace the six (M2.5x3.5) screws [2] to secure the display assembly to the computer [2].
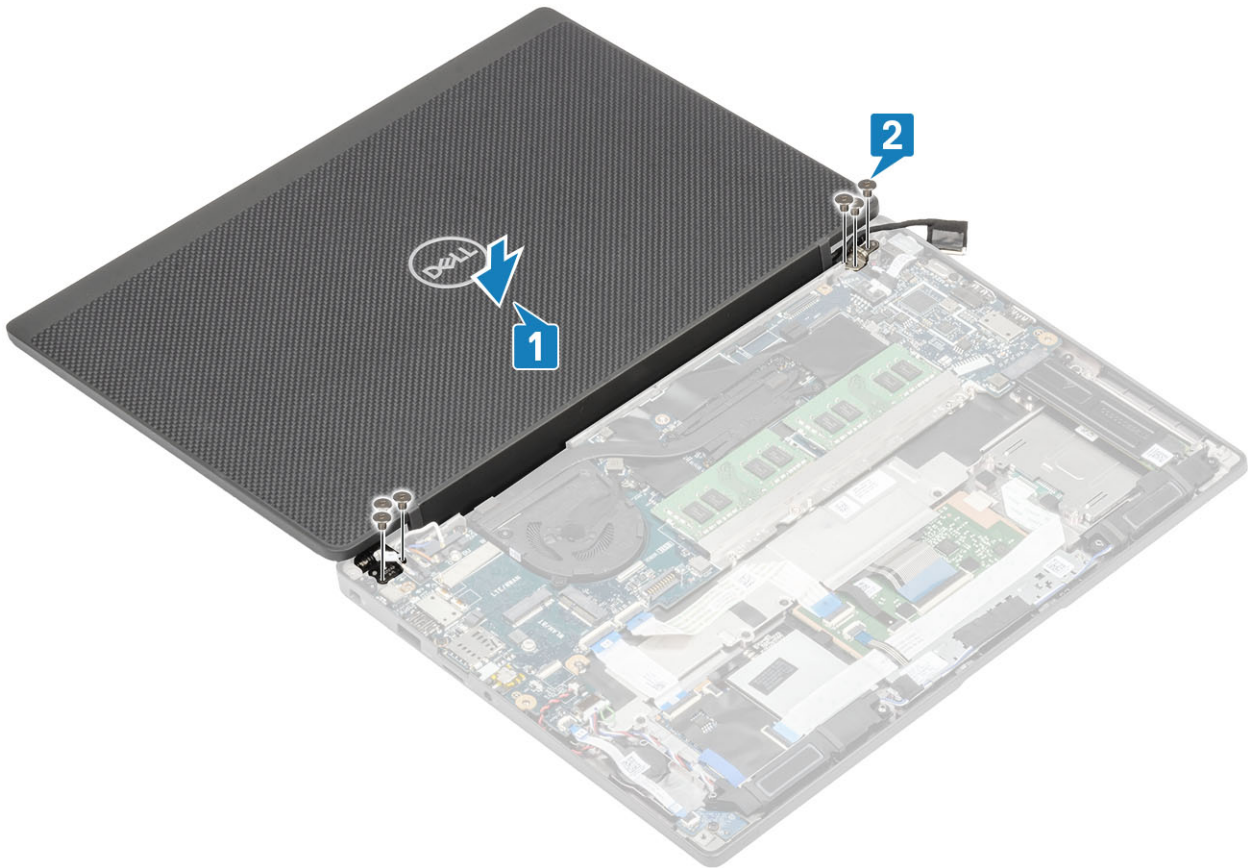
3. Close the LCD lid.
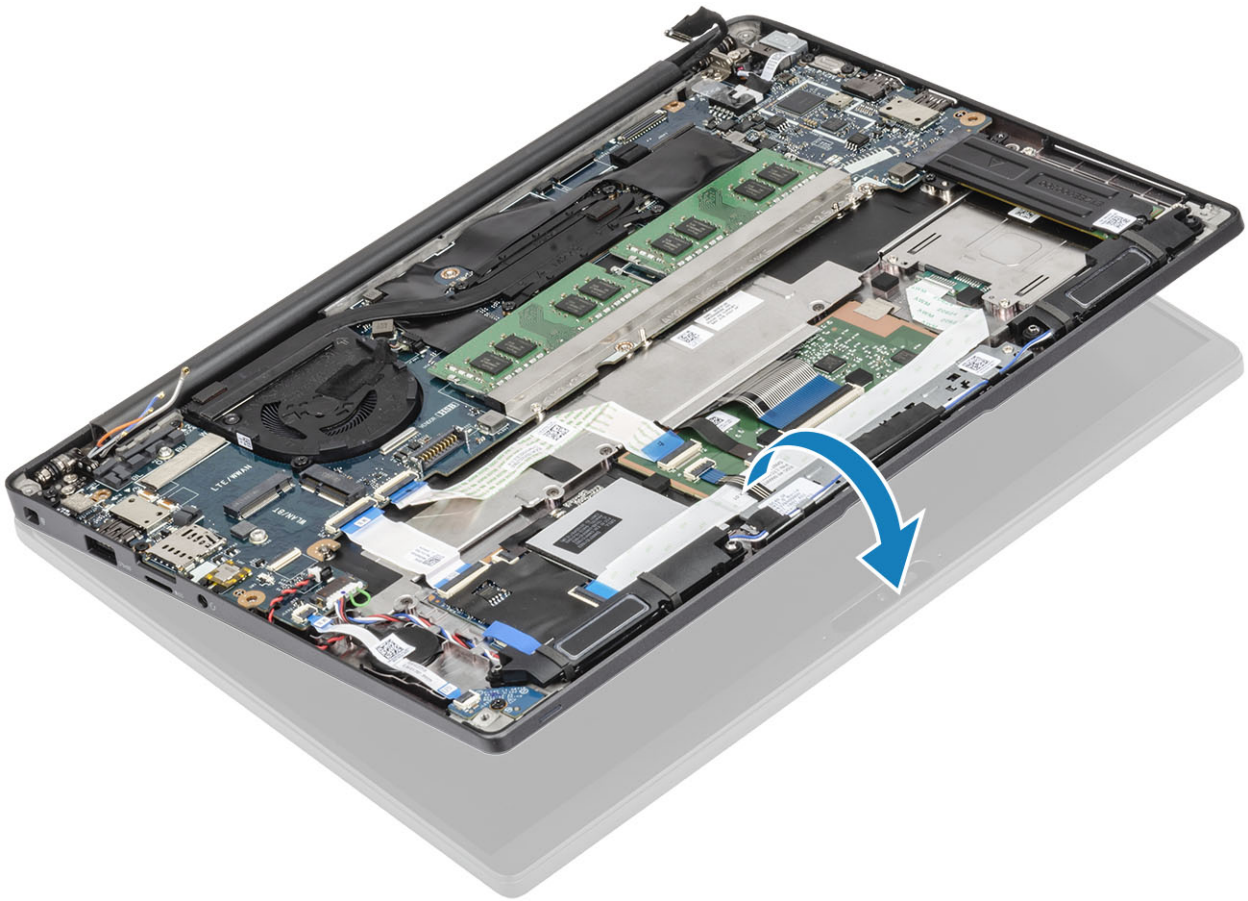
4. Route the display cable through the metal bracket [1] and place it on the system board [2].
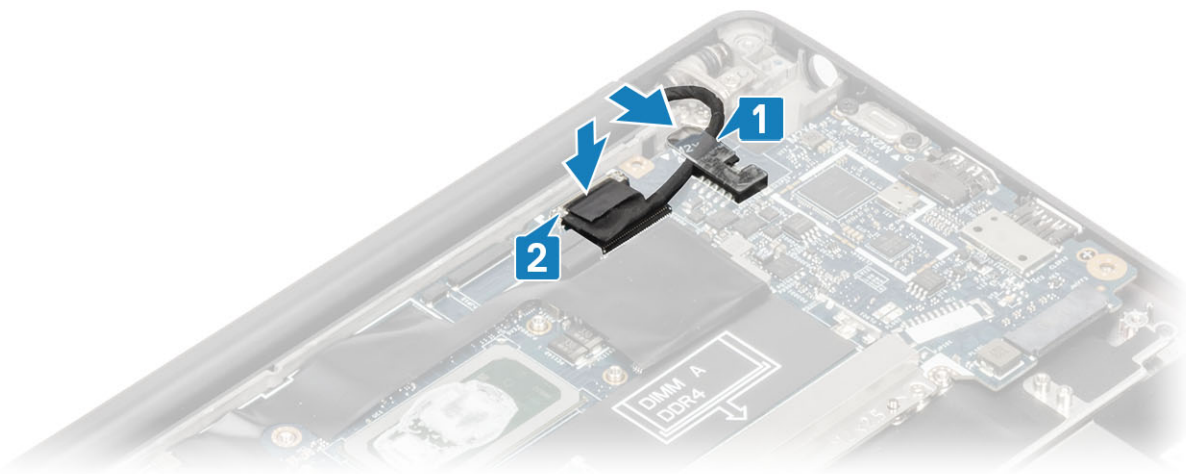
5. Connect the display cable to the connector on the system board [1].
6. Install the display cable metal bracket [2] above the display cable connector and secure it the system board using a single (M2x3) screw [3].
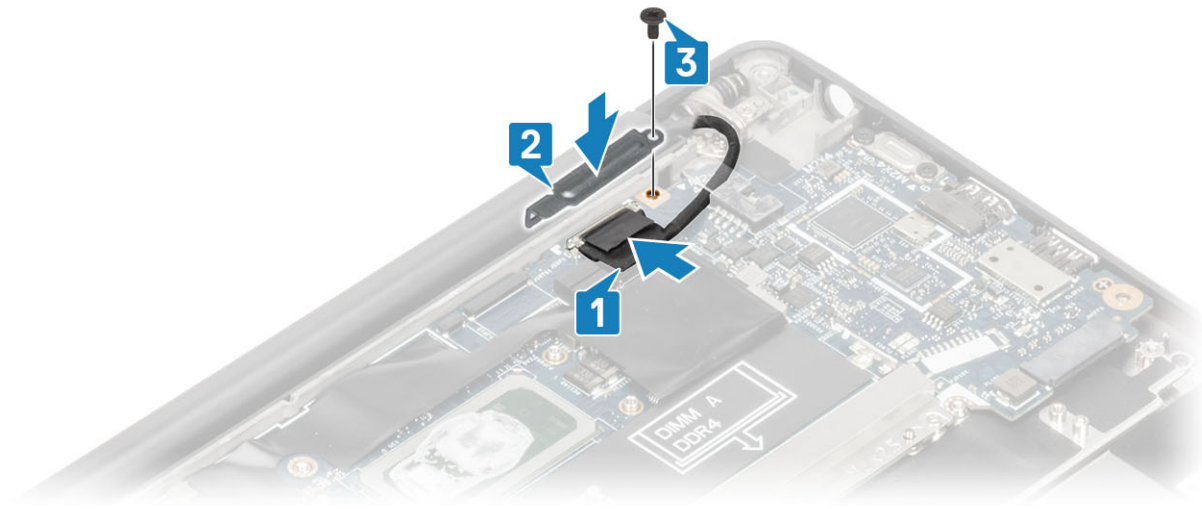
1. Install the battery.
2. Install the base cover.
3. Follow the procedure after working inside your computer.

Hinge caps

Removing the hinge cap

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the display assembly.
1. Open the hinges to 90 degrees to the display assembly [1].
2. Slide the hinge cap towards the right hinge and lift it away from the display assembly [2].

Installing the hinge cap

1. Slide the hinge cap towards the left hinge until it click locks on the display assembly [1].
2. Close the hinges to 180 degrees to the display assembly [2].

1. Install the display assembly
2. Install the battery.
3. Install the base cover.
4. Follow the procedure after working inside your computer.

Display hinges

Removing the hinges

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the display assembly.
5. Remove the hinge cap.
1. Unroute the antennae and display cable away from the hinges.

2. Remove the four (M2.5x5) screws [1] securing the hinges to the display assembly.

3. Lift and remove the hinges from the display back cover assembly [2].

Installing the hinges

1. Align and place the hinges on the display assembly [1].
2. Replace the four (2.5x5) screws to secure hinges to the display back cover assembly [2].
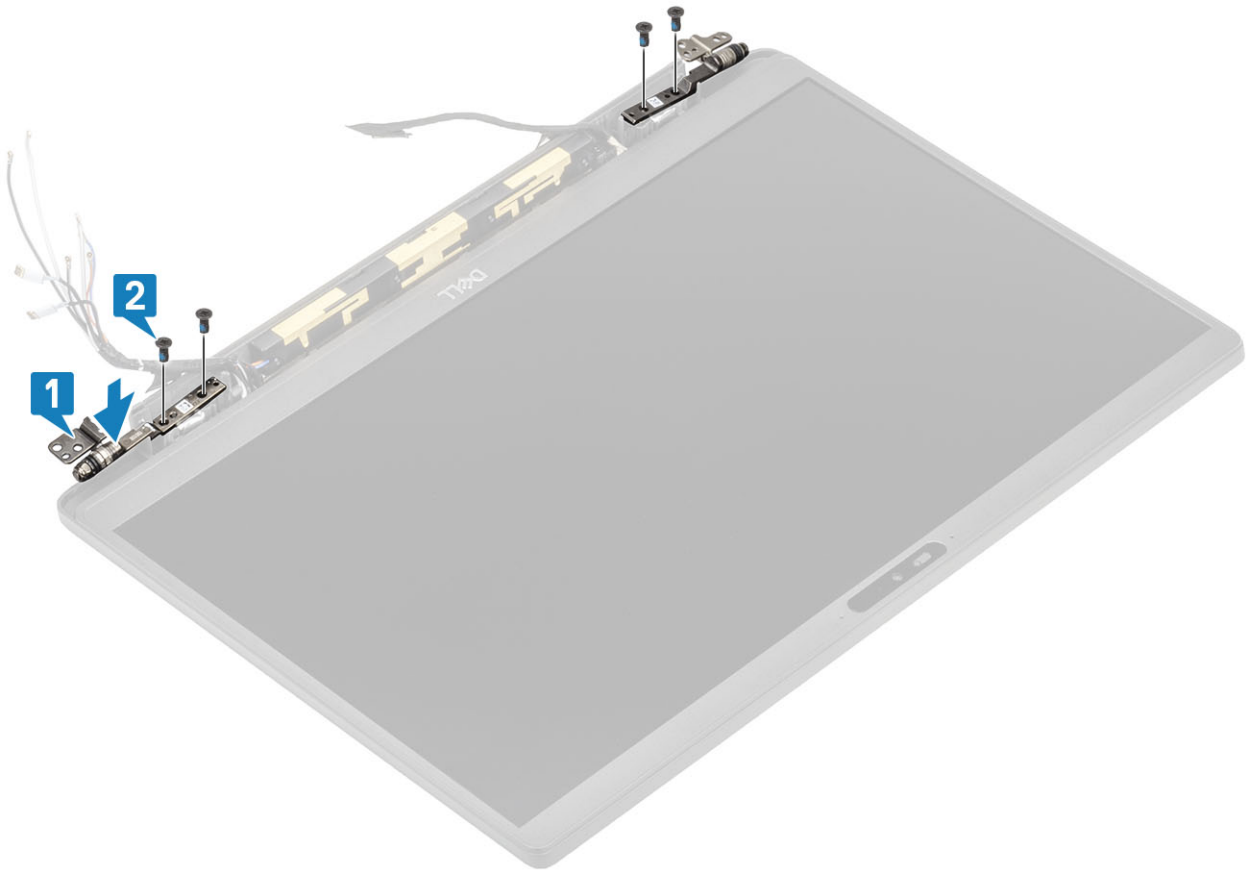
3. Route the antennae and display cable along the hinges.
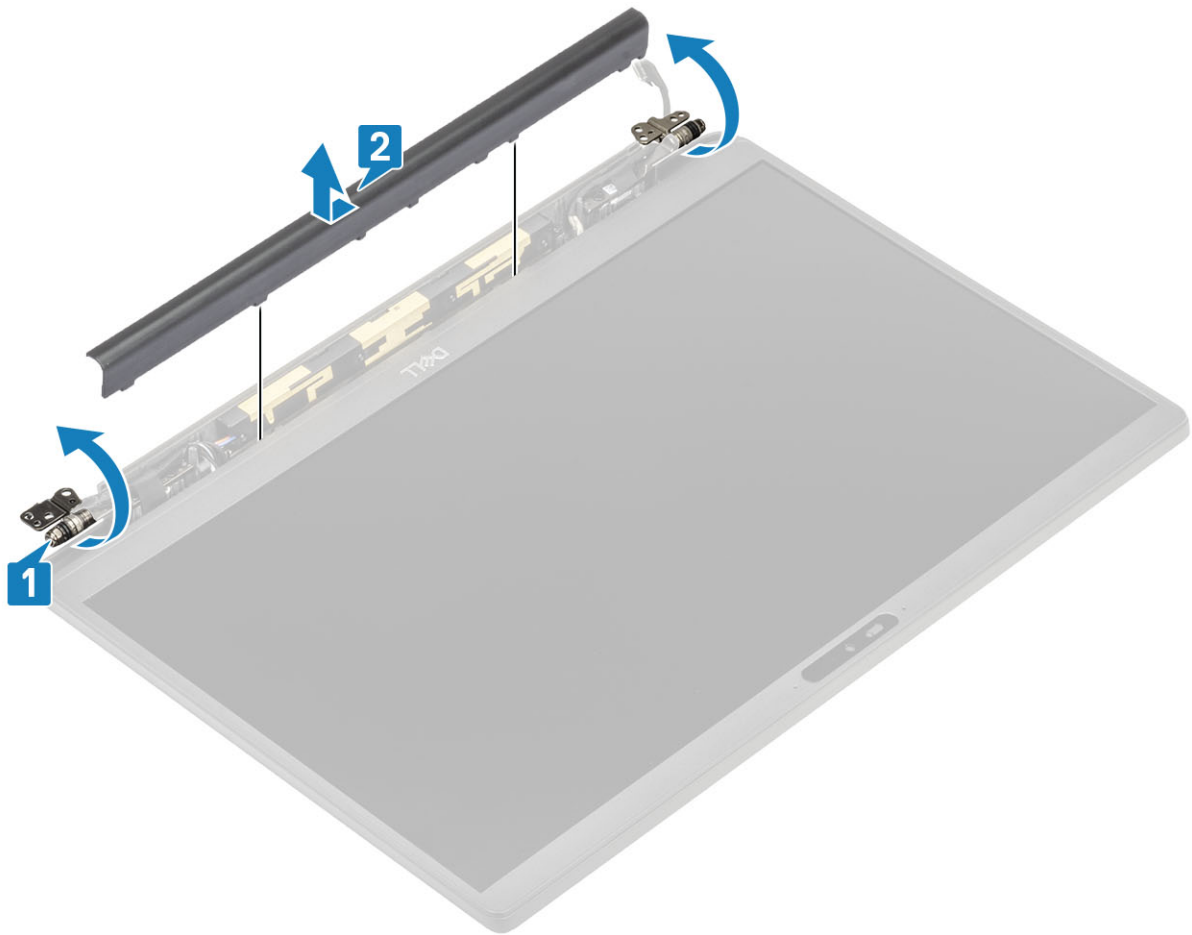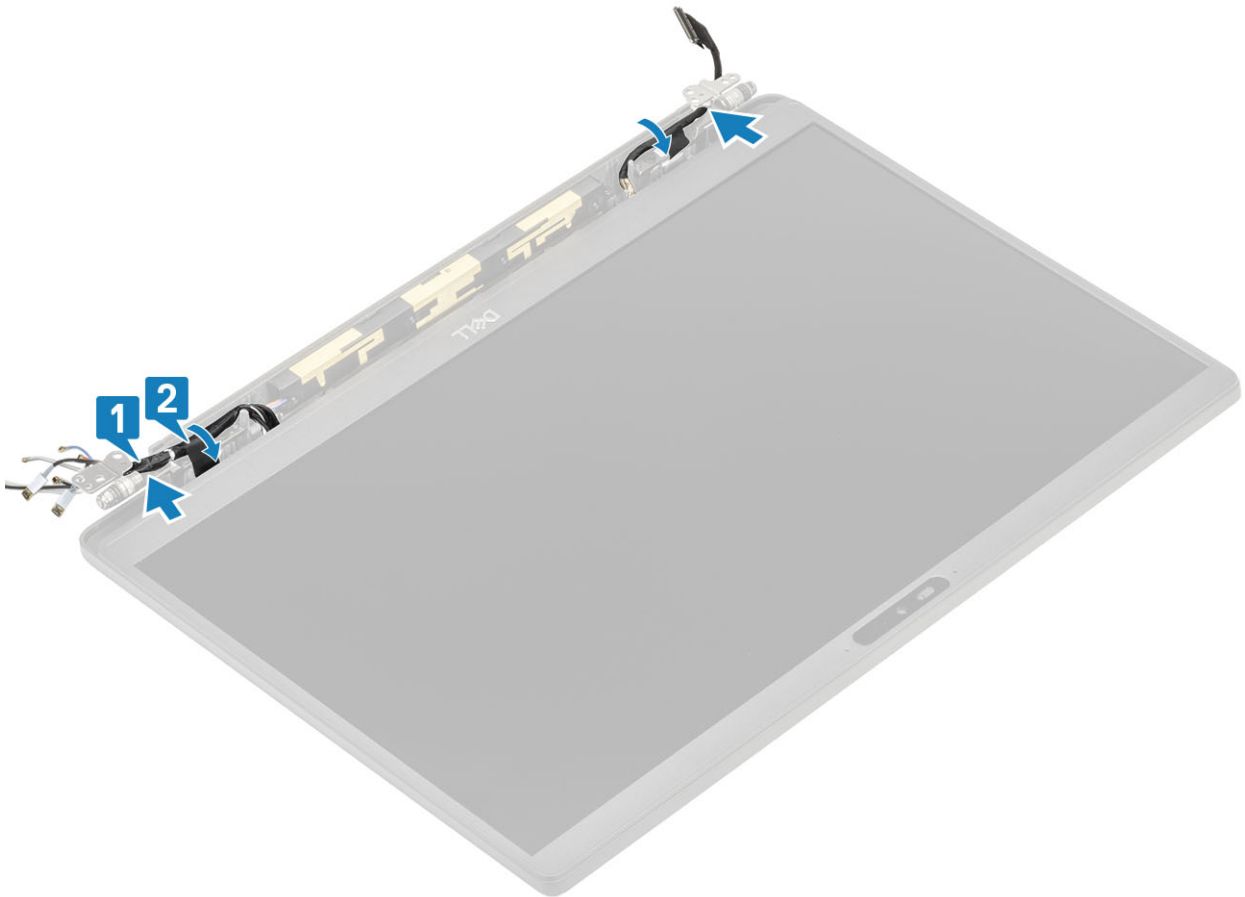
1. Install the hinge cap
2. Install the display assembly
3. Install the battery.
4. Install the base cover.
5. Follow the procedure after working inside your computer.
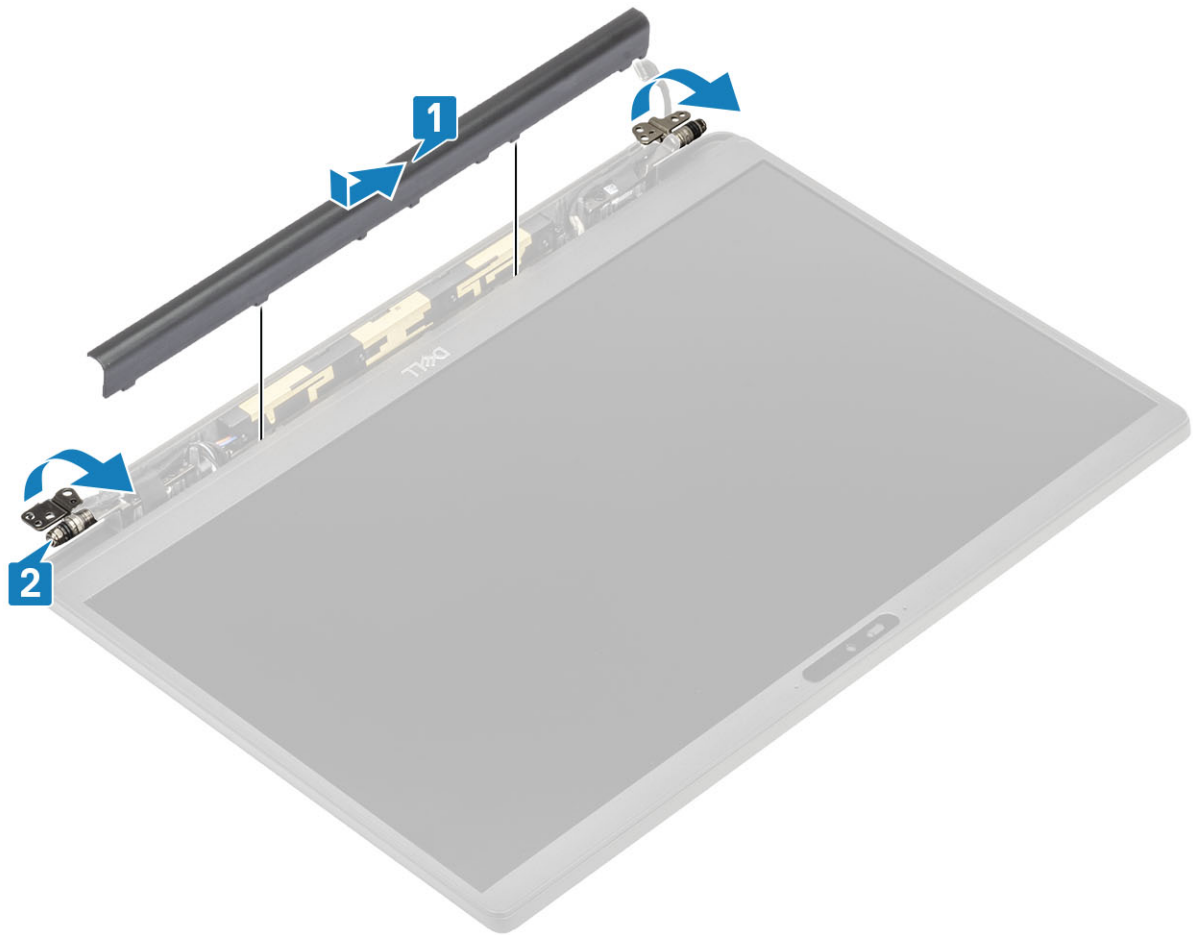
Display Bezel

Removing the display bezel

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the display assembly.
5. Remove the hinge cap.
6. Remove the hinges.
1. Use a plastic scribe to pry at the indents on the bottom of display assembly beside the hinges [1].
2. Pry along the outer edges of display bezel to remove the bezel from the display assembly [2].

Installing the display bezel

Place the display bezel on the display assembly and press along the edges to click lock it to the display back cover.

1. Install the hinges.
2. Install the hinge cap
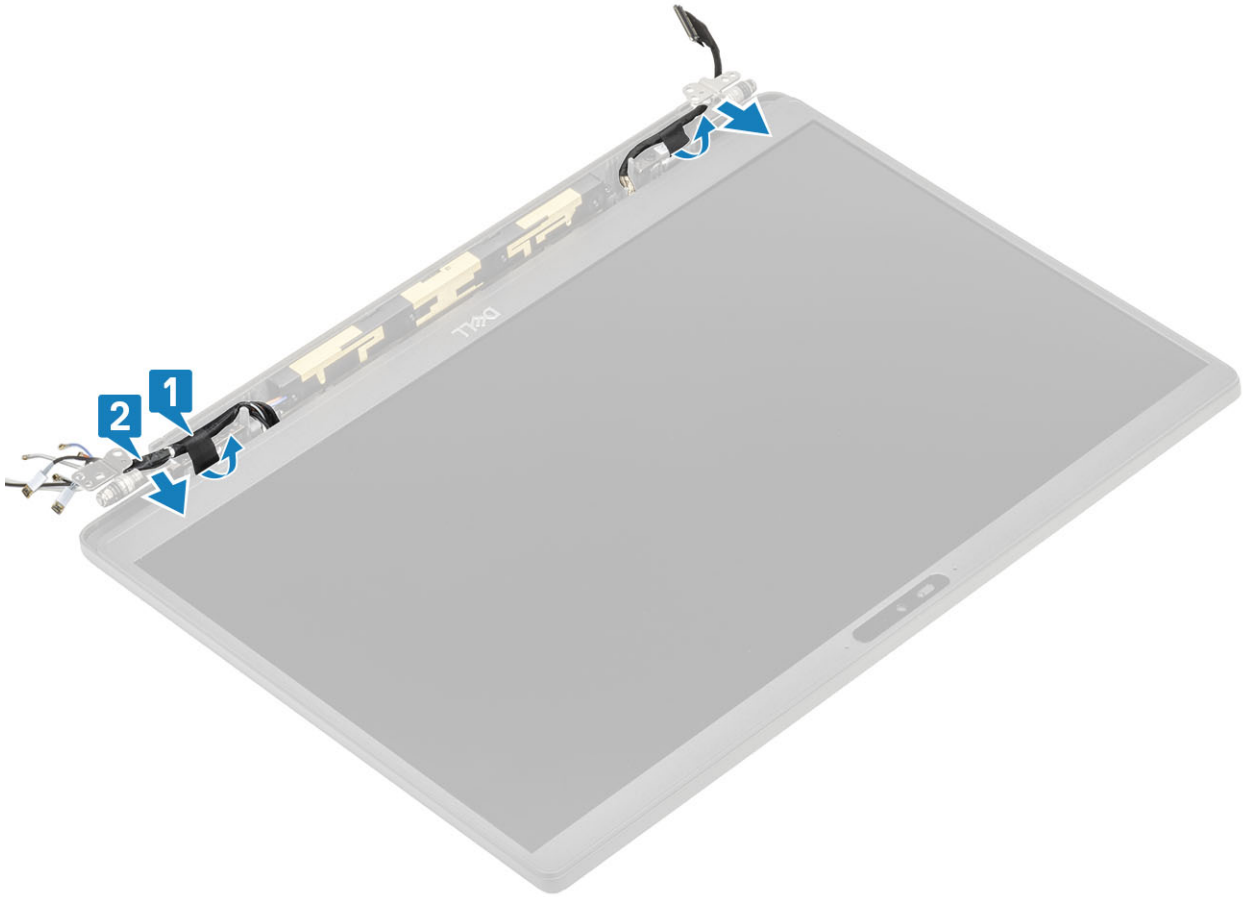3. Install the display assembly
4. Install the battery.
5. Install the base cover.
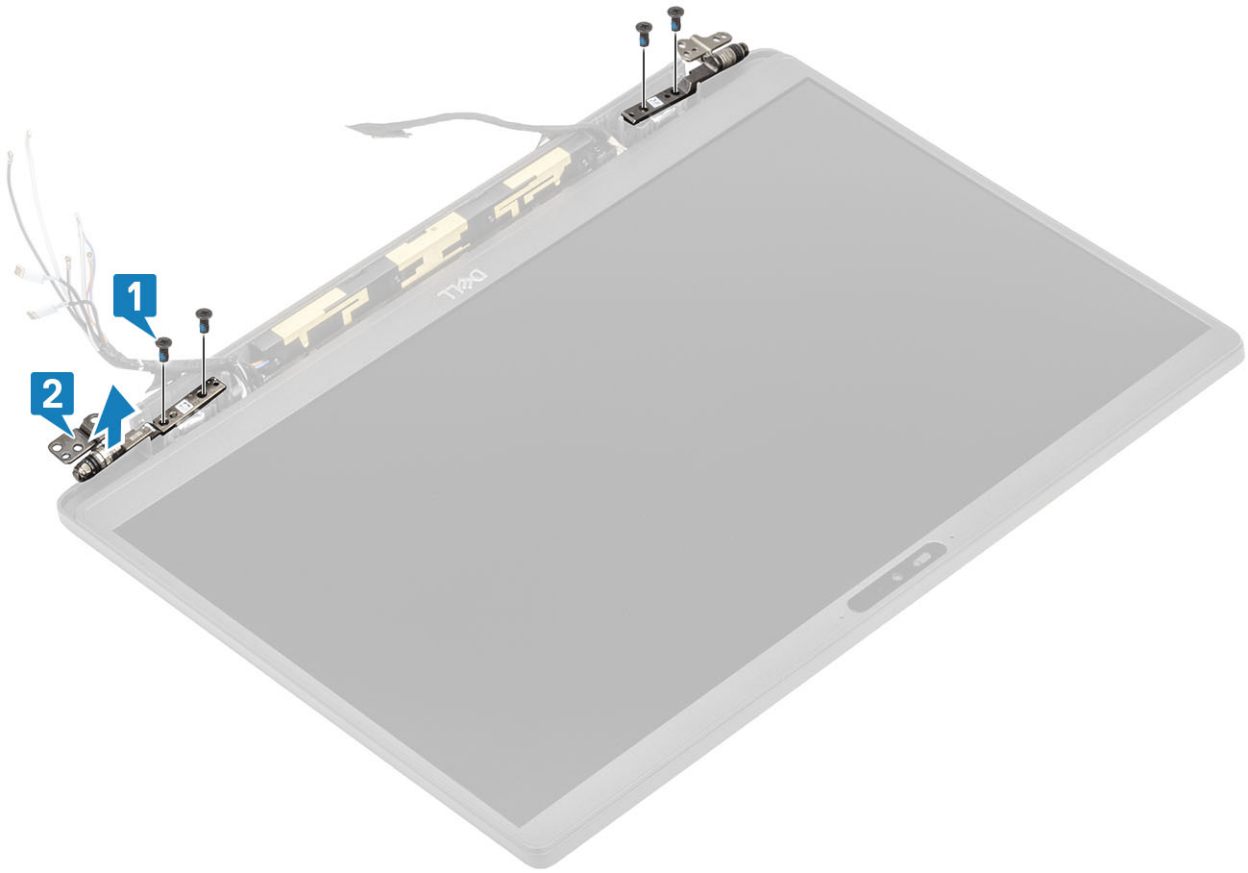6. Follow the procedure after working inside your computer.

Display Panel

Removing the display panel

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the display assembly.
5. Remove the hinge cap.
6. Remove the hinges.
7. Remove the display bezel.
1. Remove the four (M2x2.5) screws [1] and flip over display panel [2] to separate the LCD panel from the back cover.
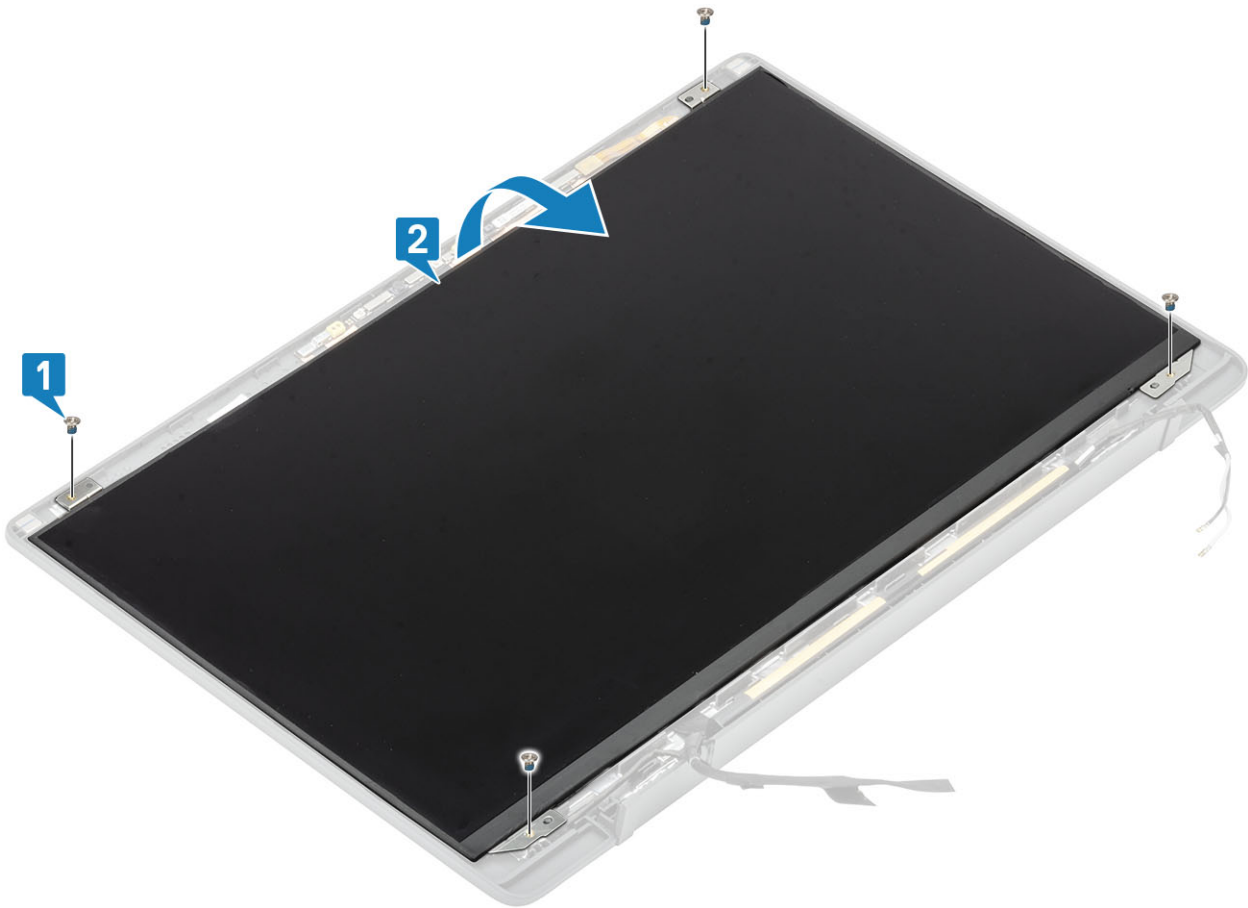
2. ⓘ **NOTE:** Do not pull and release the Stretch (SR) tapes from the display panel. There is no need to separate the brackets from the display panel.

Peel back the tape [1] and flip open the latch [2] to disconnect the EDP cable from the display panel [3].

Installing the display panel

1. Connect the EDP cable to the connector on the display panel [1] and close the actuator to secure the connector [2].
2. Adhere the adhesive tape over the EDP connector on the display panel [3] and flip over the display panel on the back cover [4].
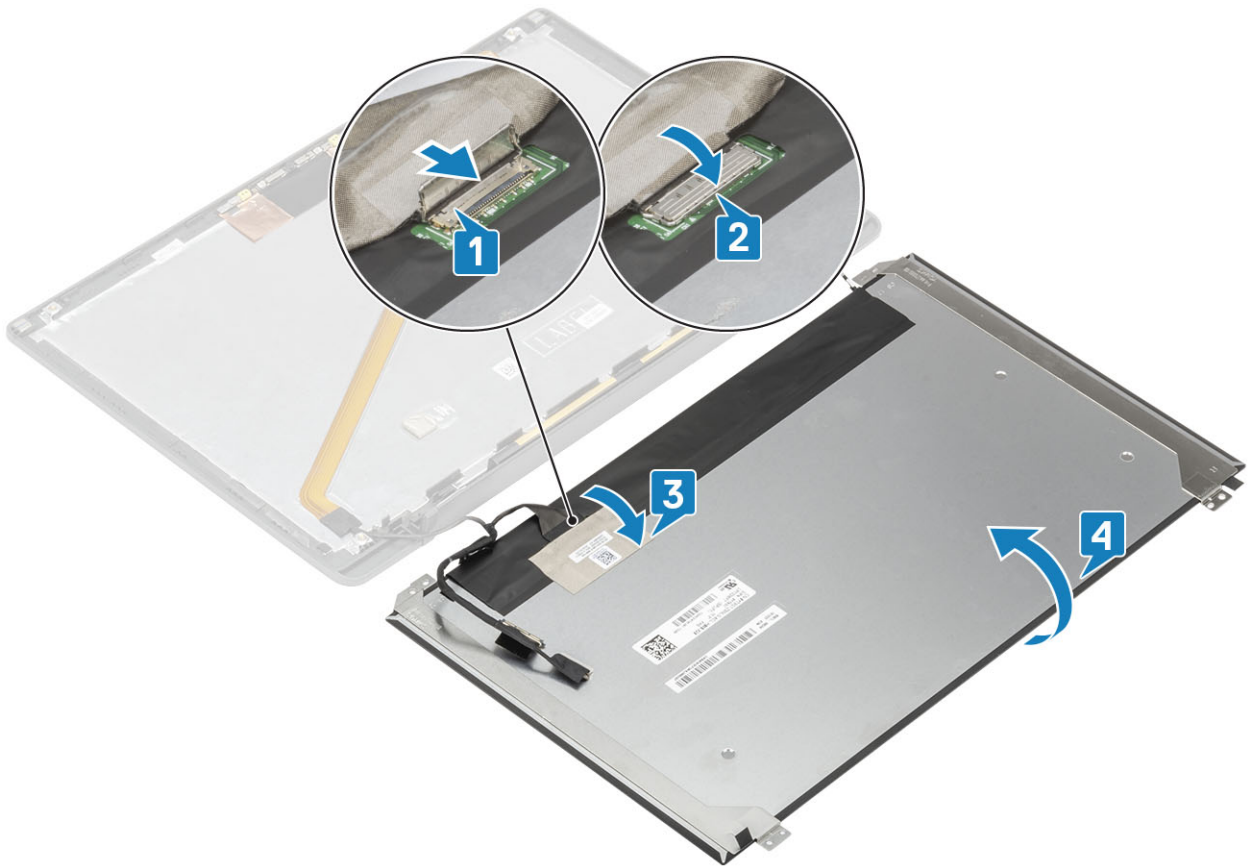
3. Install the four (M2x2.5) screws [2] on the display panel to secure it to the back cover.

1. Install the display bezel.
2. Install the hinges.
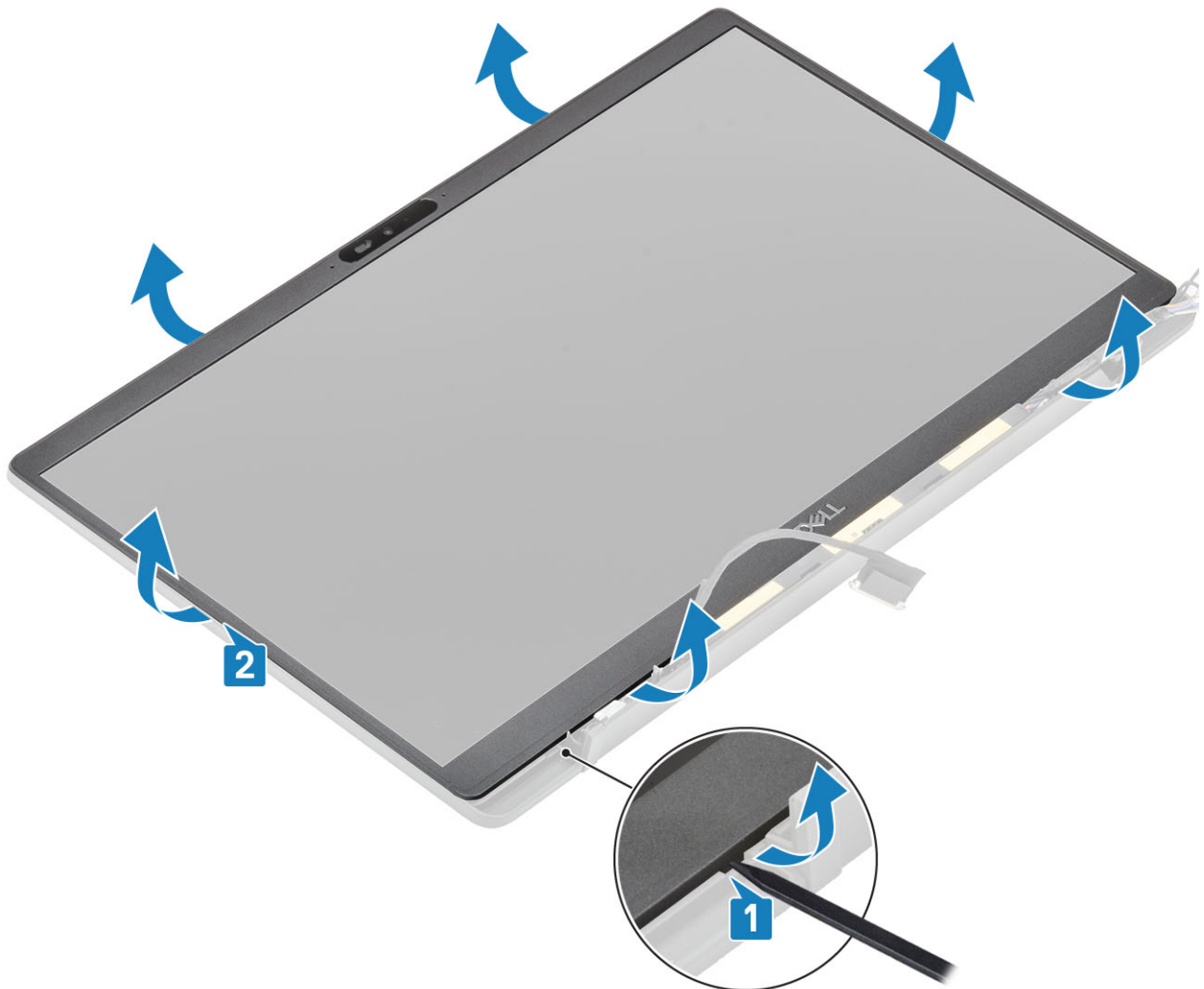3. Install the hinge cap
4. Install the display assembly
5. Install the battery.
6. Install the base cover.
7. Follow the procedure after working inside your computer.
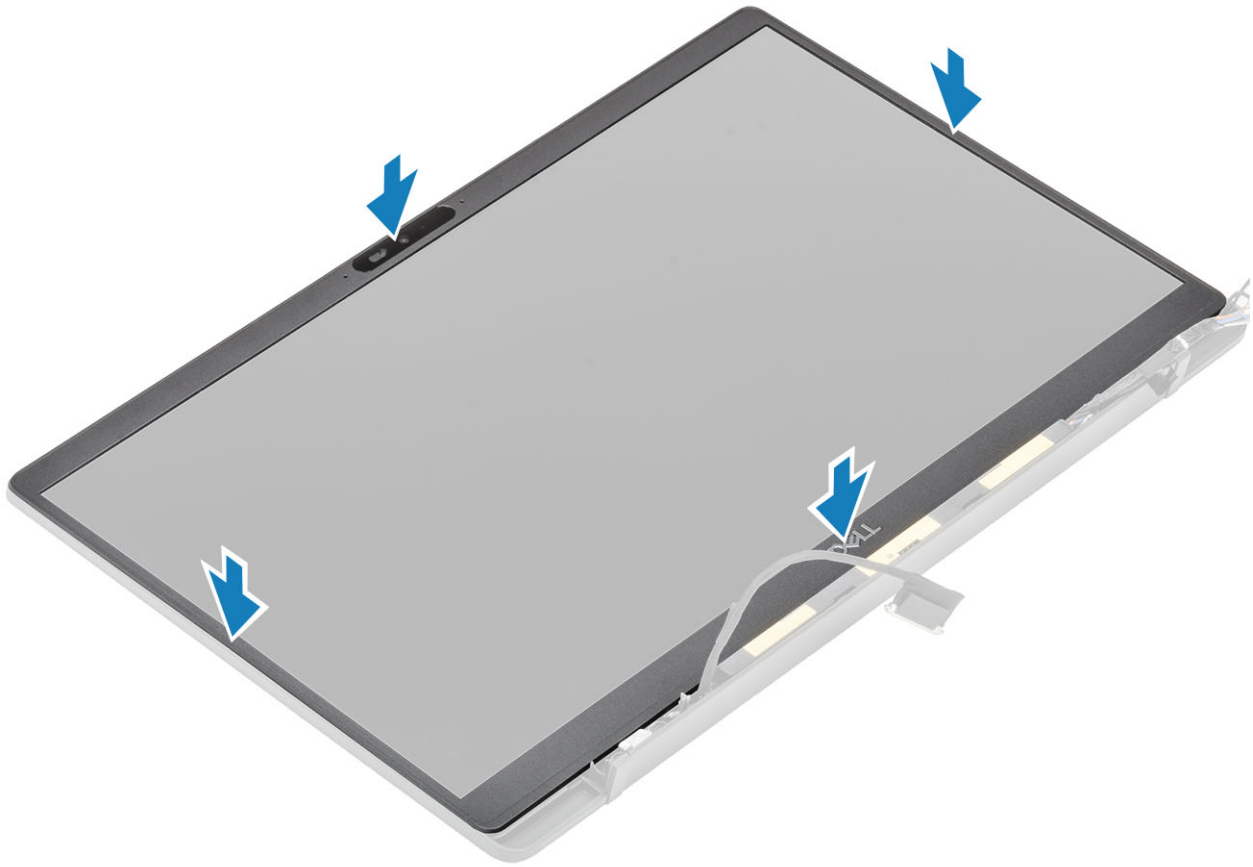
Camera—microphone module

Removing the camera—microphone module

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the display assembly.
5. Remove the hinge cap.
6. Remove the hinges.
7. Remove the display bezel.
8. Remove the display panel.
1. Disconnect the display cable connection from the camera-microphone module [1].
2. Use a plastic scribe to pry the camera-microphone module from the display back cover [2].
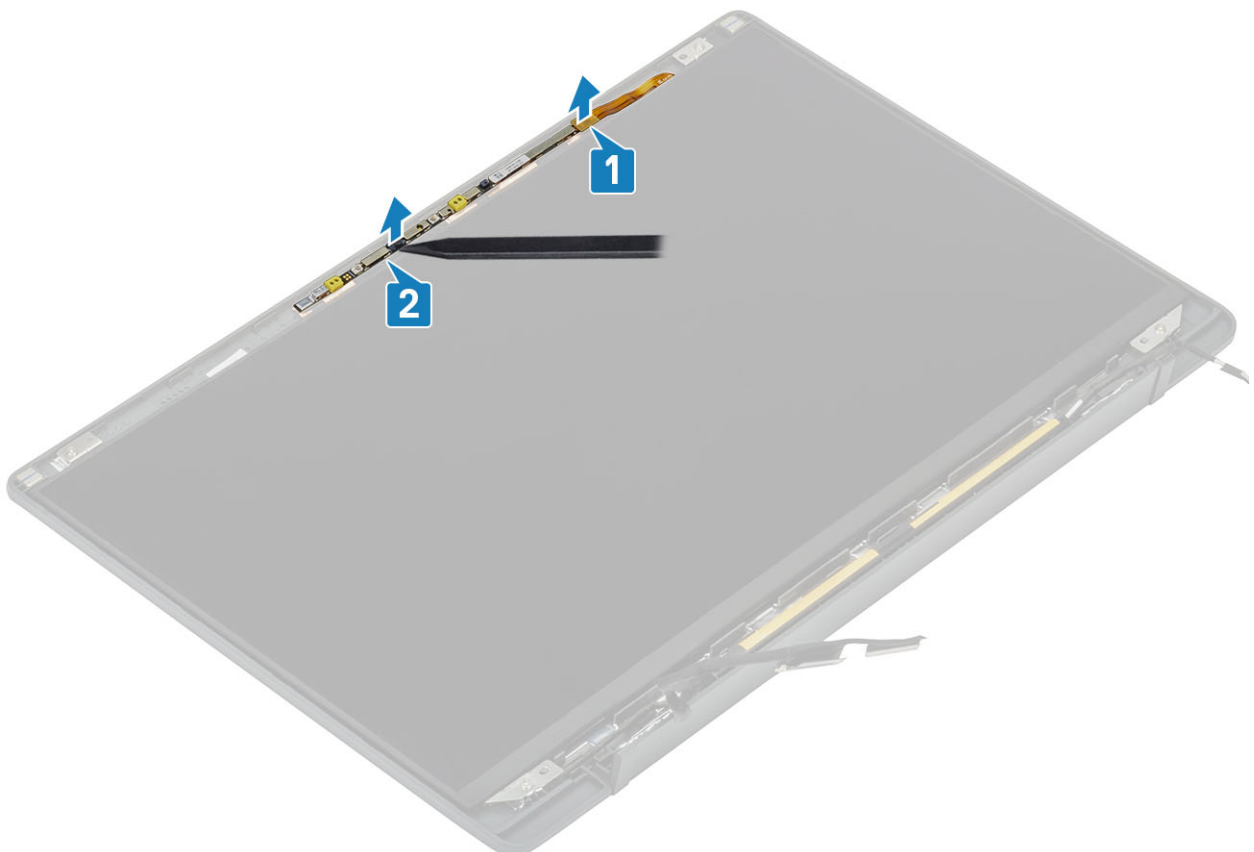
Installing the camera—microphone module

1. Align and place the camera-microphone module in the display back cover assembly [1].
2. Connect the display cable to the camera-microphone module [2].

1. Install the display panel.
2. Install the hinges.
3. Install the display bezel.
4. Install the hinge cap
5. Install the display assembly
6. Install the battery.
7. Install the base cover.
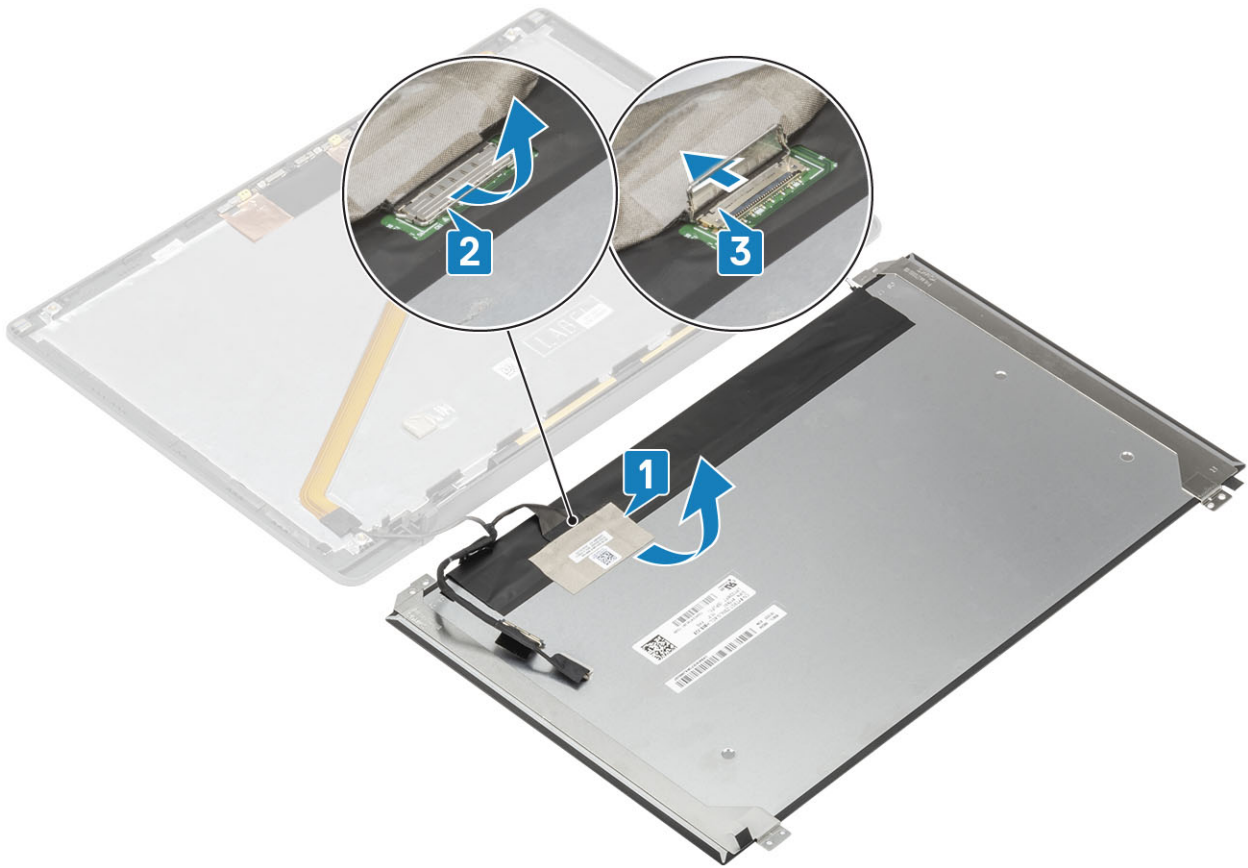8. Follow the procedure after working inside your computer.

Display Cable

Removing the display cable

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the display assembly.
5. Remove the hinge cap.
6. Remove the display bezel.
7. Remove the hinges.
8. Remove the display panel.
1. Peel back the adhesive tape securing the display cable to the camera-microphone module [1].
2. Gently peel off the display cable from its routing channel on the display back cover [2].
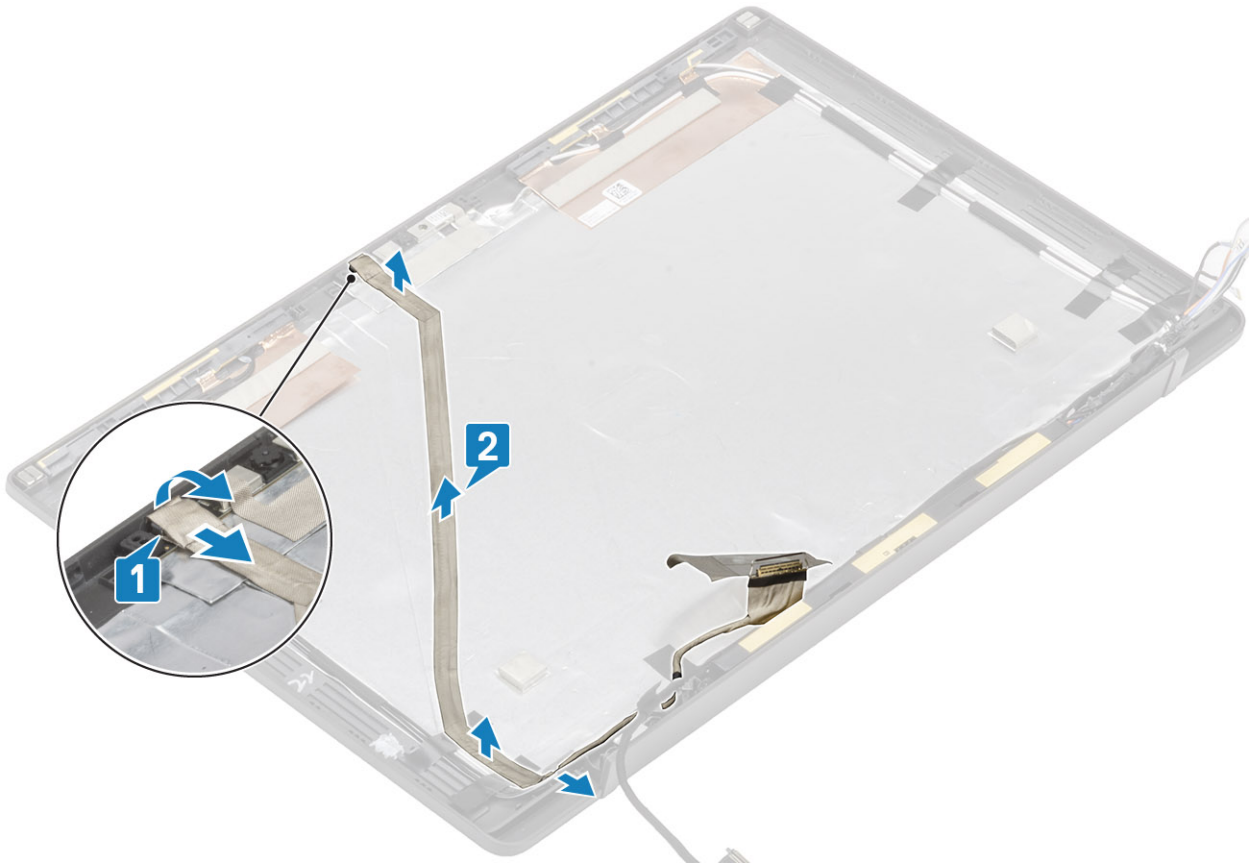
Installing the display cable

1. Adhere the display cable along the routing channel on the display back cover assembly [1] .
2. Connect the display cable to the camera microphone module and replace the tape on the connector [2].
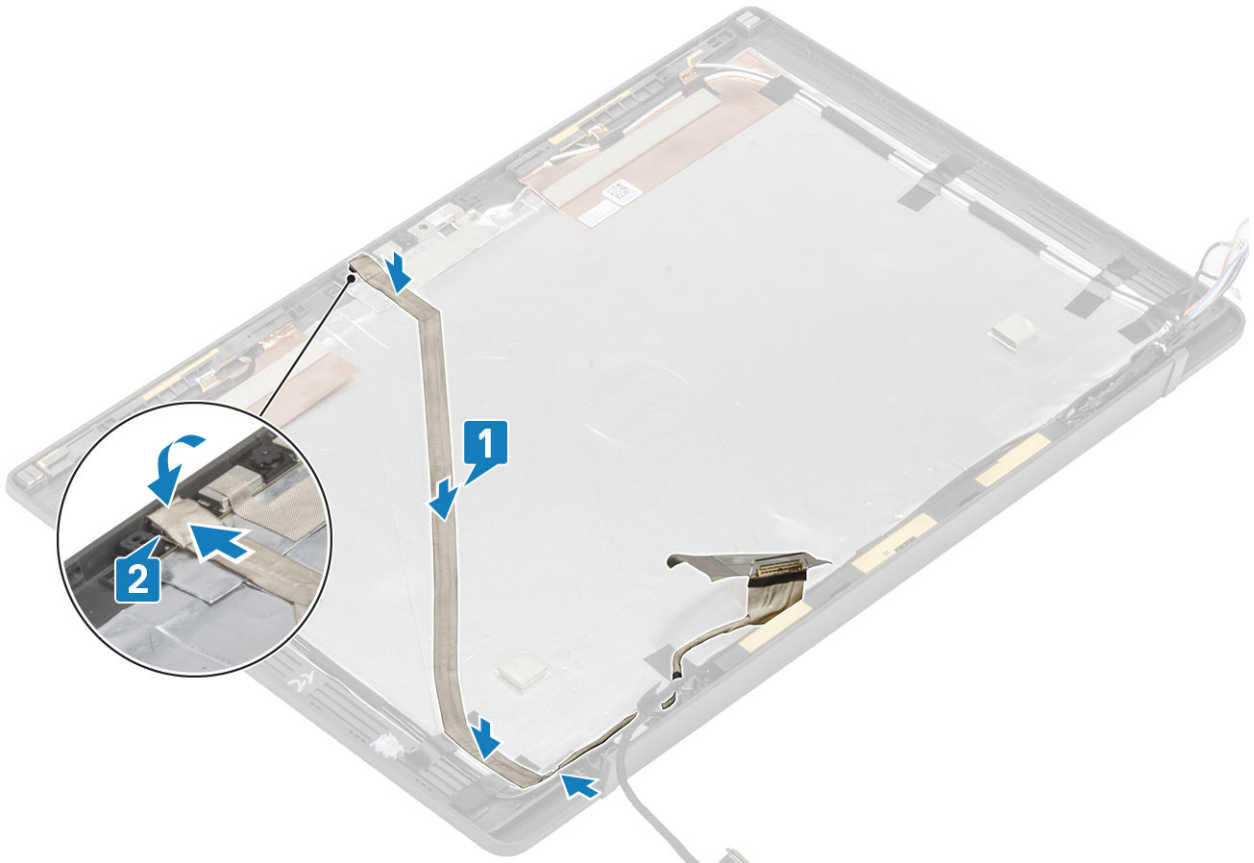
1. Install the display panel.
2. Install the hinges.
3. Install the display bezel.
4. Install the hinge cap
5. Install the display assembly
6. Install the battery.
7. Install the base cover.
8. Follow the procedure after working inside your computer.

System board
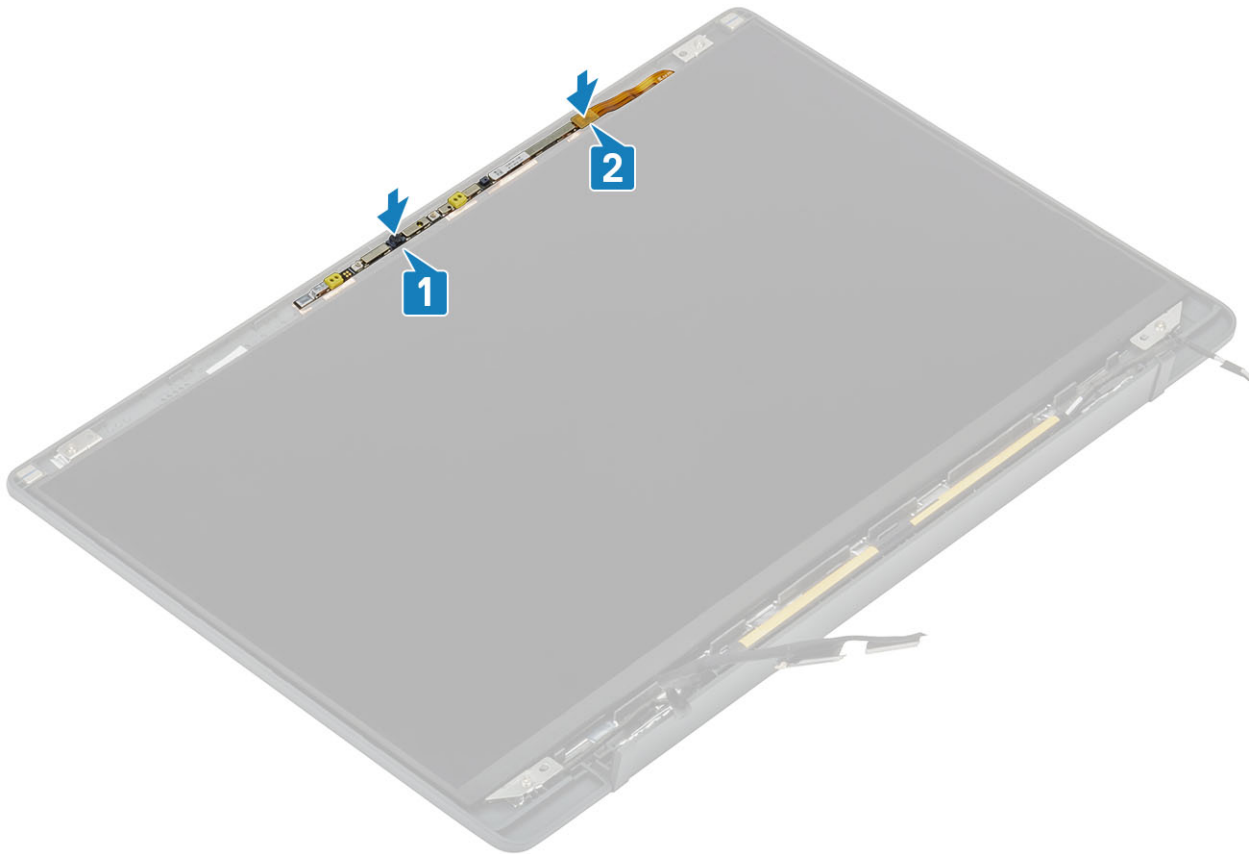
Removing the system board

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the memory.
5. Remove the SSD.
6. Remove the WLAN card.
7. Remove the heatsink-fan assembly.
8. Remove the power adapter port.
9. Remove the display assembly.

(i) **NOTE:** System board can be removed with heatsink assembly installed, this simplifies the procedure in an event of power button, keyboard and palmrest assembly replacements.

1. Remove the single (M2x4) screw on the metal bracket over the display cable connector on the system board [1]
2. Lift and remove the metal bracket [2] to disconnect the display cable from the system board [3].
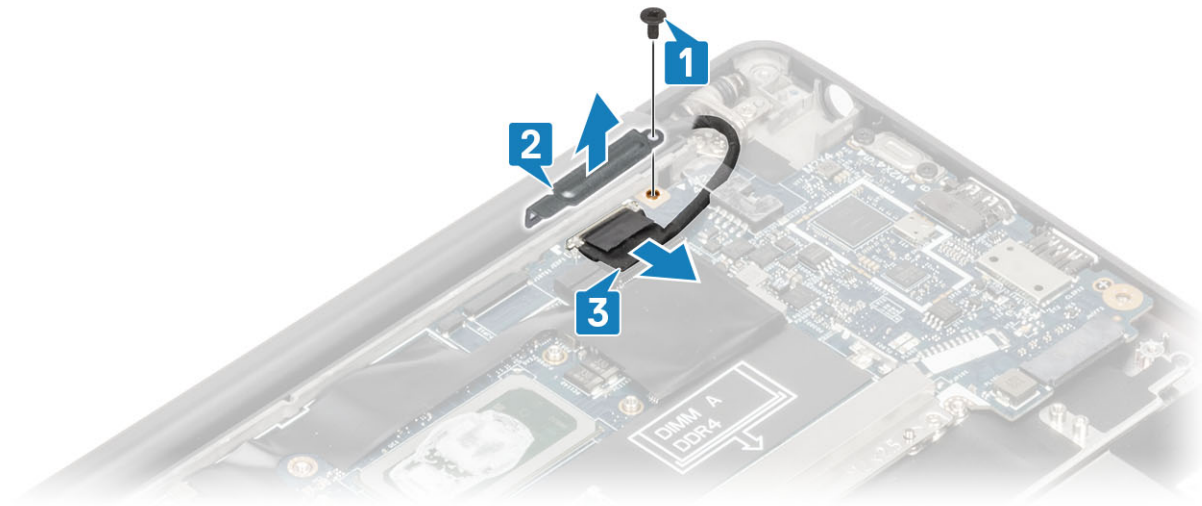
3. Disconnect the display cable [1] and unroute it from the metal bracket on the system board [2].
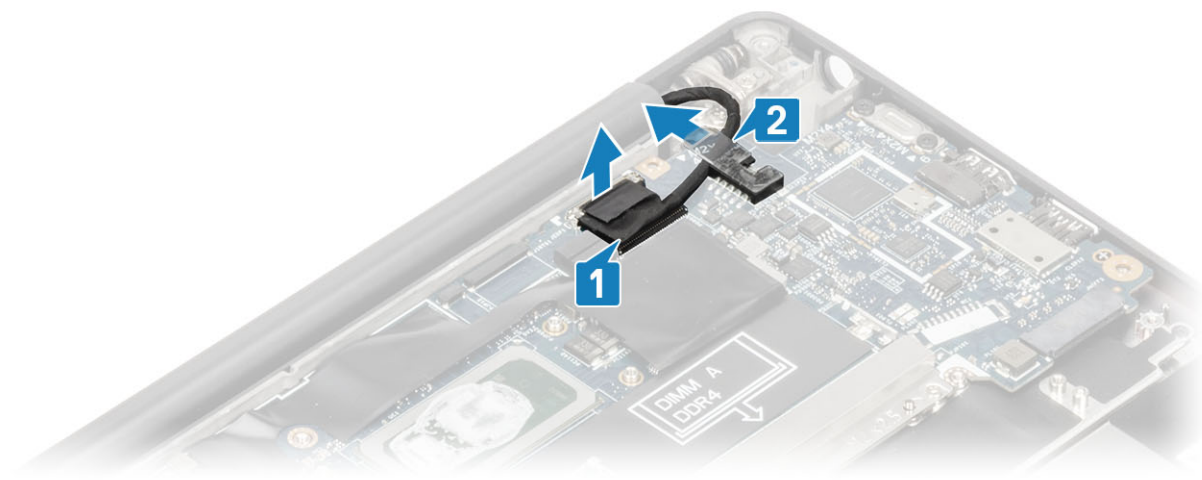
4. Remove the single (M2x4) screw [1] and remove the metal bracket over the WWAN Darwin antennae cable [2].
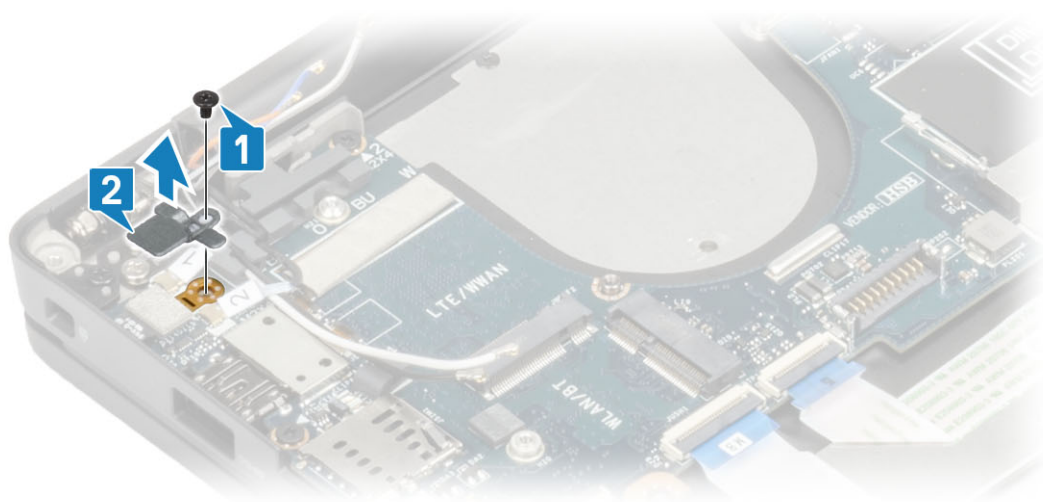
5. Disconnect the power button (with finger print reader) cable from the system board [1].
6. Disconnect the WWAN Darwin antennae cables [2] from the system board.
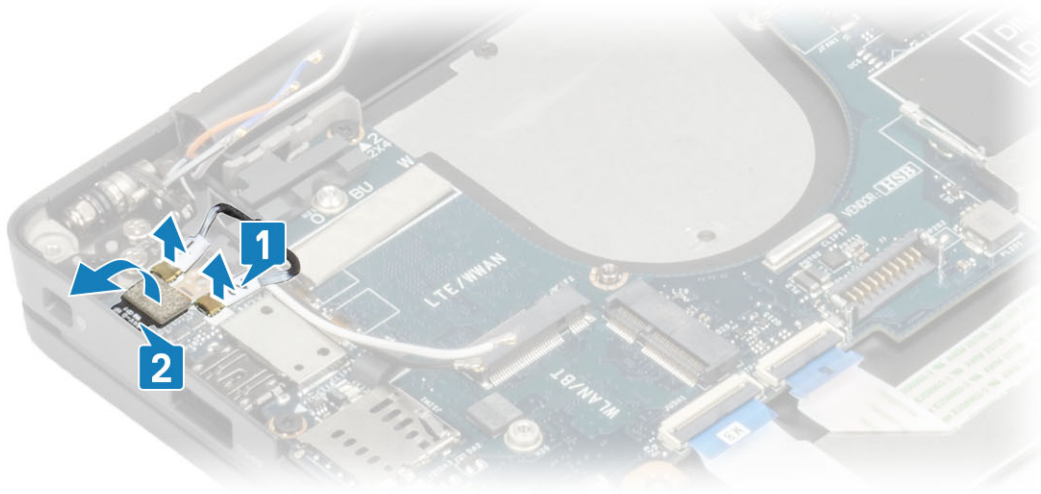
7. Remove the two (M2x4) screws [1] and lift up the USB Type-C bracket from the system board [2].
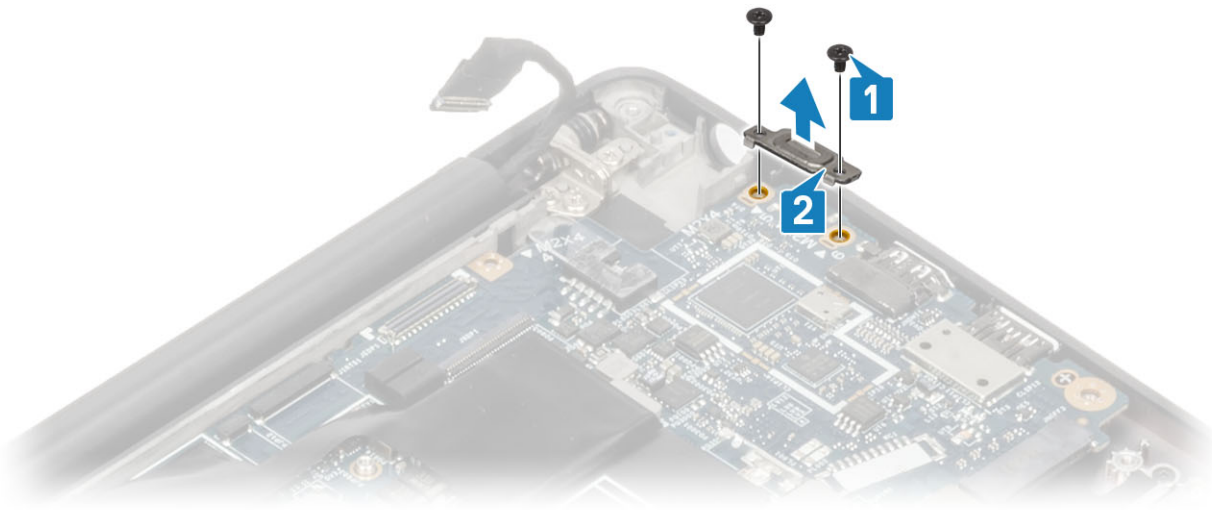
8. Disconnect the coin cell [1], speaker cable [2] and the LED daughterboard cable [3] from the system board.
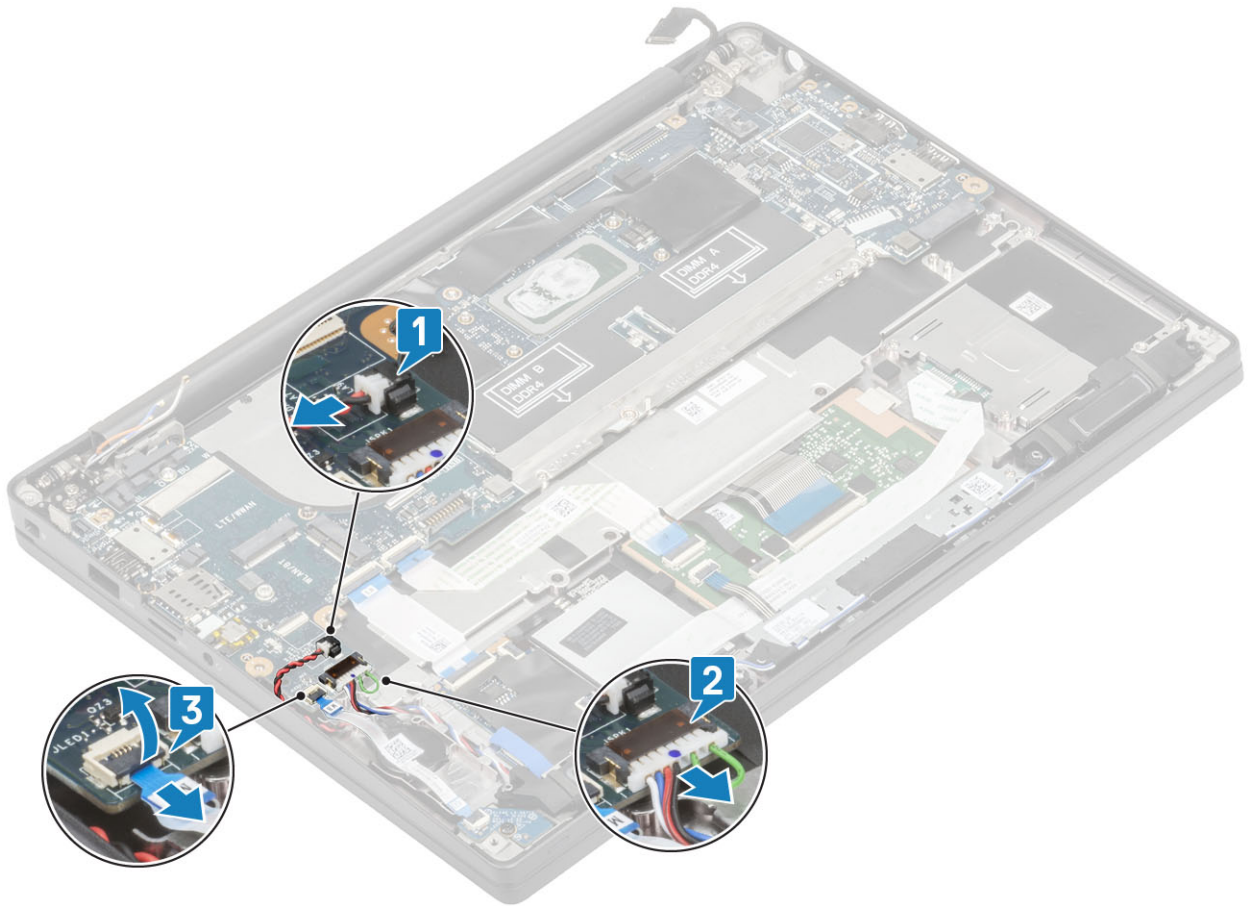
9. Disconnect the USH daughterboard [1] and touchpad cables [2] from the system board.
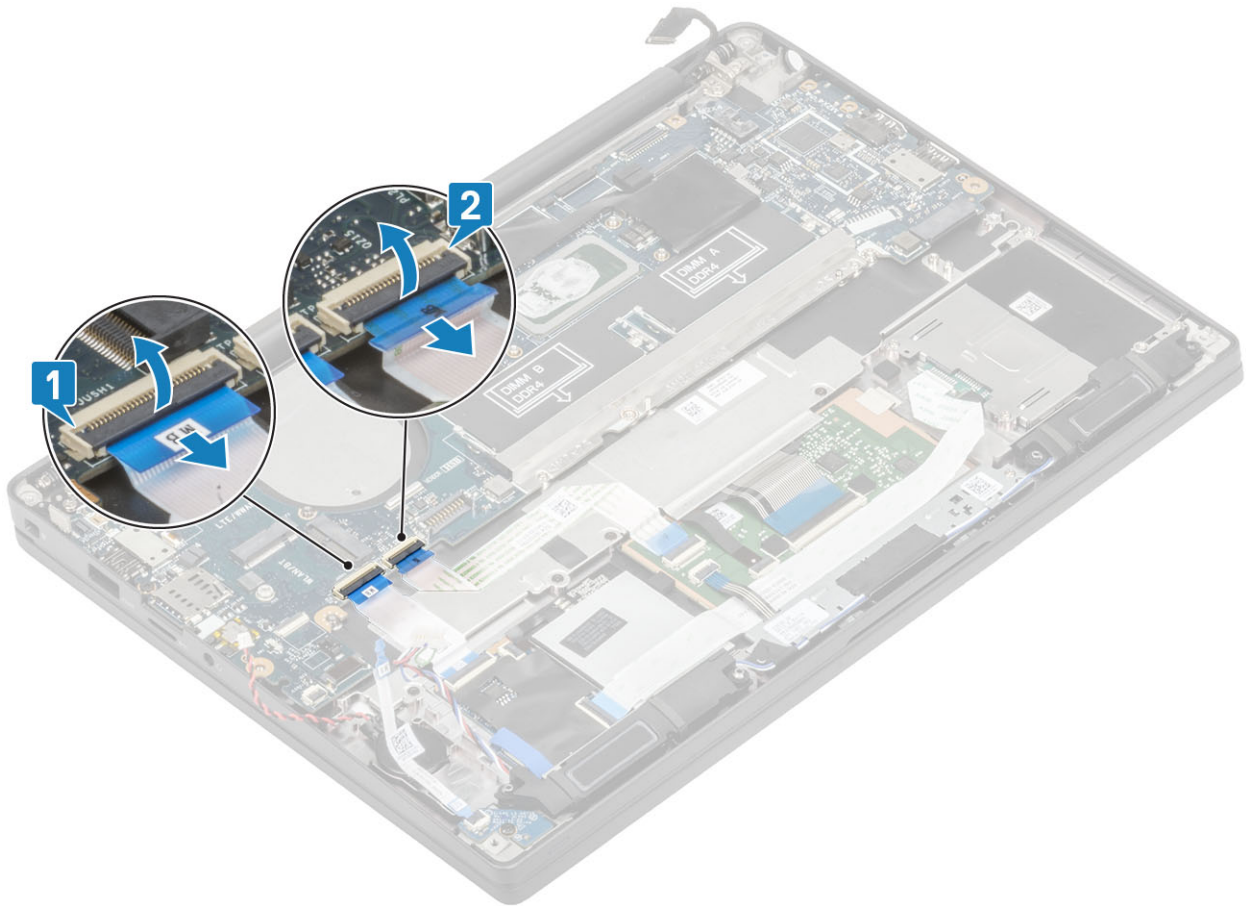
10. Remove the two (M2x2.5) screws on the DDR ESD bracket [1] and lift to remove it from the system board [2].
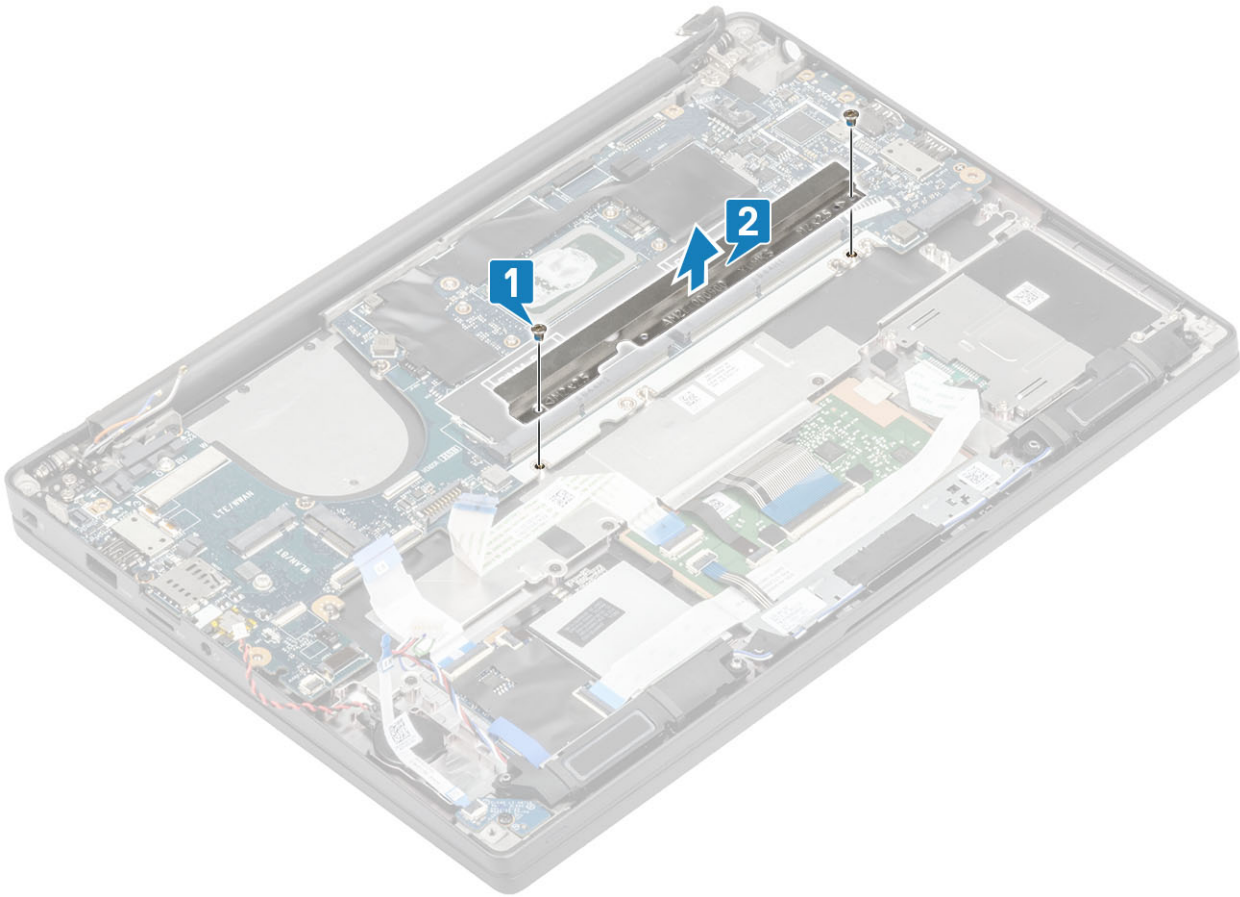
11. Remove the two (M2x4) screws [1] and remove the system board from the palmrest assembly [2].

ⓘ **NOTE:** For models shipped with a fingerprint reader or WWAN antennas, there are three (M2x3) screws securing the system board to the computer.
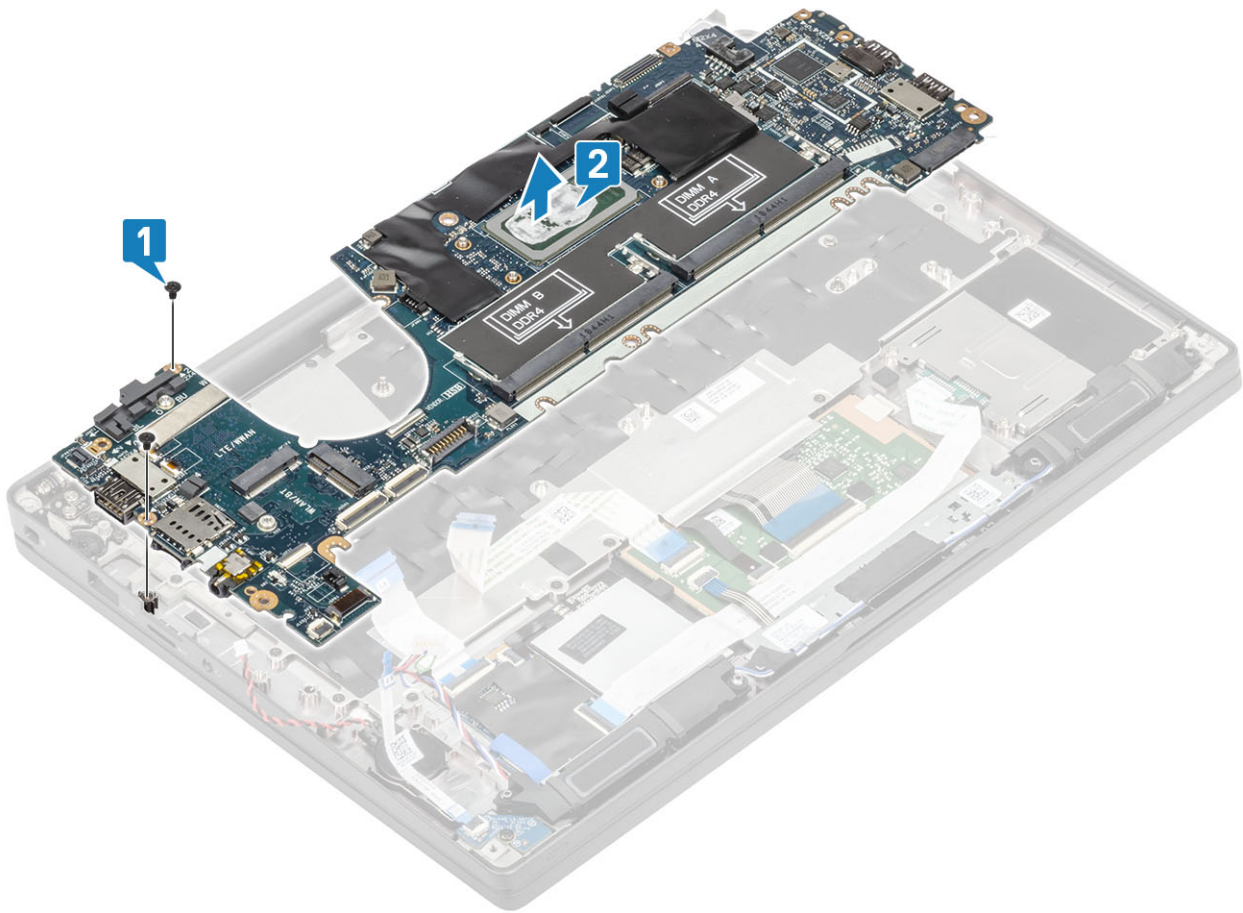
Installing the system board

1. Align and place the system board in the palmrest assembly [1]
2. Replace the two (M2x4) screws on the system board securing it to the palmrest assembly [2].
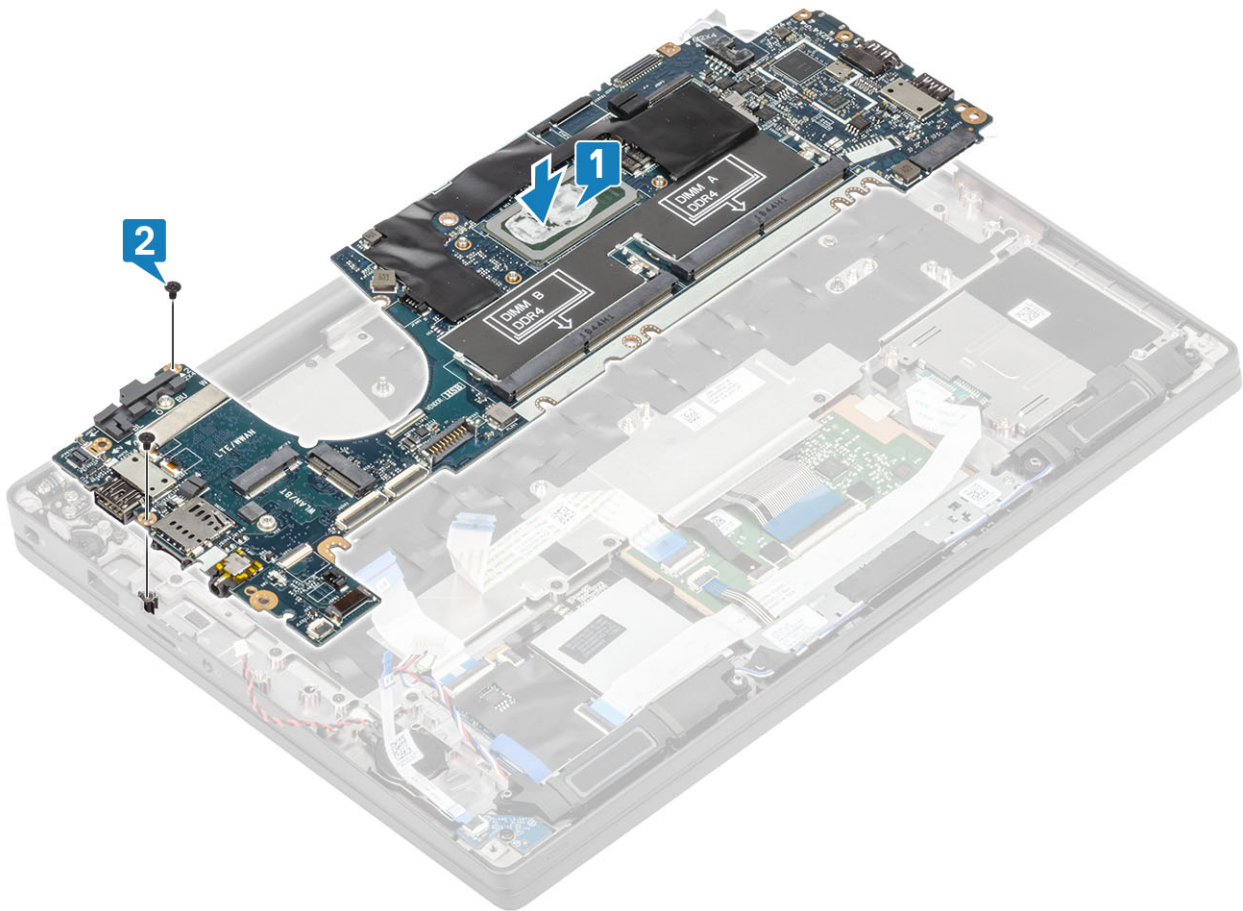
(i) **NOTE:** For models shipped with a fingerprint reader or WWAN antennas, there are three (M2x4) screws securing the system board to the computer.

3. Place the USB Type-C bracket [1] on the system board and secure it using two (M2x5) screws [2] to the system board.
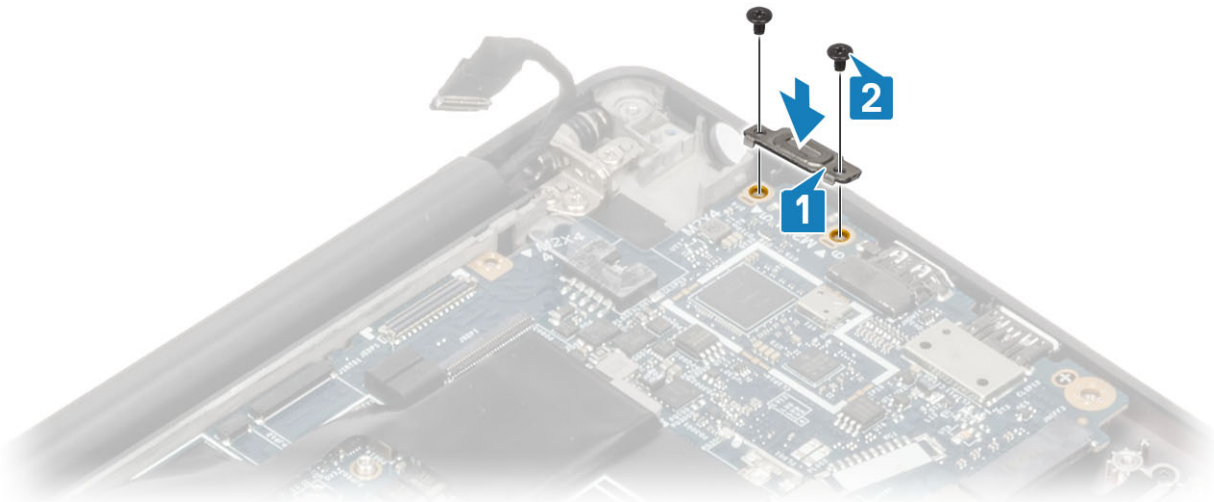
4. Install the DDR ESD bracket [1] on the system board and secure it using two (M2x2.5) screws to the system board [2]
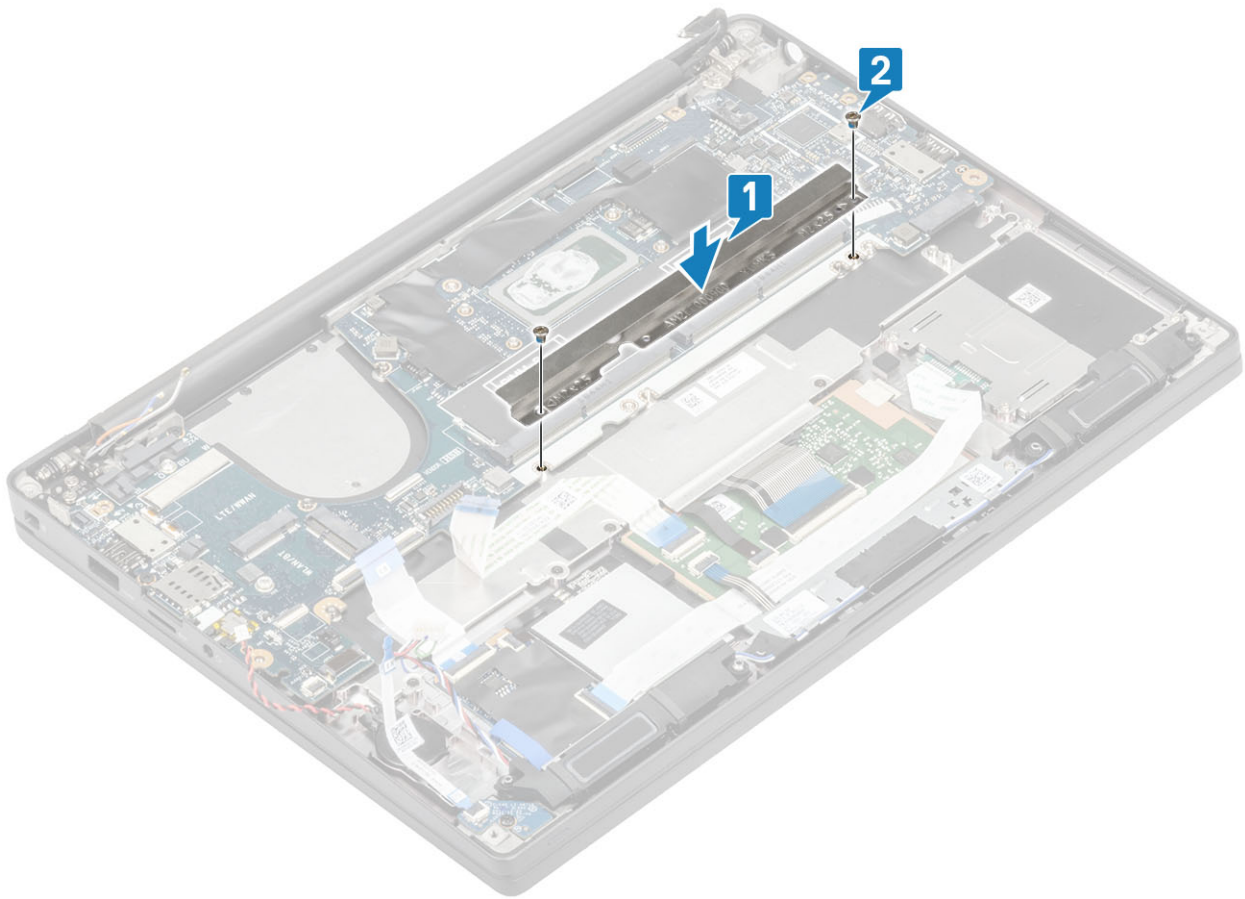
5. Open the latch and connect the USH board cable [1] and the touchpad cable [2] to the system board.
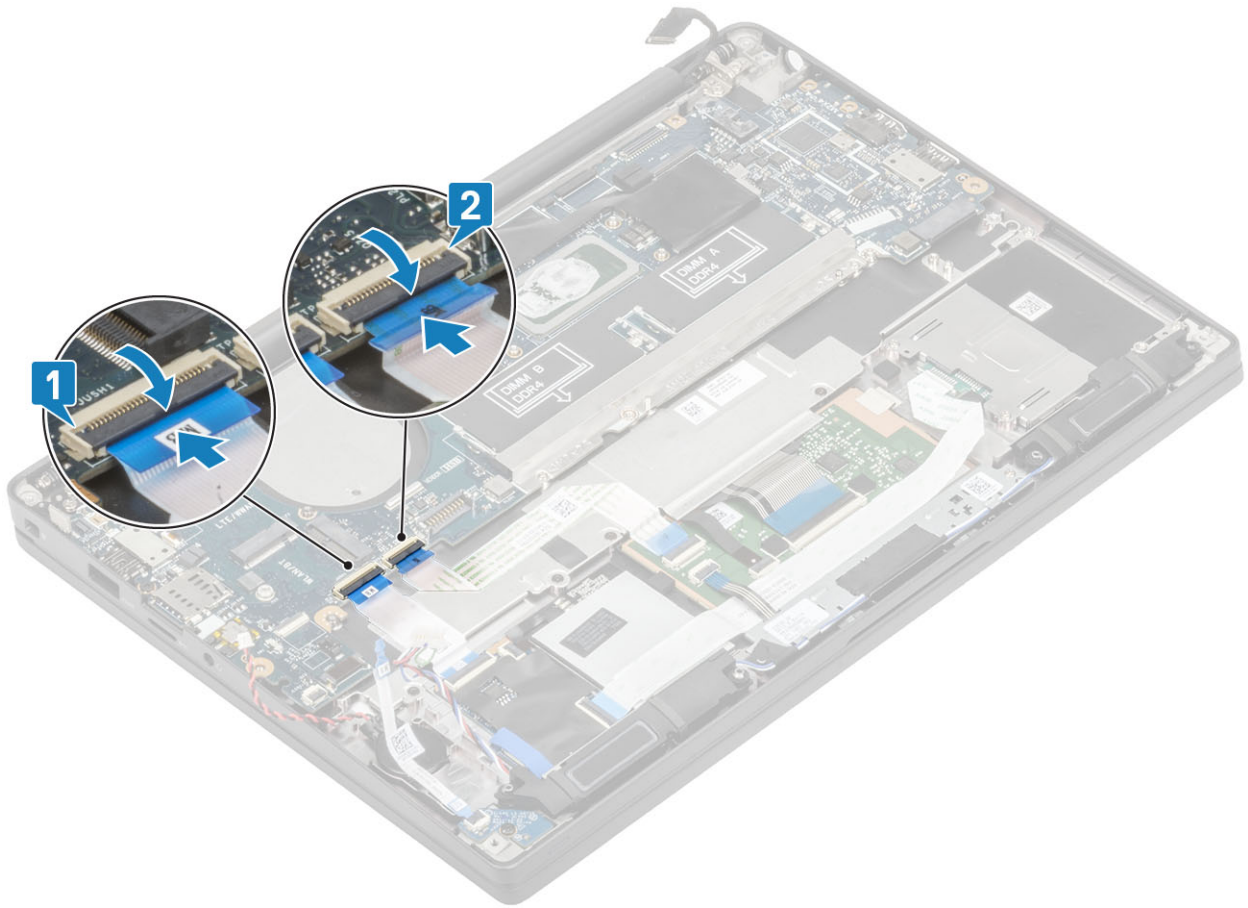
6. Connect the coin cell [1], speaker cable [2], and the LED daughterboard ribbon cable [3] to the system board.
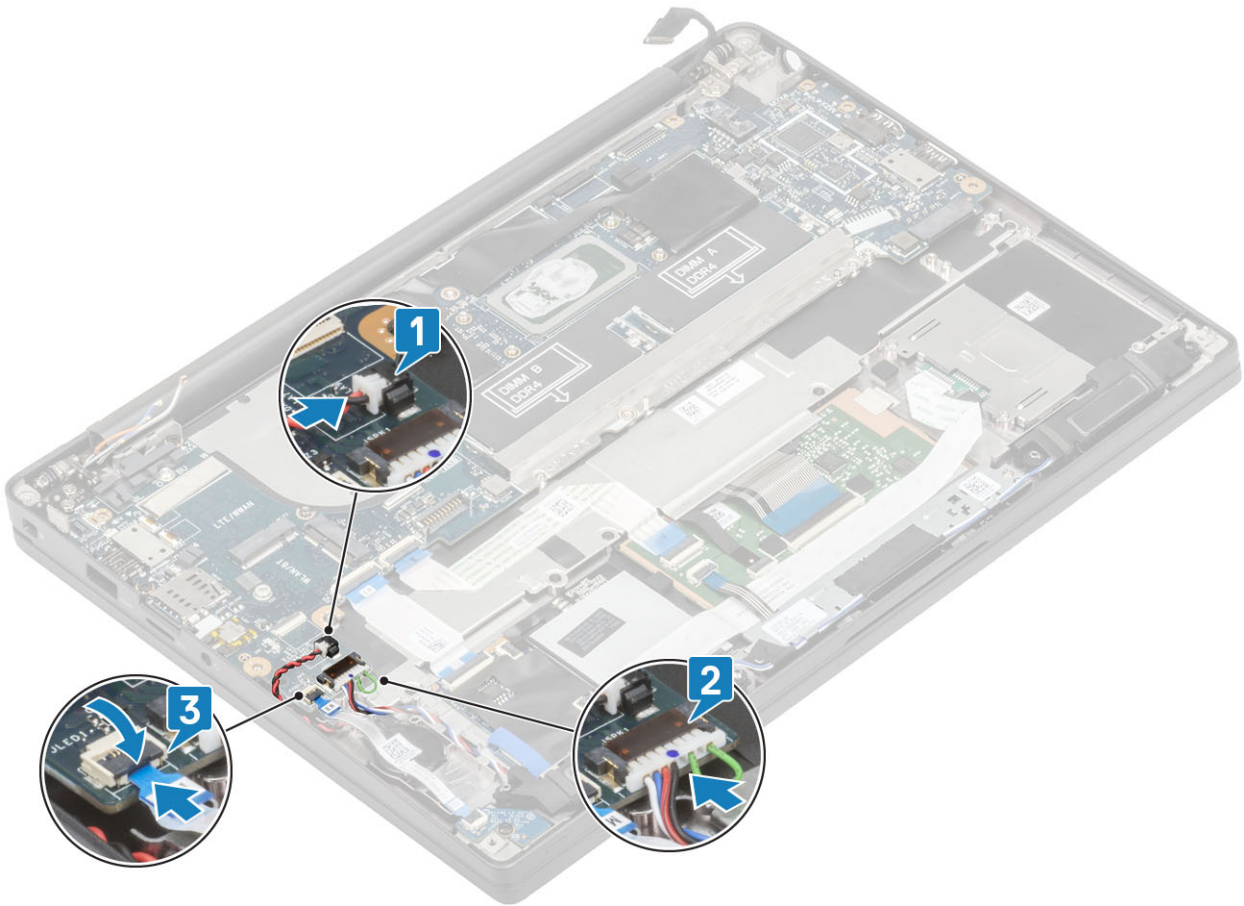
7. Install the metal bracket on the Darwin connector [1] and secure it to the palmrest using a single (M2x4) screw [2] to the system board.
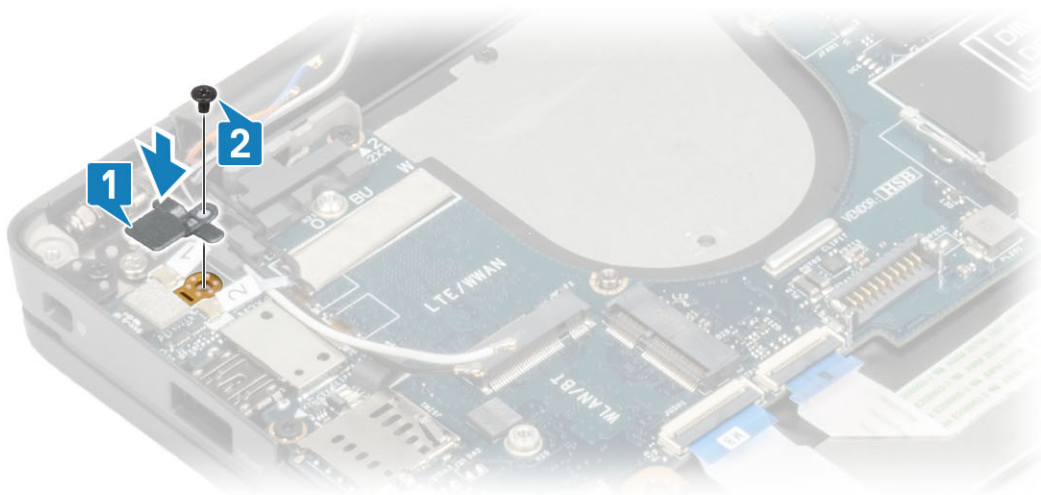
8. Route the display cable through the metal bracket [1] and connect it to the system board [2].
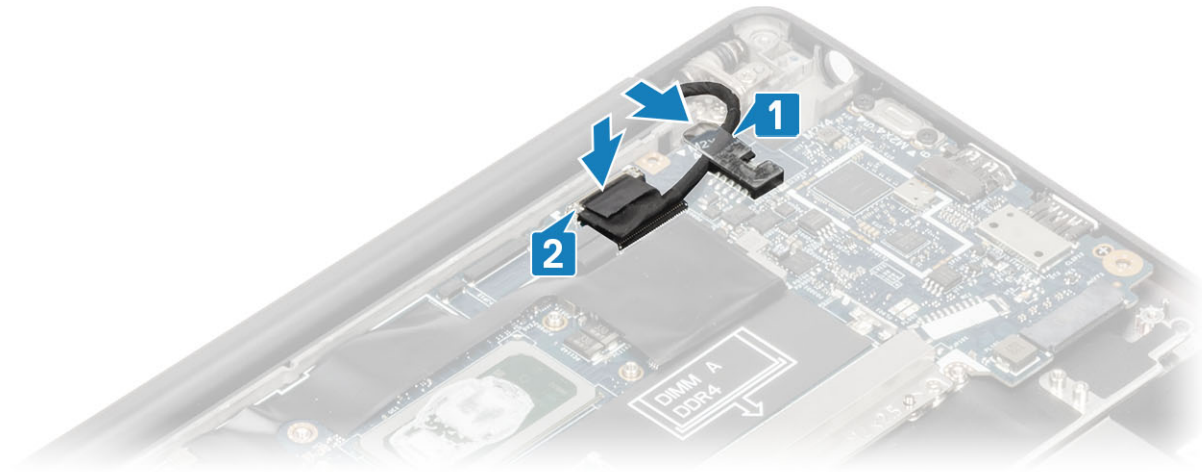
9. Install the display cable bracket [1] on the EDP connector of the system board and secure it using a single (M2x3) screw [2].
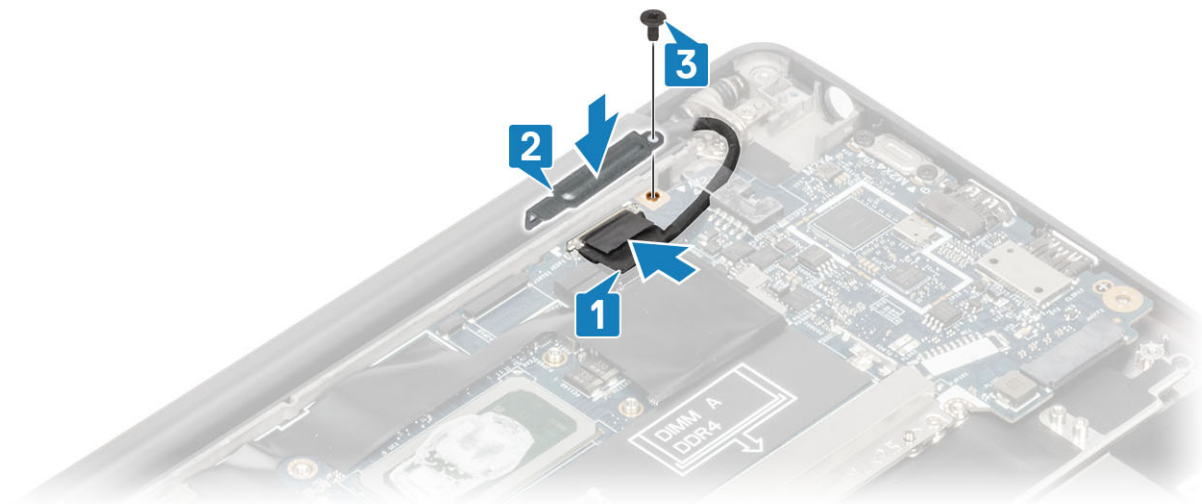
10. Connect the power button (with finger print reader) cable to the system board [1].
11. Connect the Darwin WWAN antenna cables [2] to the the system board.
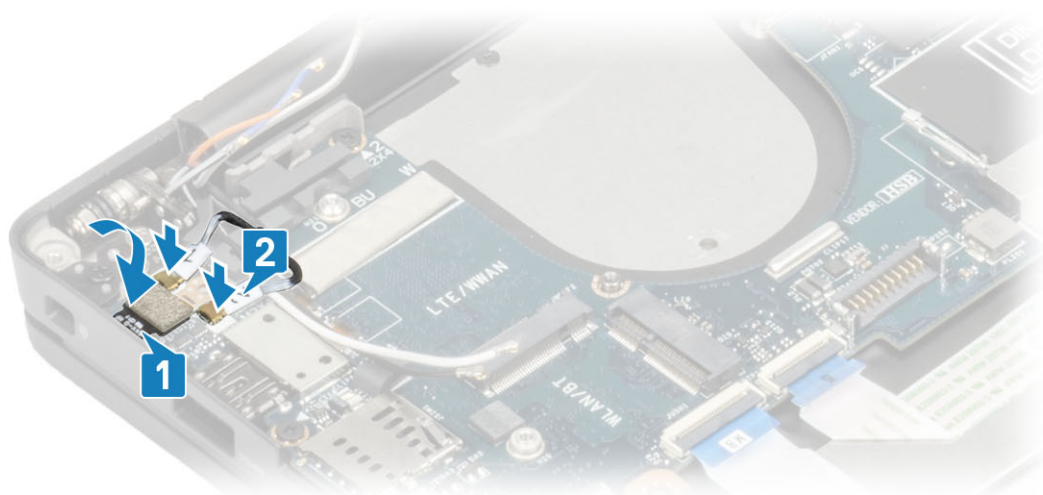
1. Install the display assembly
2. Install the power adapter port.
3. Install the heatsink-fan assembly.

4. Install the WLAN card.
5. Install the SSD.
6. Install the memory.
7. Install the battery.
8. Install the base cover.
9. Follow the procedure after working inside your computer.

Power-Button Board

Removing the power-button board

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the memory.
5. Remove the SSD.
6. Remove the WLAN card.
7. Remove the heatsink-fan assembly.
8. Remove the power adapter port.
9. Remove the speaker.
10. Remove the display assembly.
11. Remove the system board.
1. Remove the two (M2x2.5) screws, that secure the power-button board to the palmrest assembly [1].
2. Remove the power-button board from its slot, in the palmrest assembly [2].

   ⓘ **NOTE:** Power-button board with Finger Print Reader (FPR), has a cable that disconnects from the system board.
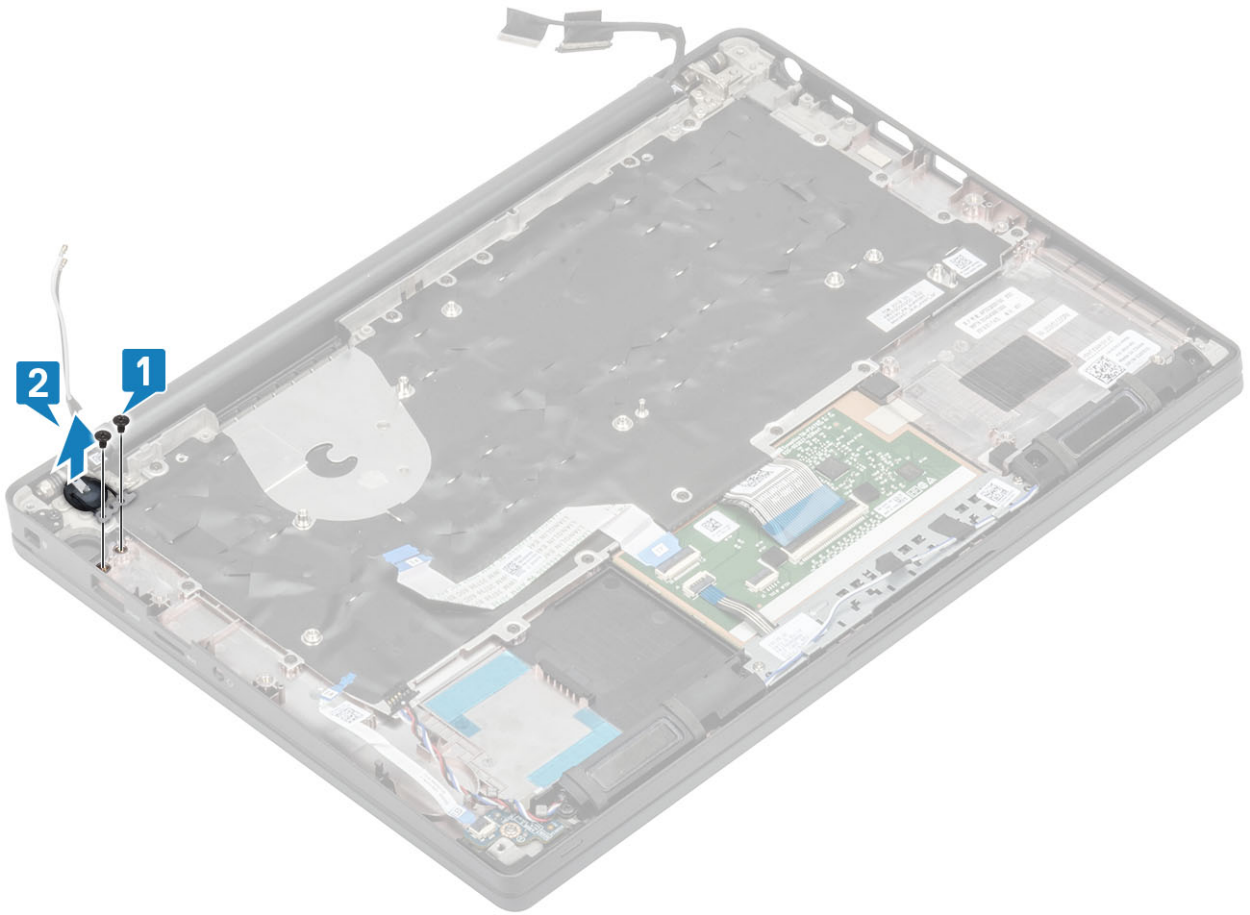
Figure 3. Power-button board without FPR
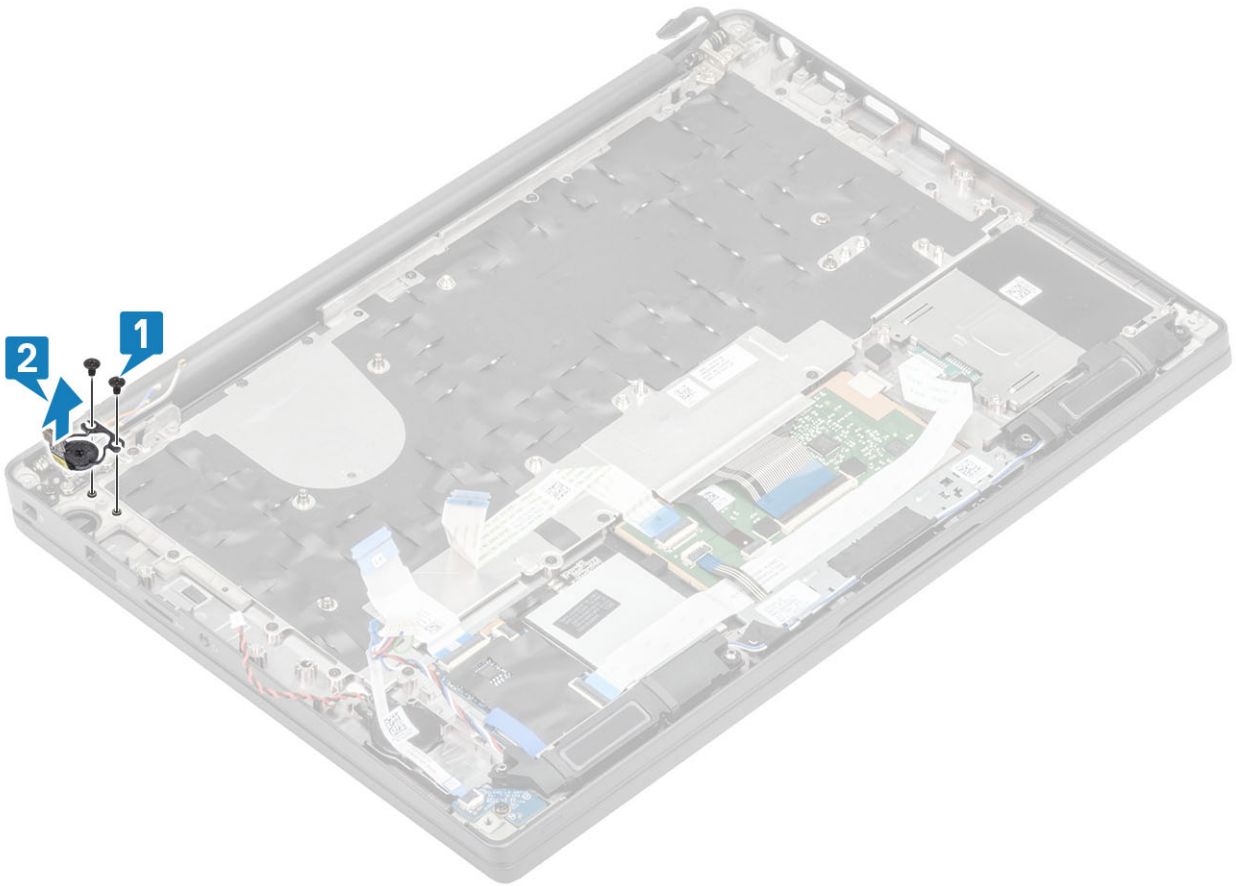
Figure 4. Removing the power-button board with FPR

Installing the power-button board

1. Align and place the power-button board in to its slot on the plamrest assembly [1].
2. Replace the two (M2x2.5) screws to secure the power-button board to the palmrest assembly [2].
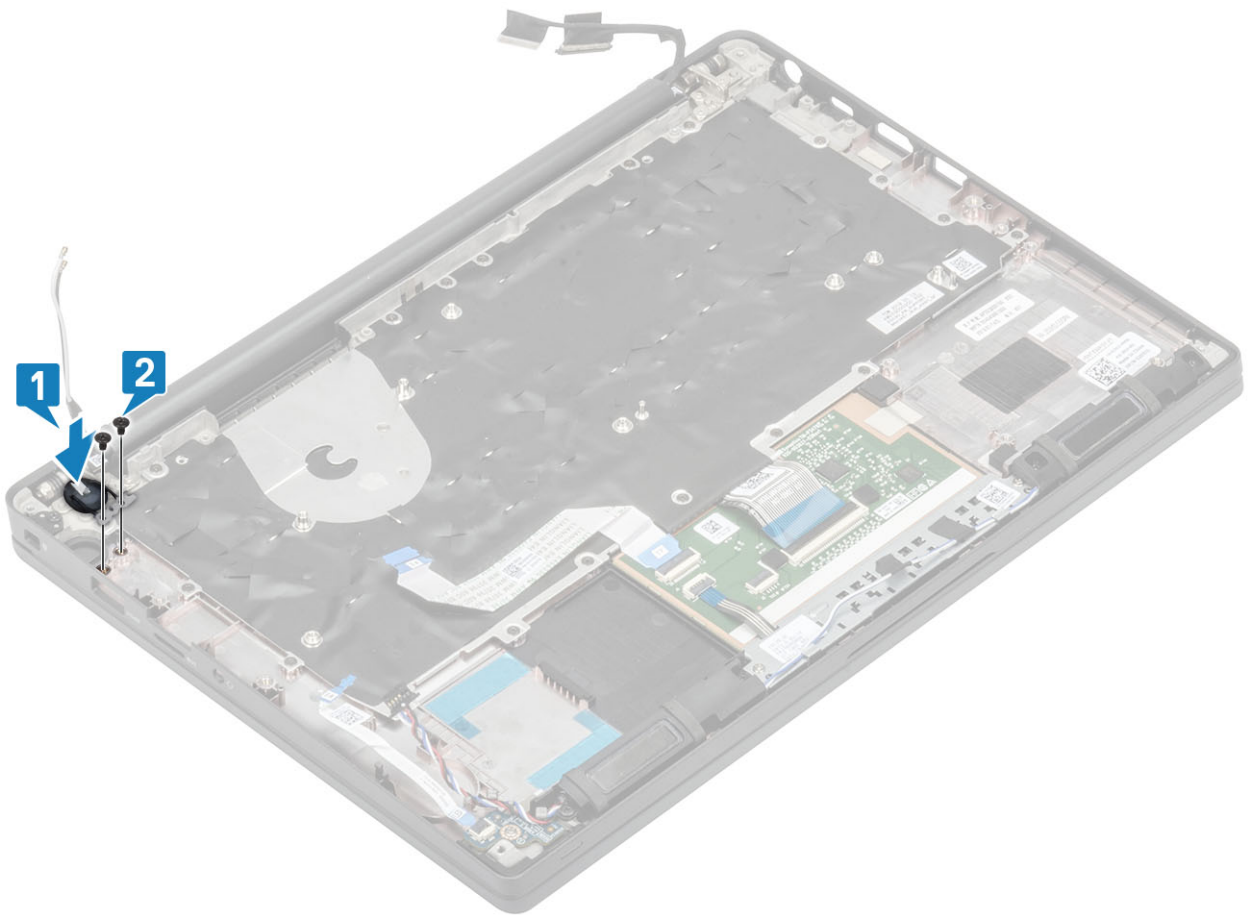
Figure 5. Power-button board - without FPR
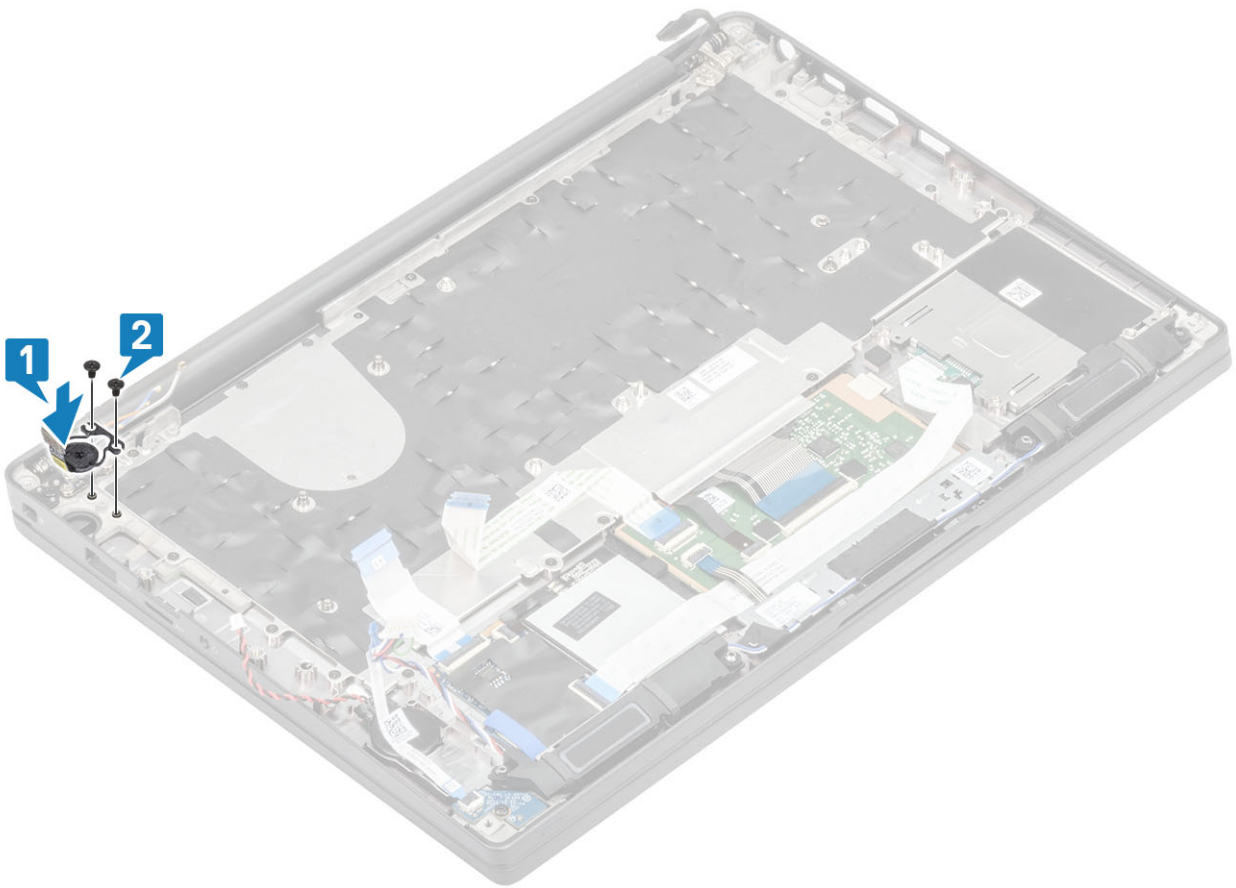
Figure 6. Installing the power-button board with FPR

ⓘ **NOTE:** Power-button board with finger print reader, has a cable that connects to the system board.

1. Install the system board.
2. Install the touchpad buttons.
3. Install the display assembly.
4. Install the power adapter port.
5. Install the heatsink-fan assembly.
6. Install the WLAN card.
7. Install the SSD.
8. Install the memory.
9. Install the battery.
10. Install the base cover.
11. Follow the procedure after working inside your computer.

Keyboard

Removing the keyboard

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the memory.
5. Remove the SSD.
6. Remove the WLAN card.

7. Remove the heatsink-fan assembly.
8. Remove the power adapter port.
9. Remove the display assembly.
10. Remove the system board.
11. Remove the coin cell.
12. Remove the power-button board.
1. Lift the latch and disconnect the keyboard cable [1] and the backlight cable [2] from the touchpad module.
2. ⓘ **NOTE:** This image shows disassembly of a carbon fiber variant, an Aluminum variant of this model has 21 M1.6x2 screws securing the keyboard assembly to palmrest.

   Remove the 19 (M1.6x2) screws [3] and separate the keyboard assembly from the palmrest [4].
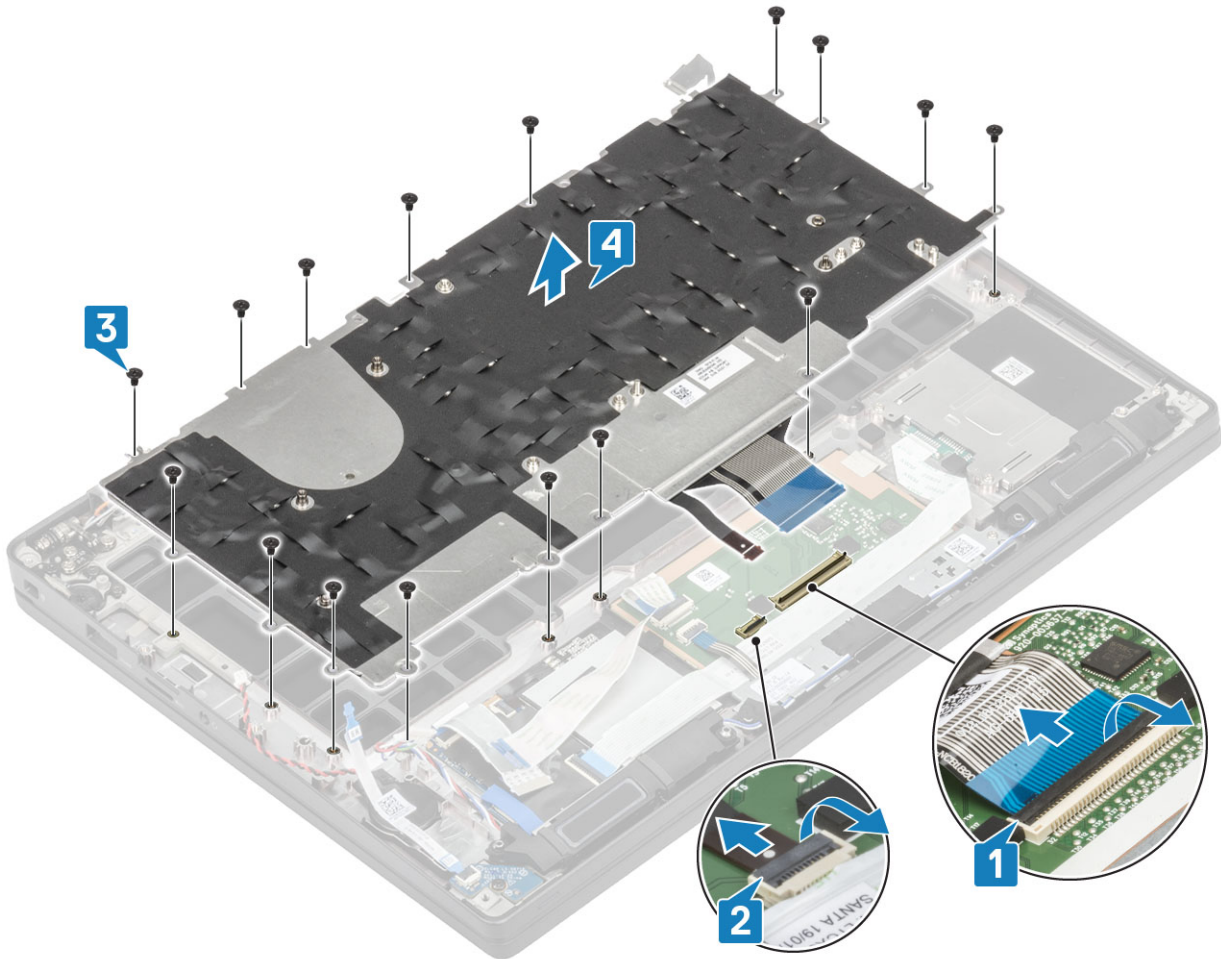
3. Remove the five (M2x2) screws [1] to lift the keyboard from the keyboard support plate.
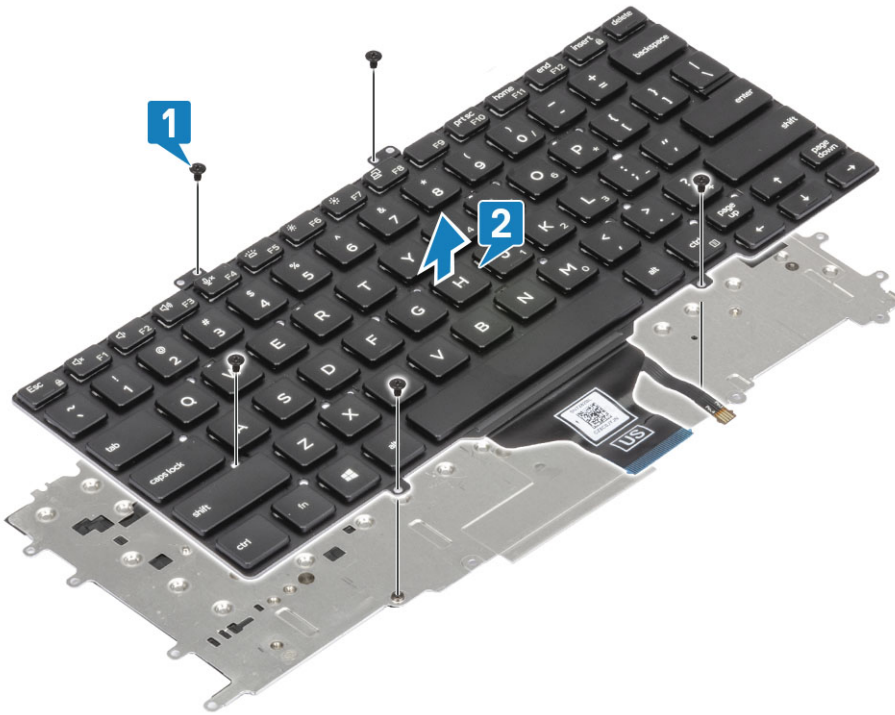
Installing the keyboard

1. ⓘ **NOTE:** The keyboard has multiple snap points on the lattice side which must be pushed down firmly at the snap points in order to secure and fit it to the replacement keyboard.

    Align the keyboard to the keyboard support plate [1] and replace the two (M2x2) screws [2].
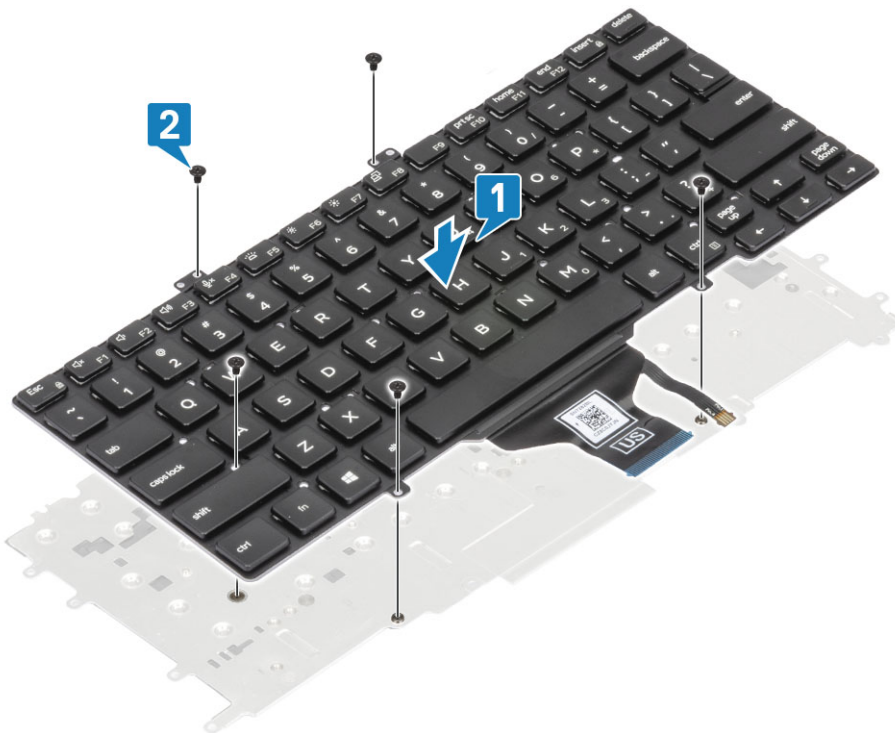
2. Place the keyboard assembly in the palmrest [1] and secure it with the 17 (M1.6x2) screws [2].

    ⓘ **NOTE:** This image shows disassembly of a carbon fiber variant, an Aluminum variant of this model has 21 M1.6x2 screws securing the keyboard assembly to palmrest. assembly.

3. Connect the keyboard cable [3] and the backlight cable [4] to the touchpad module.
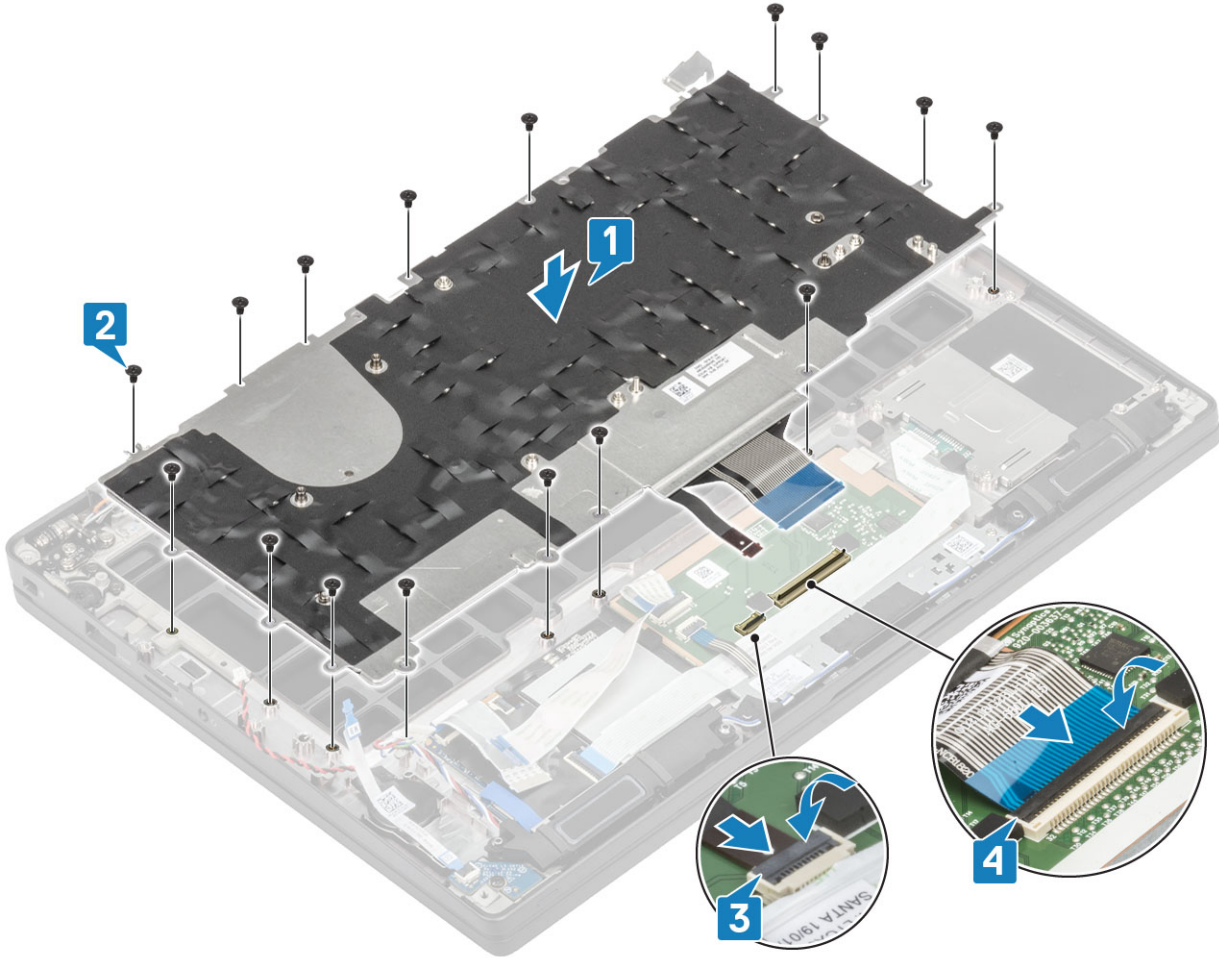
1. Install the power button.
2. Install the coin cell.
3. Install the system board.
4. Install the display assembly
5. Install the power adapter port.
6. Install the heatsink-fan assembly.
7. Install the WLAN card.
8. Install the SSD.
9. Install the memory.
10. Install the battery.
11. Install the base cover.
12. Follow the procedure after working inside your computer.

Palmrest

1. Follow the procedure in before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the memory.
5. Remove the SSD.
6. Remove the WLAN card.
7. Remove the heatsink-fan assembly.
8. Remove the power adapter port.
9. Remove the LED daughterboard.

10. Remove the speaker.
11. Remove the display assembly.
12. Remove the touchpad buttons.
13. Remove the system board.
14. Remove the coin cell.
15. Remove the power button.
16. Remove the keyboard.
1. After removing these components, you are left with the palmrest assembly.

2. Install the following components to the new palmrest assembly:
1. Install the keyboard.
2. Install the power button.
3. Install the coin cell.
4. Install the system board.
5. Install the display assembly.
6. Install the speaker.
7. Install the LED board.
8. Install the power adapter port.
9. Install the heatsink-fan assembly.
10. Install the WLAN card.
11. Install the SSD.
12. Install the memory.
13. Install the battery.
14. Install the base cover.
15. Follow the procedure after working inside your computer.

System setup

⚠ **CAUTION: Unless you are an expert computer user, do not change the settings in the BIOS Setup program. Certain changes can make your computer work incorrectly.**

ⓘ **NOTE:** Before you change BIOS Setup program, it is recommended that you write down the BIOS Setup program screen information for future reference.

Use the BIOS Setup program for the following purposes:
- Get information about the hardware installed in your computer, such as the amount of RAM and the size of the hard drive.
- Change the system configuration information.
- Set or change a user-selectable option, such as the user password, type of hard drive installed, and enabling or disabling base devices.

Topics:

- BIOS overview
- Entering BIOS setup program
- Navigation keys
- One time boot menu
- System setup options
- Updating the BIOS
- System and setup password
- Clearing CMOS settings
- Clearing BIOS (System Setup) and System passwords

BIOS overview

The BIOS manages data flow between the computer's operating system and attached devices such as hard disk, video adapter, keyboard, mouse, and printer.

Entering BIOS setup program

1. Turn on your computer.
2. Press F2 immediately to enter the BIOS setup program.

   ⓘ **NOTE:** If you wait too long and the operating system logo appears, continue to wait until you see the desktop. Then, turn off your computer and try again.

Navigation keys

ⓘ **NOTE:** For most of the System Setup options, changes that you make are recorded but do not take effect until you restart the system.

Table 2. Navigation keys

Keys	Navigation
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.

Table 2. Navigation keys (continued)

Keys	Navigation
Enter	Selects a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area. ⓘ **NOTE:** For the standard graphics browser only.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.

One time boot menu

To enter **one time boot menu**, turn on your computer, and then press F12 immediately.

ⓘ **NOTE:** It is recommended to shutdown the computer if it is on.

The one-time boot menu displays the devices that you can boot from including the diagnostic option. The boot menu options are:

- Removable Drive (if available)
- STXXXX Drive (if available)
  ⓘ **NOTE:** XXX denotes the SATA drive number.
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

The boot sequence screen also displays the option to access the System Setup screen.

System setup options

ⓘ **NOTE:** Depending on the laptop and its installed devices, the items listed in this section may or may not appear.

General options

Table 3. General

Option	Description

System Information	This section lists the primary hardware features of your computer.
	
	The options are:
	
	- **System Information**
	  - BIOS version
	  - Service Tag
	  - Asset Tag
	  - Ownership Tag
	  - Manufacture Date
	  - Express Service Code
	- **Memory Configuration**
	  - Memory Installed

Table 3. General (continued)

Option	Description

	○ Memory Available
	    ○ Memory Speed
	    ○ Memory Channel Mode
	    ○ Memory Technology
	    ○ DIMM A Size
	    ○ DIMM B Size
	    ⓘ **NOTE:** Due to an amount of memory being assigned for system use, "Memory Available" is less than "Memory Installed". Note that certain operating systems may not be able to use all the available memory.
	● **Processor Information**
	    ○ Processor Type
	    ○ Core Count
	    ○ Processor ID
	    ○ Current Clock Speed
	    ○ Minimum Clock Speed
	    ○ Maximum Clock Speed
	    ○ Processor L2 Cache
	    ○ Processor L3 Cache
	    ○ HT Capable
	    ○ 64-Bit Technology
	● **Device Information**
	    ○ M.2 SATA
	    ○ M.2 SATA1
	    ○ M.2 PCIe SSD-0
	    ○ M.2 PCIe SSD-1
	    ○ Passthrough MAC Address
	    ○ Video Controller
	    ○ Video BIOS Version
	    ○ Video Memory
	    ○ Panel Type
	    ○ Native Resolution
	    ○ Privacy Screen
	        ⓘ **NOTE:** Applicable for e-Privacy version.
	    ○ Audio Controller
	    ○ Wi-Fi Device
	    ○ Bluetooth Device

Battery Information	Displays the battery status and the type of AC adapter connected to the computer.
Boot Sequence	Allows you to change the order in which the computer attempts to find an operating system. The options are: ● **Windows Boot Manager**—Default ● **Boot List Option:** Allows you to add, delete and, view the boot list options.
Advanced Boot Options	Allows you to Enable Legacy Option ROMs. ● **Enable UEFI Network Stack**—Default

Table 3. General (continued)

Option	Description
UEFI Boot Path Security	Allows you to control whether the system prompts the user to enter the Admin password when booting to a UEFI boot path.
	Click one of the following options:
	● **Always, Except Internal HDD**—Default
	● **Always, Except Internal HDD & PXE**
	● **Always**
	● **Never**
Date/Time	Allows you to set the date and time. The change to the system date and time takes effect immediately.

System configuration

Table 4. System Configuration

Option	Description
SATA Operation	Allows you to configure the operating mode of the integrated SATA hard-drive controller.
	Click one of the following options:
	● **Disabled**
	● **AHCI**
	● **RAID On**—Default
	ⓘ **NOTE:** SATA is configured to support RAID mode.
Drives	These fields let you enable or disable various drives on board.
	The options are:
	● **SATA-1**
	● **SATA-2**
	● **M.2 PCIe SSD-0**
	● **M.2 PCIe SSD-1**
SMART Reporting	This field controls whether hard drive errors for integrated drives are reported during startup.
	The option is disabled by default.
USB Configuration	Allows you to enable or disable the internal/integrated USB configuration.
	The options are:
	● **Enable USB Boot Support**
	● **Enable External USB Ports**
	All the options are set by default.
	ⓘ **NOTE:** USB keyboard and mouse always work in the BIOS setup irrespective of these settings.
Dell Type-C Dock Configuration	Allows you to connect to Dell WD and TB family of docks(Type-C Docks) independent of USB and thunderbolt adapter configuration.
	This option is enabled by default.
Thunderbolt™ Adapter Configuration	Allows you to enable or disable Thunderbolt options:

Table 4. System Configuration (continued)

Option	Description
	• **Thunderbolt (Enabled by Defualt)** • **Enable Thunderbolt Boot Support** • **Enable Thunderbolt (and PCIe behind TBT) Pre-boot** With following security levels : • **No Security** • **User Authentication (Enabled by Defualt)** • **Secure Connect** • **Display Port and USB Only**
Thunderbolt™ Auto Switch	This option configures the method used by the Thunderbolt controller to perform PCIe device enumeration. • **Auto Switch** : The BIOS will automatically switch between BIOS Assist and Native Thunderbolt PC device enumeration modes to get all benefits of the installed OS • **Native Enumeration**: The BIOS will program the Thunderbolt controller to Native mode (Auto Switching is disabled) • **BIOS Assist Enumeration**: The BIOS will program the Thunderbolt controller to BIOS Assist mode (Auto Switching is disabled) ⓘ **NOTE:** A reboot is required for these changes to take effect.
USB PowerShare	This option enable/disable the USB PowerShare feature behavior. This option is disabled by default.
Audio	Allows you to enable or disable the integrated audio controller. By default, the **Enable Audio** option is selected. The options are: • **Enable Microphone** • **Enable Internal Speaker** This option is set by default.
Keyboard Illumination	This field lets you choose the operating mode of the keyboard illumination feature. • **Disabled**: The Keyboard illumination will always be off or 0%. • **Dim**: Enable the keyboard illumination feature at 50% brightness. • **Bright (Enabled by Defualt)**: Enable the keyboard illumination feature at 100% brightness level. ⓘ **NOTE:** Option present on system opted with backlit keyboard.
Keyboard Backlight Timeout on AC	This feature defines the timeout value for the keyboard backlight when an AC adapter is plugged into the system. Options are: • **5 seconds** • **10 seconds**(Default) • **15 seconds** • **30 seconds** • **1 minute**

Table 4. System Configuration (continued)

Option	Description
	● **5 minute** ● **15 minute** ● **Never** ⓘ **NOTE:** Option present on system opted with backlit keyboard.
Keyboard Backlight Timeout on Battery	This feature defines the timeout value for the keyboard backlight when the system is running only on battery power. Options are: ● **5 seconds** ● **10 seconds**(Default) ● **15 seconds** ● **30 seconds** ● **1 minute** ● **5 minute** ● **15 minute** ● **Never** ⓘ **NOTE:** Option present on system opted with backlit keyboard.
Unobtrusive Mode	When enabled, pressing Fn+F7 will turn off all light and sound emission in the system. Press Fn+F7 to resume normal operation. Default is Disabled.
Fingerprint Reader	Enable or disable the Fingerprint Reader or the Fingerprint Reader Device's Single Sign On capability. ● **Enable Fingerprint Reader Device**: Enabled by Default ⓘ **NOTE:** Option present on system opted with finger print reader on the power button.
Miscellaneous devices	Allows you to enable or disable various on board devices. ● **Enable Camera**—Default ● **Enable Secure Digital (SD) Card** ● **Secure Digital (SD) Card Boot** - Disabled ● **Secure Digital Card (SD) Read-Only Mode** - Disabled
MAC Address Pass-Through	This feature replaces the external NIC MAC address (in a supported dock or dongle) with the selected MAC address from the system. The options are ● **System Unique MAC Address**— Default ● **Disabled**

Video screen options

Table 5. Video

Option	Description
LCD Brightness	Allows you to set the display brightness depending upon the power source. On Battery(100% is default) and On AC (100 % is default).

Table 5. Video (continued)

Option	Description
Privacy Screen	This option Enables or Disables the Privacy Screen if the Panel supports this feature. The options are: ● **Disabled**: When Disabled the privacy screen is not applied to the embedded display panel. ● **Enabled — Default**: When enabled, the privacy screen is applied to the embedded display panel and can be toggled between public mode and privacy mode using the Fn+F9 key combination on the embedded keyboard. ● **Always On**: When always on the privacy screen is always on and cannot be turned off by the user. ⓘ **NOTE:** This option is present if the display supports e-Privacy panel.

Security

Table 6. Security

Option	Description
Admin Password	Allows you to set, change, or delete the administrator(admin) password. The entries to set password are: ● **Enter the old password:** ● **Enter the new password:** ● **Confirm new password:** Click **OK** once you set the password. ⓘ **NOTE:** For the first time login, "Enter the old password:" field is marked to "Not set". Hence, password has to be set for the first time you log in and then you can change or delete the password.
System Password	Allows you to set, change, or delete the System password. The entries to set password are: ● **Enter the old password:** ● **Enter the new password:** ● **Confirm new password:** Click **OK** once you set the password. ⓘ **NOTE:** For the first time login, "Enter the old password:" field is marked to "Not set". Hence, password has to be set for the first time you log in and then you can change or delete the password.
Strong Password	Allows you to enforce the option to always set strong password. ● **Enable Strong Password** This option is not set by default.
Password Configuration	You can define the length of your password. Min = 4, Max = 32
Password Bypass	Allows you to bypass the System password and the Internal HDD password, when it is set, during a system restart. Click one of the options: ● **Disabled**—Default ● **Reboot bypass**

Table 6. Security (continued)

Option	Description
Password Change	Allows you to change the System password when the administrator password is set. ● **Allow Non-Admin Password Changes** This option is set by default.
UEFI Capsule Firmware Updates	Allows you to update the system BIOS via UEFI capsule update packages. ● **Enable UEFI Capsule Firmware Updates** This option is set by default.
HDD Security	This options controls the mechanism used by BIOS to block external Self Encrypting Drives (SED) management software to take ownership of the SED. The options are: ● **SED Block SID Authentication** ● **PPI Bypass for SED Block SID Command** Both the options are disabled by default. ⓘ **NOTE:** This option is applicable with laptops shipped with SED
TPM 2.0 Security	Allows you to enable or disable the Trusted Platform Module (TPM) during POST. The options are: ● **TPM On**—Default ● **Clear** ● **PPI Bypass for Enable Command**—Default ● **PPI Bypass for Disbale Command** ● **PPI Bypass for Clear Command** ● **Attestation Enable**—Default ● **Key Storage Enable**—Default ● **SHA-256**—Default
Absolute®	This field lets you Enable, Disable, or Permanently Disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute® Software. This option is enabled by default.
OROM Keyboard Access	This option determines whether users are able to enter Option ROM Configuration screens via hotkey during boot. Specifically this settings is capable of preventing access to Intel® RAID(Ctrl+I) or Intel® Management Engine BIOS Extension (Ctrl+P/F12). Options are: ● **Enable**— Default ● **One Time Enable** ● **Disable**
Admin Setup Lockout	Allows you to prevent users from entering Setup when an administrator password is set. ● **Enable Admin Setup Lockout** This option is not set by default.
Master Password Lockout	Allows you to disable master password support. ● **Enable Master Password Lockout** This option is not set by default. ⓘ **NOTE:** Hard Disk password should be cleared before the settings can be changed.
SMM Security Mitigation	Allows you to enable or disable additional UEFI SMM Security Mitigation protection. ● **SMM Security Mitigation**

Table 6. Security (continued)

Option	Description
	This option is not set by default.

Secure boot

Table 7. Secure Boot

Option	Description
Secure Boot Enable	Allows you to enable or disable the Secure Boot Feature. ● **Secure Boot Enable**—Default
Secure Boot Mode	Changes to the Secure Boot operation mode modifies the behaviour of Secure Boot to allow evaluation of UEFI driver signatures. Choose one of the option: ● **Deployed Mode**—Default ● **Audit Mode**
Expert Key Management	Allows you to enable or disable Expert Key Management. ● **Enable Custom Mode** This option is not set by default. The Custom Mode Key Management options are: ● **PK**—Default ● **KEK** ● **db** ● **dbx**

Intel Software Guard Extensions options

Table 8. Intel Software Guard Extensions

Option	Description
Intel SGX Enable	This field specifies you to provide a secured environment for running code/storing sensitive information in the context of the main OS. Click one of the following options: ● **Disabled** ● **Enabled** ● **Software controlled**—Default
Enclave Memory Size	This option sets **SGX Enclave Reserve Memory Size** Click one of the following options: ● **32 MB** ● **64 MB** ● **128 MB**—Default

Performance

Option	Description
Multi Core Support	This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores. ● **All**—Default ● **1** ● **2** ● **3**
Intel SpeedStep	Allows you to enable or disable the Intel SpeedStep mode of processor. ● **Enable Intel SpeedStep** This option is set by default.
C-States Control	Allows you to enable or disable the additional processor sleep states. ● **C states** This option is set by default.
Intel® TurboBoost™	This option enables or disables the Intel® TurboBoost™ mode of the processor
Hyper-Thread Control	Allows you to enable or disable the HyperThreading in the processor. ● **Disabled** ● **Enabled**—Default

Power management

Option	Description
AC Behavior	Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected. ● **Wake on AC** This option is not set by default.
Enable Intel Speed Shift technology	This option is used to enable/disable Intel Speed Shift Technology. This option is not set by default.
Auto On Time	Allows you to set the time at which the computer must turn on automatically. The options are: ● **Disabled**—Default ● **Every Day** ● **Weekdays** ● **Select Days** This option is not set by default.
USB Wake Support	Allows you to enable USB devices to wake the system from standby.

Table 10. Power Management (continued)

Option	Description
	● **Wake on Dell USB-C Dock** This option is set by default.
Wireless Radio Control	This option if enabled, will sense the connection of the system to a wired network and subsequently disable the selected wireless radios (WLAN and/or WWAN). Upon disconnection from the wired network the selected wireless radio will ne enabled. ● **Control WLAN radio** ● **Control WWAN radio** Both the options are not set by default.
Block Sleep	This option lets you to block entering to sleep in OS environment. This option is not set by default.
Peak Shift	Allows you enable of disable the Peak shift feature. This feature when enabled minimizes the AC power usage at times of peak demand. Battery doesnot charge between the Peak Shift start and end time Peak Shift Start and End Time can be configured for all weekdays This option set the battery threshold value (15 % to 100 %)
Advanced Battery Charge Configuration	This option enables you to maximize the battery health. By enabling this option, your system uses the standard charging algorithm and other techniques, during the non-work hours to improve the battery health. Advanced Battery Charge Mode can be configured for all weekdays
Primary Battery Charge Configuration	Allows you to select the charging mode for the battery. The options are: ● **Adaptive**—Default ● **Standard** - Fully charges your battery at a standard rate. ● **ExpressCharge™**- The battery charges over a shorter period of time using Dell's fast charging technology. ● **Primarily AC use** ● **Custom** If Custom Charge is selected, you can also configure Custom Charge Start and Custom Charge Stop. ⓘ **NOTE:** All charging mode may not be available for all the batteries.

Post behavior

Table 11. POST Behavior

Option	Description
Adapter Warnings	Allows you to enable or disable the system setup (BIOS) warning messages when you use certain power adapters. ● **Enable Adapter Warnings**—Default
Keyboard Embedded	This option lets you choose one of two methods to enable the keypad that is embedded in the internal keyboard. The options are: ● **Fn Key Only** ● **By Numlock**
Numlock Enable	Allows you to enable or disable the Numlock function when the system boots.

Table 11. POST Behavior (continued)

Option	Description
	● **Enable Numlock**—Default
Fn Lock Options	Allows you to let hot key combinations Fn + Esc toggle the primary behavior of F1–F12, between their standard and secondary functions. If you disable this option, you cannot toggle dynamically the primary behavior of these keys. ● **Fn Lock**—Default Click one of the following options: ● **Lock Mode Disable/Standard** ● **Lock Mode Enable/Secondary**—Default
Fastboot	Allows you to speed up the boot process by bypassing some of the compatibility steps. Click one of the following options: ● **Minimal**—Default ● **Thorough** ● **Auto**
Extended BIOS POST Time	Allows you to create an additional preboot delay. Click one of the following options: ● **0 seconds**—Default ● **5 seconds** ● **10 seconds**
Full Screen Logo	Allows you to display full screen logo, if your image matches screen resolution. ● **Enable Full Screen Logo** This option is not set by default.
Warnings and Errors	Allows you to select different options to either stop, prompt and wait for user input, continue when warnings are detected but pause on errors, or continue when either warnings or errors are detected during the POST process. Click one of the following options: ● **Prompt on Warnings and Errors**—Default ● **Continue on Warnings** ● **Continue on Warnings and Errors**

Manageability

ⓘ **NOTE:** This option is present if the system has Intel V-Pro enabled.

Table 12. Manageability

Option	Description
Intel AMT Capability	This option allows to enable and disable the Intel AMT Capabilities of the system. The options are: ● **Disabled** ● **Enabled** ● **Restrict MEBx Access**
USB Provision	When enabled Intel AMT can be provisioned using the local provisioning file via a USB storage device. This option is disabled by default.

Table 12. Manageability (continued)

Option	Description
MEBx Hotkey	This option specifies whether the MEBx Hotkey function should be enabled when the system boots.

Virtualization support

Table 13. Virtualization Support

Option	Description
Virtualization	This option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by the Intel Virtualization technology. ● **Enable Intel Virtualization Technology** This option is set by default.
VT for Direct I/O	Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by the Intel Virtualization technology for direct I/O. ● **Enable VT for Direct I/O** This option is set by default.
Trusted Execution	This option specifies whether a Measured Virtual Machine Monitor (MVMM) can utilize the additional hardware capabilities provided by Intel® Trusted Execution Technology. (i) **NOTE:** The TPM has to be enabled and activated and Virtualization Technology and VT for Direct I/O must be enabled to use this feature.

Wireless options

Table 14. Wireless

Option	Description
Wireless Device Enabled	Allows to set the wireless devices that can be controlled by the wireless switch. The options are: ● **WWAN / GPS** ● **WLAN** ● **Bluetooth®** All the options are enabled by default.

Maintenance

Table 15. Maintenance

Option	Description
Service Tag	Displays the service tag of your computer.
Asset Tag	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.
BIOS Downgrade	Allows you to flash previous revisions of the system firmware.

Table 15. Maintenance (continued)

Option	Description
	● **Allow BIOS Downgrade** This option is set by default.
Data Wipe	Allows you to securely erase data from all internal storage devices. ● **Wipe on Next Boot** This option is not set by default.
Bios Recovery	**BIOS Recovery from Hard Drive**—This option is set by default. Allows you to recover the corrupted BIOS from a recovery file on the HDD or an external USB key. **BIOS Auto-Recovery**— Allows you to recover the BIOS automatically. ⓘ **NOTE: BIOS Recovery from Hard Drive** field should be enabled. **Always Perform Integrity Check**—Performs integrity check on every boot.

System logs

Table 16. System Logs

Option	Description
BIOS events	Allows you to view and clear the System Setup (BIOS) POST events.
Thermal Events	Allows you to view and clear the System Setup (Thermal) events.
Power Events	Allows you to view and clear the System Setup (Power) events.

Updating the BIOS

Updating the BIOS in Windows

⚠ **CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: https://www.dell.com/support/article/sln153694**

1. Go to www.dell.com/support.
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.

   ⓘ **NOTE:** If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.

3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.

   For more information, see knowledge base article 000124211 at www.dell.com/support.

Updating the BIOS in Linux and Ubuntu

To update the system BIOS on a computer that is installed with Linux or Ubuntu, see the knowledge base article 000131486 at www.dell.com/support.

Updating the BIOS using the USB drive in Windows

⚠ **CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: https://www.dell.com/support/article/sln153694**

1. Follow the procedure from step 1 to step 6 in Updating the BIOS in Windows to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, see the knowledge base article 000145519 at www.dell.com/support.
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F12** .
6. Select the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
   The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS from the F12 One-Time boot menu

Update your computer BIOS using the BIOS update.exe file that is copied to a FAT32 USB drive and booting from the F12 One-Time boot menu.

⚠ **CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: https://www.dell.com/support/article/sln153694**

BIOS Update

You can run the BIOS update file from Windows using a bootable USB drive or you can also update the BIOS from the F12 One-Time boot menu on the computer.

Most of the Dell computers built after 2012 have this capability, and you can confirm by booting your computer to the F12 One-Time Boot Menu to see if BIOS FLASH UPDATE is listed as a boot option for your computer. If the option is listed, then the BIOS supports this BIOS update option.

ⓘ **NOTE:** Only computers with BIOS Flash Update option in the F12 One-Time boot menu can use this function.

Updating from the One-Time boot menu

To update your BIOS from the F12 One-Time boot menu, you need the following:

● USB drive formatted to the FAT32 file system (key does not have to be bootable)
● BIOS executable file that you downloaded from the Dell Support website and copied to the root of the USB drive
● AC power adapter that is connected to the computer
● Functional computer battery to flash the BIOS

Perform the following steps to perform the BIOS update flash process from the F12 menu:

⚠ **CAUTION: Do not turn off the computer during the BIOS update process. The computer may not boot if you turn off your computer.**

1. From a turn off state, insert the USB drive where you copied the flash into a USB port of the computer.

2. Turn on the computer and press F12 to access the One-Time Boot Menu, select BIOS Update using the mouse or arrow keys then press Enter.
   The flash BIOS menu is displayed.
3. Click **Flash from file**.
4. Select external USB device.
5. Select the file and double-click the flash target file, and then click **Submit**.
6. Click **Update BIOS**. The computer restarts to flash the BIOS.
7. The computer will restart after the BIOS update is completed.

System and setup password

Table 17. System and setup password

Password type	Description
System password	Password that you must enter to log in to your system.
Setup password	Password that you must enter to access and make changes to the BIOS settings of your computer.

You can create a system password and a setup password to secure your computer.

⚠ **CAUTION: The password features provide a basic level of security for the data on your computer.**

⚠ **CAUTION: Anyone can access the data that is stored on your computer if it is not locked and left unattended.**

ⓘ **NOTE:** System and setup password feature is disabled.

Assigning a system setup password

You can assign a new **System or Admin Password** only when the status is in **Not Set**.

To enter the system setup, press F12 immediately after a power-on or reboot.

1. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
   The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.
   Use the following guidelines to assign the system password:
   ● A password can have up to 32 characters.
   ● At least one special character: ! " # $ % & ' ( ) * + , - . / : ; < = > ? @ [\ ] ^ _ ` { | }
   ● Numbers 0 through 9.
   ● Upper case letters from A to Z.
   ● Lower case letters from a to z.
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press Esc and save the changes as prompted by the pop-up message.
5. Press Y to save the changes.
   The computer restarts.

Deleting or changing an existing system setup password

Ensure that the **Password Status** is Unlocked (in the System Setup) before attempting to delete or change the existing System and/or Setup password. You cannot delete or change an existing System or Setup password, if the **Password Status** is Locked.

To enter the System Setup, press F12 immediately after a power-on or reboot.

1. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.
   The **System Security** screen is displayed.
2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.

3. Select **System Password**, update, or delete the existing system password, and press Enter or Tab.
4. Select **Setup Password**, update, or delete the existing setup password, and press Enter or Tab.

> ⓘ **NOTE:** If you change the System and/or Setup password, reenter the new password when prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.

5. Press Esc and a message prompts you to save the changes.
6. Press Y to save the changes and exit from System Setup.
   The computer restarts.

Clearing CMOS settings

> ⚠ **CAUTION: Clearing CMOS settings will reset the BIOS settings on your computer.**

1. Remove the base cover.
2. Disconnect the battery cable from the system board.
3. Remove the coin-cell battery.
4. Wait for one minute.
5. Replace the coin-cell battery.
6. Connect the battery cable to the system board.
7. Replace the base cover.

Clearing BIOS (System Setup) and System passwords

To clear the system or BIOS passwords, contact Dell technical support as described at www.dell.com/contactdell.

> ⓘ **NOTE:** For information on how to reset Windows or application passwords, refer to the documentation accompanying Windows or your application.

Troubleshooting

Topics:

Handling swollen Lithium-ion batteries

Like most laptops, Dell laptops use lithium-ion batteries. One type of lithium-ion battery is the lithium-ion polymer battery. Lithium-ion polymer batteries have increased in popularity in recent years and have become standard in the electronics industry due to customer preferences for a slim form factor (especially with newer ultra-thin laptops) and long battery life. Inherent to lithium-ion polymer battery technology is the potential for swelling of the battery cells.

Swollen battery may impact the performance of the laptop. To prevent possible further damage to the device enclosure or internal components leading to malfunction, discontinue the use of the laptop and discharge it by disconnecting the AC adapter and letting the battery drain.

Swollen batteries should not be used and should be replaced and disposed of properly. We recommend contacting Dell product support for options to replace a swollen battery under the terms of the applicable warranty or service contract, including options for replacement by a Dell authorized service technician.

The guidelines for handling and replacing Lithium-ion batteries are as follows:

*   Exercise caution when handling Lithium-ion batteries.
*   Discharge the battery before removing it from the system. To discharge the battery, unplug the AC adapter from the system and operate the system only on battery power. When the system will no longer power on when the power button is pressed, the battery is fully discharged.
*   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 type 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 battery can be dangerous.
*   Do not attempt to reassemble a damaged or swollen battery into a laptop.
*   Swollen batteries that are covered under warranty should be returned to Dell in an approved shipping container (provided by Dell)—this is to comply with transportation regulations. Swollen batteries that are not covered under warranty should be disposed of at an approved recycling center. Contact Dell product support at https://www.dell.com/support for assistance and further instructions.
*   Using a non-Dell or incompatible battery may increase the risk of fire or explosion. Replace the battery only with a compatible battery purchased from Dell that is designed to work with your Dell computer. Do not use a battery from other computers with your computer. Always purchase genuine batteries from https://www.dell.com or otherwise directly from Dell.

Lithium-ion batteries can swell for various reasons such as age, number of charge cycles, or exposure to high heat. For more information on how to improve the performance and lifespan of the laptop battery and to minimize the possibility of occurrence of the issue, see Dell Laptop Battery - Frequently Asked Questions.

Dell SupportAssist Pre-boot System Performance Check diagnostics

SupportAssist diagnostics (also known as system diagnostics) performs a complete check of your hardware. The Dell SupportAssist Pre-boot System Performance Check diagnostics 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

(i) **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.

For more information, see https://www.dell.com/support/kbdoc/000180971.

Running the SupportAssist Pre-Boot System Performance Check

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.

Built-in self-test (BIST)

M-BIST

M-BIST (Built In Self-Test) is the system board's built-in self-test diagnostics tool that improves the diagnostics accuracy of system board embedded controller (EC) failures.

(i) **NOTE:** M-BIST can be manually initiated before POST (Power On Self Test).

How to run M-BIST

(i) **NOTE:** M-BIST must be initiated on the system from a power-off state either connected to AC power or with battery only.

1. Press and hold both the **M** key on the keyboard and the **power button** to initiate M-BIST.
2. With both the **M** key and the **power button** held down, the battery indicator LED may exhibit two states:
   a. OFF: No fault detected with the system board
   b. AMBER: Indicates a problem with the system board
3. If there is a failure with the system board, the battery status LED will flash one of the following error codes for 30 seconds:

Table 18. LED error codes

Blinking Pattern		Possible Problem
Amber	White	
2	1	CPU Failure
2	8	LCD Power Rail Failure
1	1	TPM Detection Failure
2	4	Unrecoverable SPI Failure

4. If there is no failure with the system board, the LCD will cycle through the solid color screens described in the LCD-BIST section for 30 seconds and then power off.

LCD Power rail test (L-BIST)

L-BIST is an enhancement to the single LED error code diagnostics and is automatically initiated during POST. L-BIST will check the LCD power rail. If there is no power being supplied to the LCD (i.e., the L-BIST circuit fails), the battery status LED will flash either an error code [2,8] or an error code [2,7].

ⓘ **NOTE:** If L-BIST fails, LCD-BIST cannot function as no power will be supplied to the LCD.

How to invoke L-BIST Test:

1. Press the power button to start the system.
2. If the system does not start up normally, look at the battery status LED:
   - If the battery status LED flashes an error code [2,7], the display cable may not be connected properly.
   - If the battery status LED flashes an error code [2,8], there is a failure on the LCD power rail of the system board, hence there is no power supplied to the LCD.
3. For cases, when a [2,7] error code is shown, check to see if the display cable is properly connected.
4. For cases when a [2,8] error code is shown, replace the system board.

LCD Built-in Self Test (BIST)

Dell laptops have a built-in diagnostic tool that helps you determine if the screen abnormality you are experiencing is an inherent problem with the LCD (screen) of the Dell laptop or with the video card (GPU) and PC settings.

When you notice screen abnormalities like flickering, distortion, clarity issues, fuzzy or blurry image, horizontal or vertical lines, color fade etc., it is always a good practice to isolate the LCD (screen) by running the Built-In Self Test (BIST).

How to invoke LCD BIST Test

1. Power off the Dell laptop.
2. Disconnect any peripherals that are connected to the laptop. Connect only the AC adapter (charger) to the laptop.
3. Ensure that the LCD (screen) is clean (no dust particles on the surface of the screen).
4. Press and hold **D** key and **Power on** the laptop to enter LCD built-in self test (BIST) mode. Continue to hold the D key, until the system boots up.
5. The screen will display solid colors and change colors on the entire screen to white, black, red, green, and blue twice.
6. Then it will display the colors white, black and red.
7. Carefully inspect the screen for abnormalities (any lines, fuzzy color or distortion on the screen).
8. At the end of the last solid color (red), the system will shut down.

ⓘ **NOTE:** Dell SupportAssist Pre-boot diagnostics upon launch, initiates an LCD BIST first, expecting a user intervention confirm functionality of the LCD.

System-diagnostic lights

Power and battery-status light

The power and battery status light indicates the power and battery status of the computer. These are the power states:

Solid white: Power adapter is connected and the battery has more than 5% charge.

Amber: Computer is running on battery and the battery has less than 5% charge.

Off:
- Power adapter is connected, and the battery is fully charged.
- Computer is running on battery, and the battery has more than 5% charge.
- Computer is in sleep state, hibernation, or turned off.

The power and battery-status light may blink amber or white according to pre-defined "beep codes" indicating various 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.

> (i) **NOTE:** The following diagnostic light codes and recommended solutions are intended for Dell service technicians to troubleshoot problems. You should only perform troubleshooting and repairs as authorized or directed by the Dell technical assistance team. Damage due to servicing that is not authorized by Dell is not covered by your warranty.

Table 19. Diagnostic-light LED codes

Diagnostic light codes (Amber,White)	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 - SBIOS message
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

Recovering the operating system

When your computer is unable to boot to the operating system even after repeated attempts, it automatically starts Dell SupportAssist OS Recovery.

Dell SupportAssist OS Recovery is a standalone tool that is preinstalled in all Dell computers installed with Windows operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, or restore your computer to its factory state.

You can also download it from the Dell Support website to troubleshoot and fix your computer when it fails to boot into their primary operating system due to software or hardware failures.

For more information about the Dell SupportAssist OS Recovery, see *Dell SupportAssist OS Recovery User's Guide* at www.dell.com/serviceabilitytools. Click **SupportAssist** and then, click **SupportAssist OS Recovery**.

Backup media and recovery options

It is recommended to create a recovery drive to troubleshoot and fix problems that may occur with Windows. Dell proposes multiple options for recovering Windows operating system on your Dell PC. For more information. see Dell Windows Backup Media and Recovery Options.

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.

Drain residual flea power (perform hard reset)

Flea power is the residual static electricity that remains in the computer even after it has been powered off and the battery is removed.

For your safety, and to protect the sensitive electronic components in your computer, you are requested to drain residual flea power before removing or replacing any components in your computer.

Draining residual flea power, also known as a performing a "hard reset", is also a common troubleshooting step if your computer does not power on or boot into the operating system.

To drain residual flea power (perform a hard reset)

1. Turn off your computer.
2. Disconnect the power adapter from your computer.
3. Remove the base cover.
4. Remove the battery.
5. Press and hold the power button for 20 seconds to drain the flea power.
6. Install the battery.
7. Install the base cover.
8. Connect the power adapter to your computer.
9. Turn on your computer.

   ⓘ **NOTE:** For more information about performing a hard reset, see the knowledge base article 000130881 at www.dell.com/support.

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Getting help

Topics:

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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.