

Precision 3530

Service Manual



Notes, cautions, and warnings

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

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

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

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Working on your computer

Safety instructions

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

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

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

⚠ WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.Dell.com/regulatory_compliance

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

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

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

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

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

Turning off your computer — Windows 10

⚠ CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer or remove the side cover.

- 1 Click or tap .
- 2 Click or tap  and then click or tap **Shut down**.

ⓘ NOTE: Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.

Before working inside your computer

- 1 Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
- 2 Turn off your computer.
- 3 If the computer is connected to a docking device (docked), undock it.
- 4 Disconnect all network cables from the computer (if available).

 **CAUTION:** If your computer has an RJ45 port, disconnect the network cable by first unplugging the cable from your computer.

- 5 Disconnect your computer and all attached devices from their electrical outlets.
- 6 Open the display.
- 7 Press and hold the power button for few seconds, to ground the system board.

 **CAUTION:** To guard against electrical shock unplug your computer from the electrical outlet before performing Step # 8.

 **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.

- 8 Remove any installed ExpressCards or Smart Cards from the appropriate slots.

After working inside your computer

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

 **CAUTION:** To avoid damage to the computer, use only the battery designed for this particular Dell computer. Do not use batteries designed for other Dell computers.

- 1 Replace the battery.
- 2 Replace the base cover.
- 3 Connect any external devices, such as a port replicator or media base, and replace any cards, such as an ExpressCard.
- 4 Connect any telephone or network cables to your computer.

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

- 5 Connect your computer and all attached devices to their electrical outlets.
- 6 Turn on your computer.

Technology and components

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

Topics:

- [Power adapter](#)
- [DDR4](#)
- [HDMI 1.4- HDMI 2.0](#)
- [USB features](#)
- [USB Type-C](#)

Power adapter

This laptop is shipped with 7.4mm barrel plug on power adapter.

⚠ WARNING: When you disconnect the power adapter cable from the laptop, grasp the connector, not the cable itself, and then pull firmly but gently to avoid damaging the cable.

⚠ WARNING: The power adapter works with electrical outlets worldwide. However, power connectors and power strips vary among countries. Using an incompatible cable or improperly connecting the cable to the power strip or electrical outlet may cause fire or equipment damage.

DDR4

DDR4 (double data rate fourth generation) memory is a higher-speed successor to the DDR2 and DDR3 technologies and allows up to 512 GB in capacity, compared to the DDR3's maximum of 128 GB per DIMM. DDR4 synchronous dynamic random-access memory is keyed differently from both SDRAM and DDR to prevent the user from installing the wrong type of memory into the system.

DDR4 needs 20 percent less or just 1.2 volts, compared to DDR3 which requires 1.5 volts of electrical power to operate. DDR4 also supports a new, deep power-down mode that allows the host device to go into standby without needing to refresh its memory. Deep power-down mode is expected to reduce standby power consumption by 40 to 50 percent.

DDR4 Details

There are subtle differences between DDR3 and DDR4 memory modules, as listed below.

Key notch difference

The key notch on a DDR4 module is in a different location from the key notch on a DDR3 module. Both notches are on the insertion edge but the notch location on the DDR4 is slightly different, to prevent the module from being installed into an incompatible board or platform.

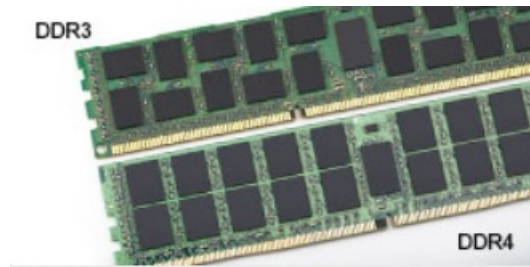


Figure 1. Notch difference

Increased thickness

DDR4 modules are slightly thicker than DDR3, to accommodate more signal layers.



Figure 2. Thickness difference

Curved edge

DDR4 modules feature a curved edge to help with insertion and alleviate stress on the PCB during memory installation.



Figure 3. Curved edge

Memory Errors

Memory errors on the system display the new ON-FLASH-FLASH or ON-FLASH-ON failure code. If all memory fails, the LCD does not turn on. Troubleshoot for possible memory failure by trying known good memory modules in the memory connectors on the bottom of the system or under the keyboard, as in some portable systems.

HDMI 1.4- HDMI 2.0

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

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

NOTE: The HDMI 1.4 will provide 5.1 channel audio support.

HDMI 1.4- HDMI 2.0 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

USB features

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

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

Table 1. USB evolution

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

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

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

- Higher transfer rates (up to 5 Gbps)

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

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

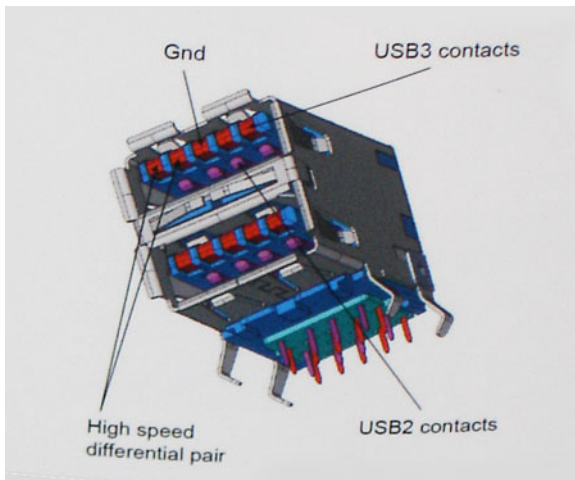


Speed

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

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

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



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

Applications

USB 3.0/USB 3.1 Gen 1 opens up the laneways and provides more headroom for devices to deliver a better overall experience. Where USB video was barely tolerable previously (both from a maximum resolution, latency, and video compression perspective), it's easy to imagine

that with 5-10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2Gbps throughput. Where 480Mbps was limiting, 5Gbps is more than promising. With its promised 4.8Gbps speed, the standard will find its way into some products that previously weren't USB territory, like external RAID storage systems.

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

- External Desktop USB 3.0/USB 3.1 Gen 1 Hard Drives
- Portable USB 3.0/USB 3.1 Gen 1 Hard Drives
- USB 3.0/USB 3.1 Gen 1 Drive Docks & Adapters
- USB 3.0/USB 3.1 Gen 1 Flash Drives & Readers
- USB 3.0/USB 3.1 Gen 1 Solid-state Drives
- USB 3.0/USB 3.1 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.0/USB 3.1 Gen 1 Adapter Cards & Hubs

Compatibility

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

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

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

Advantages of Displayport over USB Type-C

- Full DisplayPort audio/video (A/V) performance (up to 4K at 60Hz)
- SuperSpeed USB (USB 3.1) data
- Reversible plug orientation and cable direction
- Backwards compatibility to VGA, DVI with adaptors
- Supports HDMI 2.0a and is backwards compatible with previous versions

USB Type-C

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

Alternate Mode

USB Type-C is a new connector standard that's very small. It's 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

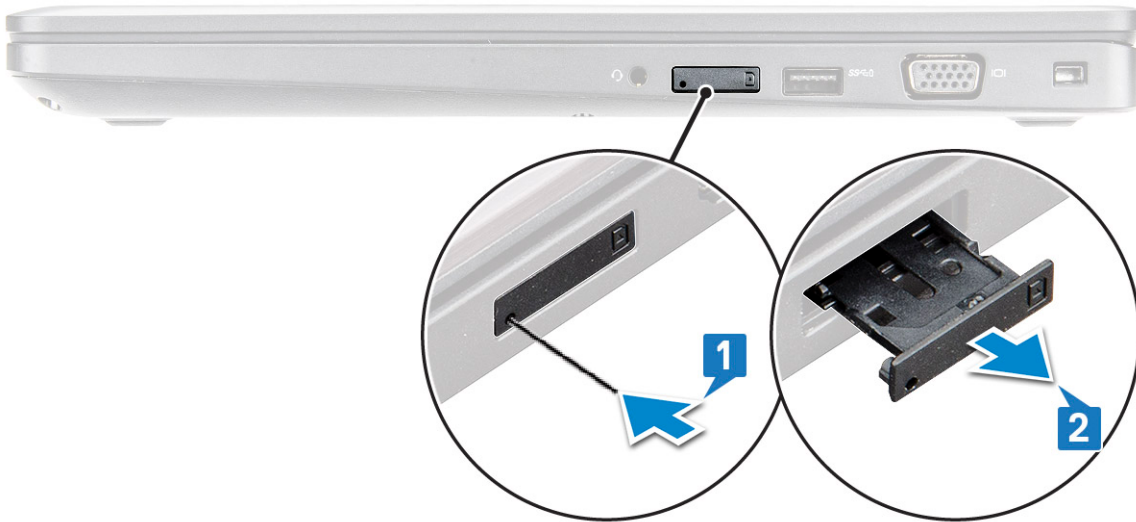
USB 3.1 is a new USB standard. USB 3's theoretical bandwidth is 5 Gbps, while USB 3.1 Gen2 is 10 Gbps. That's double the bandwidth, as fast as a first-generation Thunderbolt connector. USB Type-C isn't the same thing as USB 3.1. USB Type-C is just a connector shape, and the underlying technology could 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.

Disassembly and reassembly

Subscriber Identity Module(SIM) board

Installing the Subscriber Identification Module card

- 1 Insert Subscriber Identification Module (SIM) card removal tool or a paperclip into the pinhole [1].
- 2 Pull the SIM card tray to remove it [2].
- 3 Place the SIM on the SIM card tray.
- 4 Push the SIM card tray into the slot until it clicks into place.



Removing the Subscriber Identification Module card

CAUTION: Removing the Subscriber Identification Module (SIM) card when the computer is on may cause data loss or damage the card. Ensure your computer is turned off or the network connections are disabled.

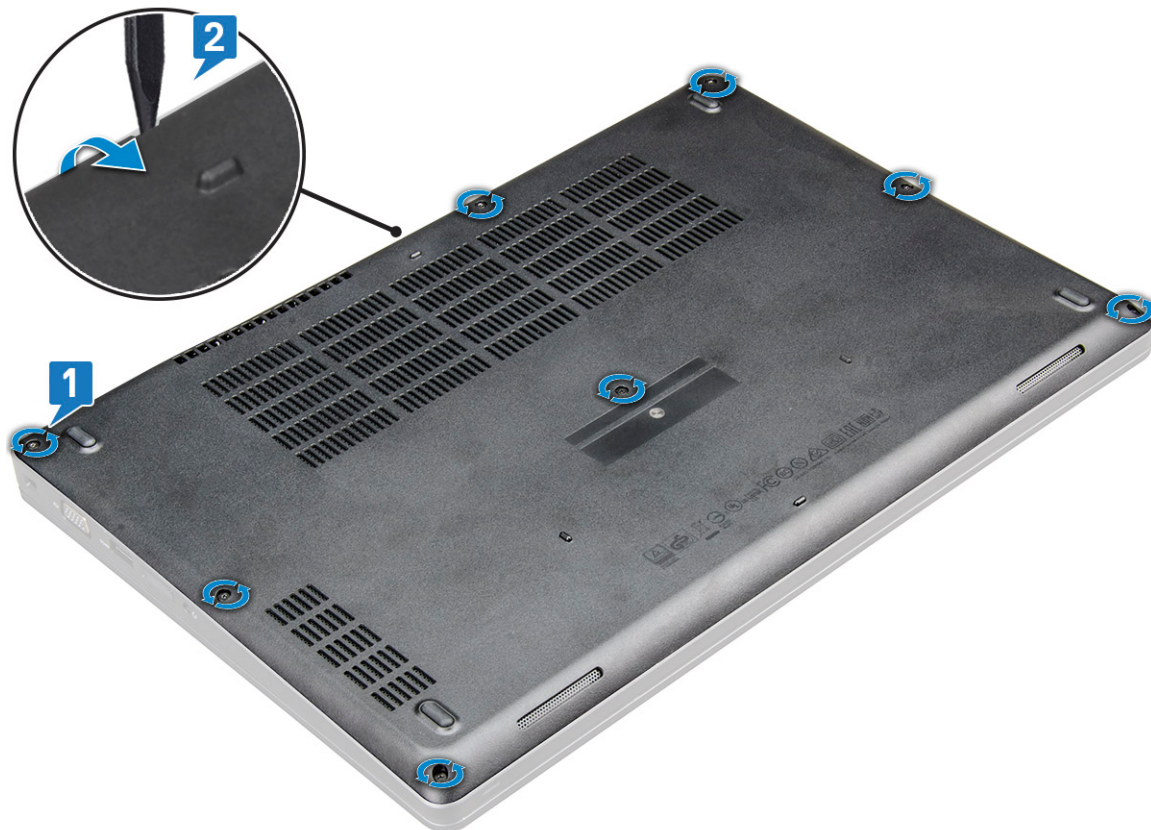
- 1 Insert a paperclip or a SIM card removal tool into the pinhole on the SIM card tray.
- 2 Pull the SIM card tray to remove it.
- 3 Remove the SIM card from the SIM card tray.
- 4 Push the SIM card tray into the slot until it clicks into place.

Base cover

Removing the base cover

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 To remove the base cover:
 - a Loosen the M2.5x5 (8) captive screws that secure the base cover to the [1].
 - b Pry the base cover from the edge near the air vent [2].

 **NOTE:** a plastic scribe to pry the recess, starting from the top edge of the base cove.



- 3 Lift the base cover away from the laptop.



Installing the base cover

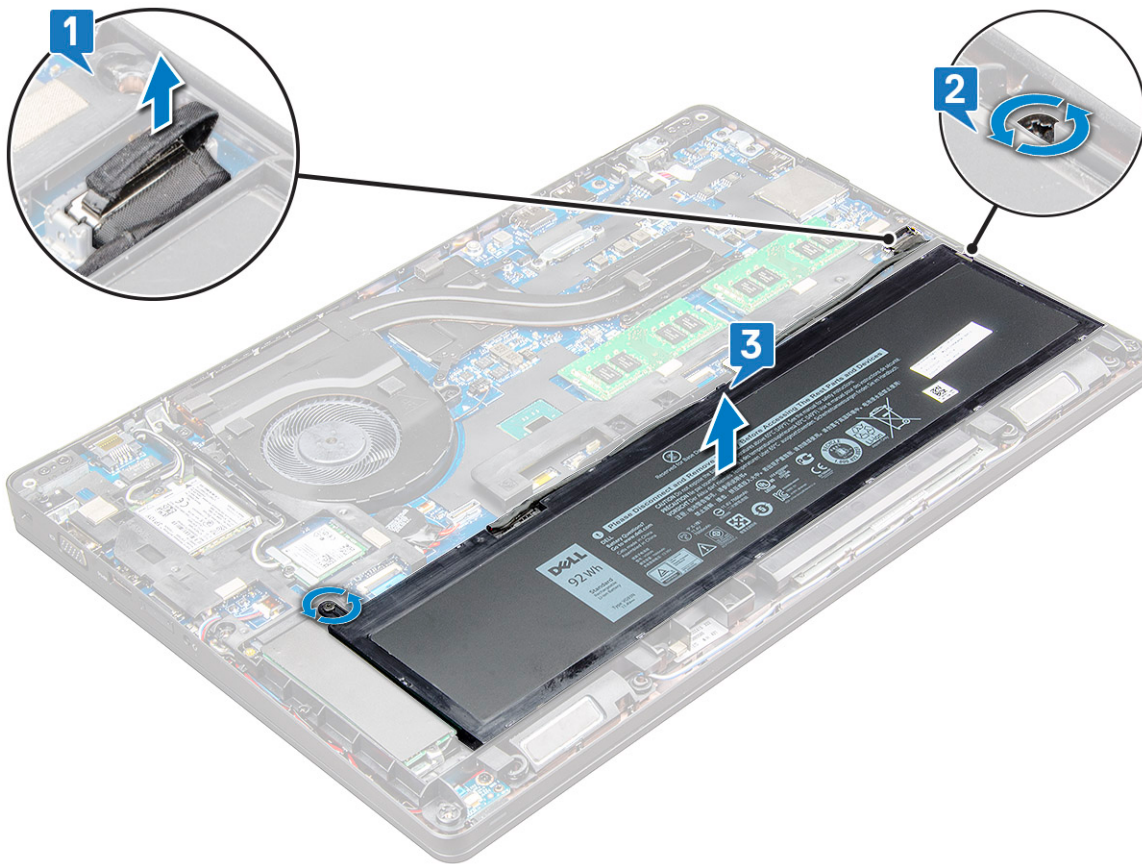
- 1 Align the base cover with the screw holders on the laptop .
- 2 Press the edges of the cover until it clicks into place.
- 3 Tighten the M2x5 screws to secure the base cover to the laptop.
- 4 Follow the procedure in [After working inside your computer](#).

Battery

Removing the battery

① **NOTE:** A 6-cell 92WHr battery has 2 screws.

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 To remove the battery:
 - a Disconnect the battery cable from the connector on the system board [1].
 - b Loosen the M2.5x5 captive screw 2 that secures the battery to the laptop [2].
 - c Lift the battery away from the laptop chassis [3].



Installing the battery

NOTE: the 92Whr battery requires the use of a M.2 card and a 68Whr battery can be used with either a M.2 or 7mm SATA drive.

1 Insert the battery into the slot on the laptop.

NOTE: Route the battery cable below the battery routing channels to enable proper connection to the connector.

2 Connect the battery cable to the connector on the system board.

3 Tighten the M2.5x5 screw (2) to secure the battery to the laptop.

4 Install the [base cover](#).

5 Follow the procedure in [After working inside your computer](#).

Solid State Drive — optional

Removing the M.2 Solid State Drive - SSD

1 Follow the procedure in [Before working inside your computer](#).

2 Remove the:

a [base cover](#)

b [battery](#)

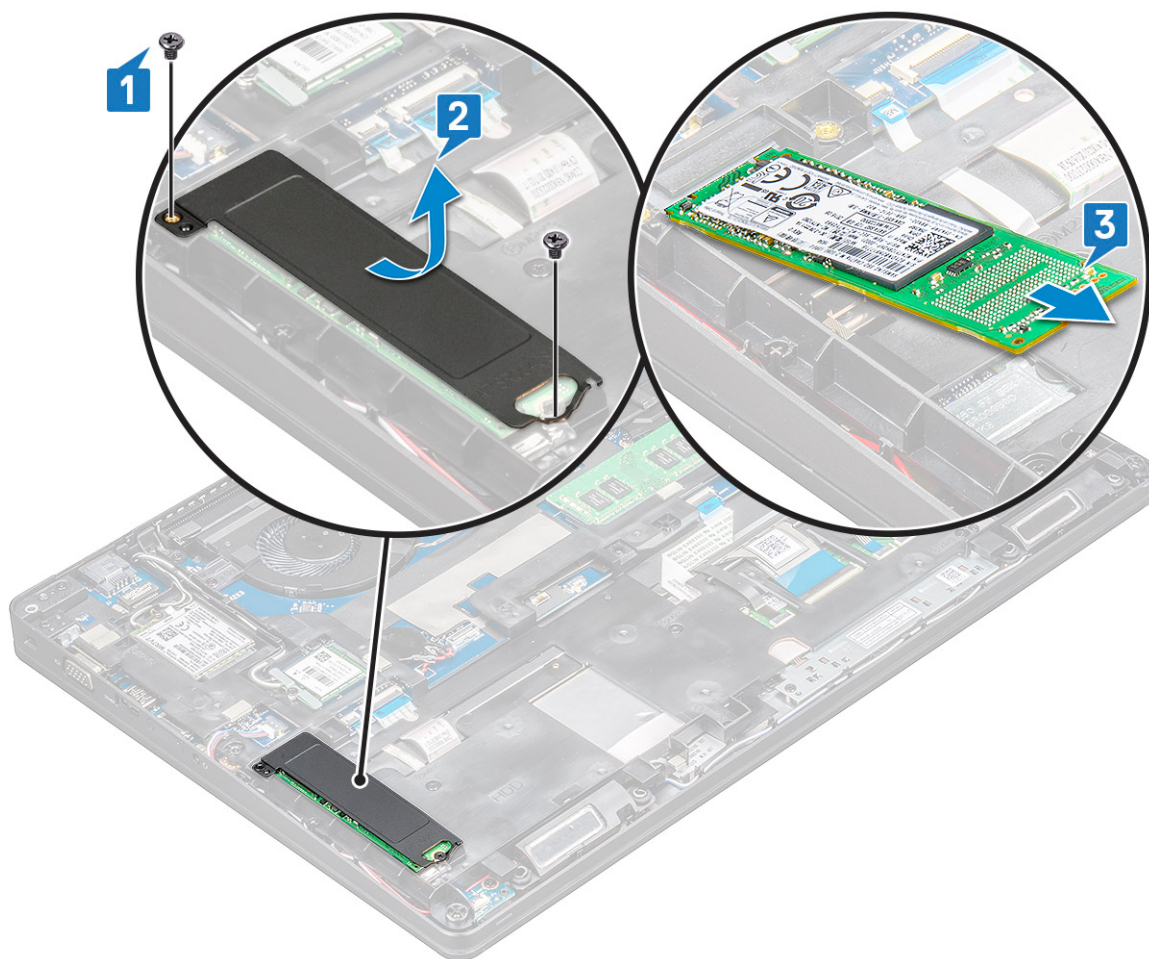
3 To remove the SSD:

a Remove the one M2x3 screw [1] that secures the SSD bracket to the laptop and lift the SSD frame [2] that secures the SSD card to the system board .

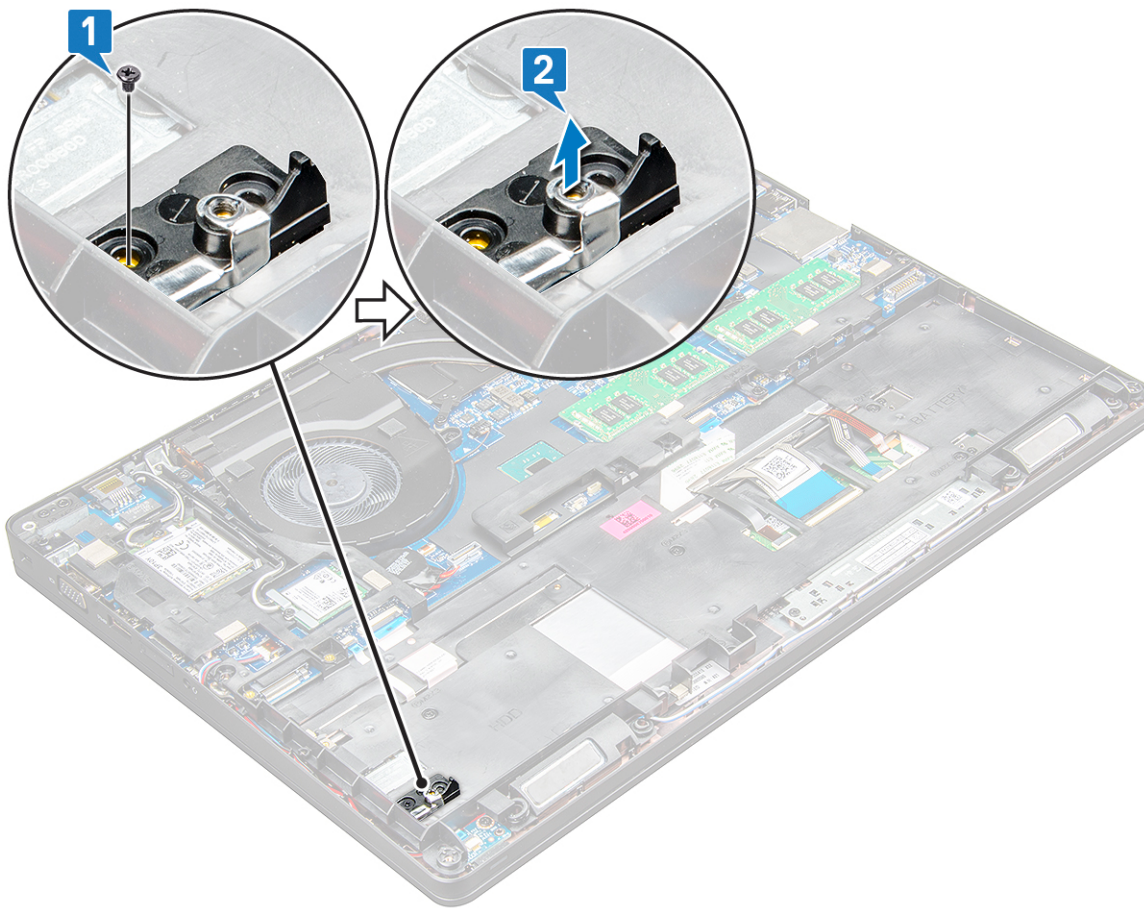
b the SSD that secures the SSD card to the system board .

- c Lift and pull the SSD card from the laptop [3].

NOTE: For models shipped with NVMe SSDs, remove the thermal plate placed over the SSD.



- 4 To remove the SSD clip:
 - a Remove the M2x3 screw that secures the SSD clip to the laptop [1].
 - b Lift the SSD clip away from the laptop [2].



Installing the M.2 Solid State Drive - SSD

NOTE: Before installing SSD card, ensure that the battery is fully charged or the power cable is plugged in.

- 1 Place the SSD clip on the laptop.
 - NOTE:** Ensure to place the SSD clip head in the placeholder in the system chassis.
- 2 Tighten the M2x3 screw that secures SSD clip to the laptop.
- 3 Insert the SSD into the socket on the laptop.
- 4 Place the SSD bracket and tighten the M2x3 screw to secure the SSD to the laptop.
- 5 Install the:
 - a battery
 - b base cover
- 6 Follow the procedure in [After working inside your computer](#).

WLAN card

Removing the WLAN card

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover

b [battery](#)

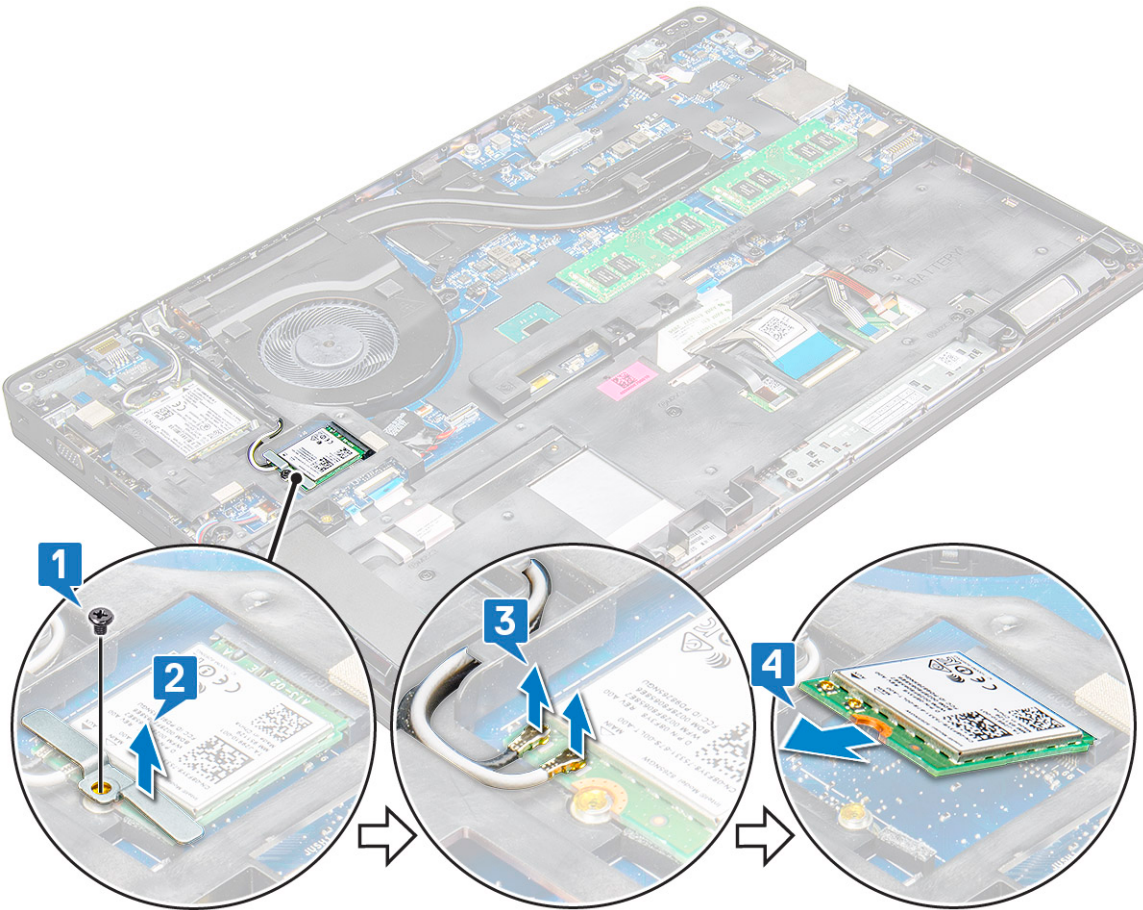
3 To remove the WLAN card:

- a Remove the M2x3 screw (1) that secures the WLAN card to the laptop [1].
- b Lift the metal bracket that secures the WLAN cables to the WLAN card [2].
- c Disconnect the WLAN cables from the connectors on the WLAN card [3].

NOTE: The WLAN card is held in place with an adhesive foam spacer. When removing the wireless card from the system, make sure the adhesive pad stays on the system board/chassis frame during the prying process. If the adhesive pad is removed from the system along with the wireless card, adhere it back to the system.

- d Pull the WLAN card to release it from the connector on the system board[4].

NOTE: Ensure NOT to pull the WLAN card more than 35°, to avoid pin damage.



Installing the WLAN card

- 1 Insert the WLAN card into the slot on the laptop.
- 2 Route the WLAN cables through the routing channel.

NOTE: When installing the display assembly or chassis frame onto the system, the wireless and WLAN antennas must be routed correctly into the routing channels on the chassis frame.

- 3 Connect the WLAN cables to the connectors on the WLAN Card.
- 4 Place the metal bracket and tighten the M2x3 screw to secures the WLAN card to the system board.
- 5 Install the:
 - a [battery](#)
 - b [base cover](#)

- 6 Follow the procedure in [After working inside your system](#).

WWAN card

Removing the WWAN card

- 1 Follow the procedure in [Before working inside your computer](#).

- 2 Remove the:

- a [base cover](#)
- b [battery](#)

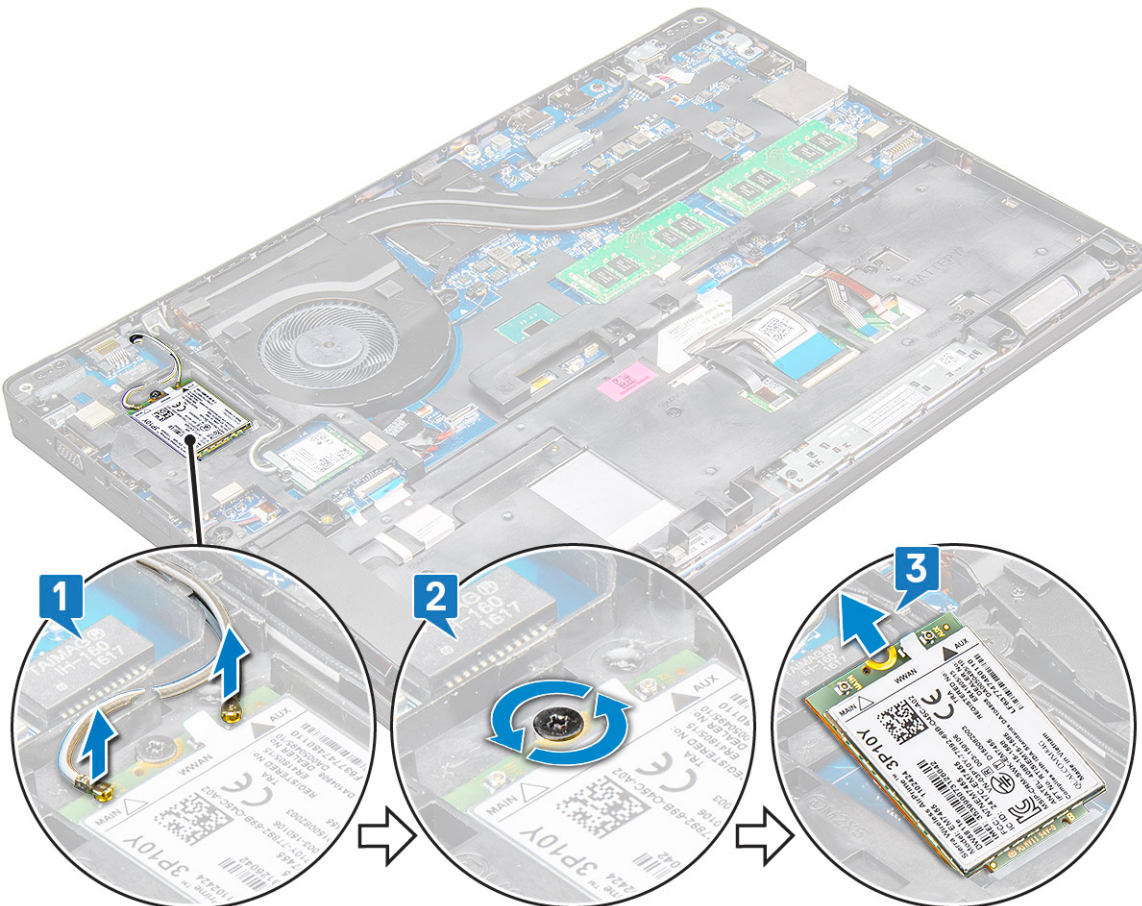
- 3 To remove the WWAN card:

- a Disconnect the WWAN cables from the connectors on the WWAN card [1].

NOTE: The WWAN card is held in place with an adhesive foam spacer. When removing the wireless card from the system, make sure the adhesive pad stays on the system board/chassis frame during the prying process. If the adhesive pad is removed from the system along with the wireless card, adhere it back to the system.

- b Remove the M2x3 screw (1) that secures the WWAN card to the system board [2].
- c Lift the WWAN card to release it from the connector on the system board [3].

NOTE: Ensure NOT to pull the WWAN card more than 35°, to avoid pin damage.



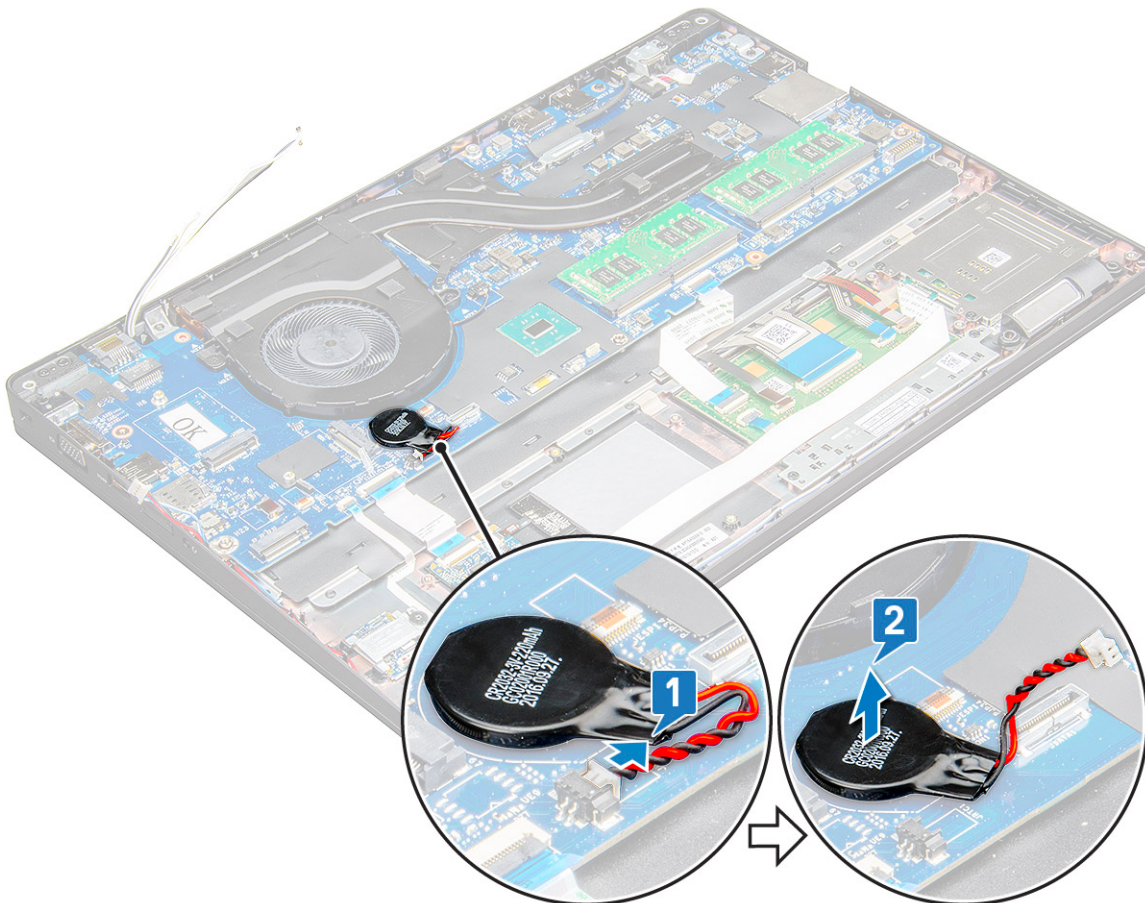
Installing the WLAN card

- 1 Insert the WWAN card into the slot on the laptop.
- 2 Place the M2x3 screw to secure the WWAN card to the system board.
- 3 Connect the WWAN cables to the connectors on the WWAN Card.
- 4 Install the:
 - a [battery](#)
 - b [base cover](#)
- 5 Follow the procedure in [After working inside your system](#).

Coin-cell battery

Removing the coin cell battery

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
- 3 To remove the coin cell battery:
 - a Disconnect the coin cell battery cable from the connector on the system board [1].
 - b Pry the coin cell battery to release from the adhesive and lift it away from the system board [2].



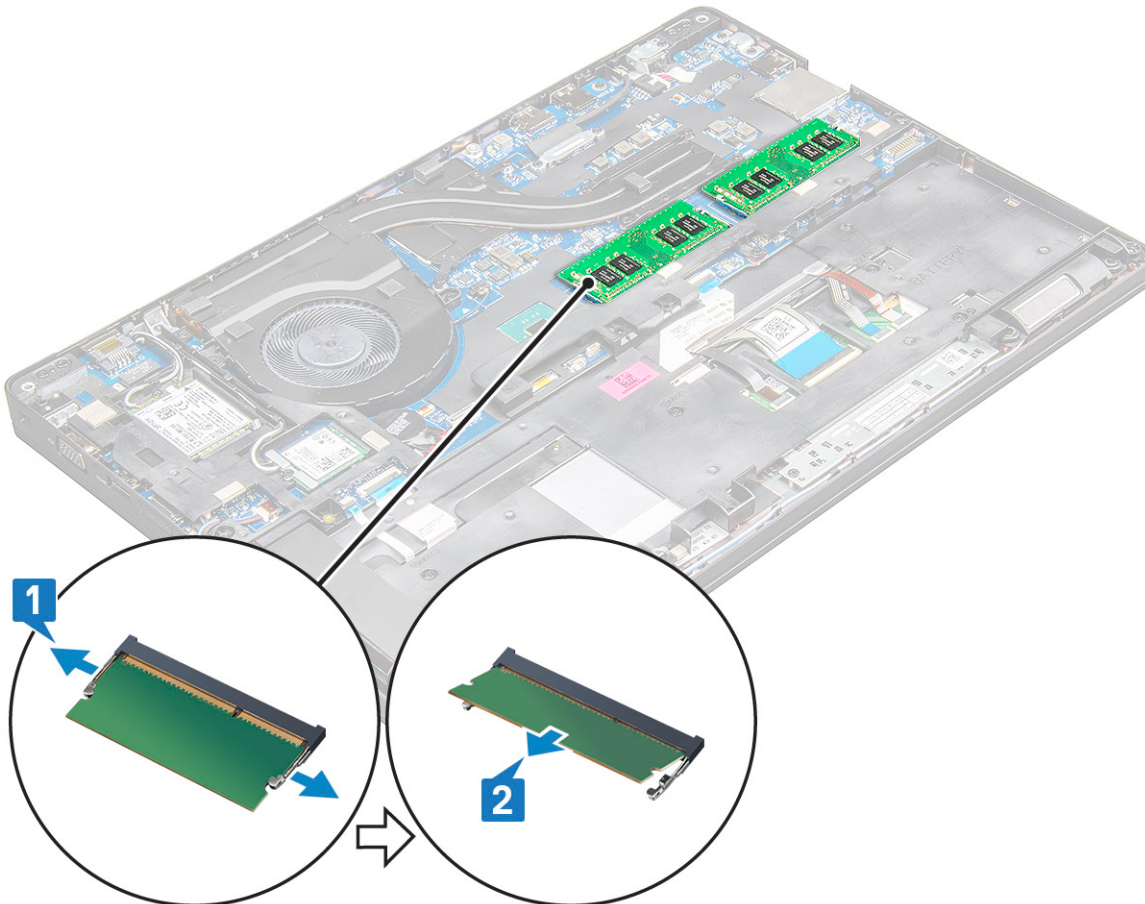
Installing the coin cell battery

- 1 Place the coin cell battery on the system board.
- 2 Connect the coin cell battery cable to the connector on the system board.
- ① **NOTE:** Route the coin cell battery cable carefully to avoid damaging the cable.
- 3 Install the:
 - a chassis frame
 - b battery
 - c base cover
- 4 Follow the procedure in [After working inside your computer](#).

Memory modules

Removing the memory module

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b battery
- 3 To remove the memory module:
 - a Press the clips securing the memory module until the memory pops-up [1].
 - b Pull the memory module from the connector on the system board [2].



Installing the memory module

- 1 Insert the memory module into the memory module socket then press downward until the clips secure the memory module.

NOTE: Ensure to insert the memory module at an angle NOT more than 30°. Press the memory module down to engage the retaining clips.

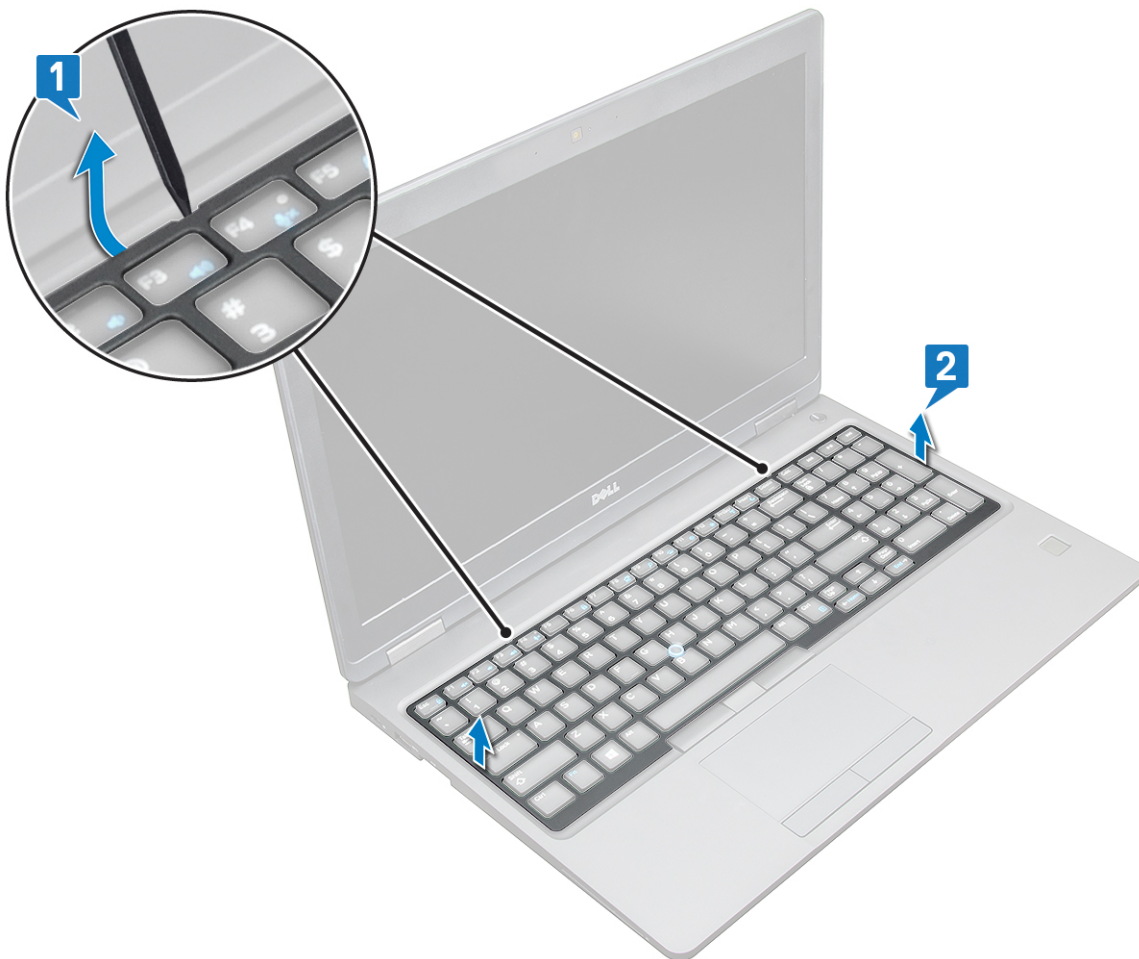
- 2 Install the:
 - a battery
 - b base cover
- 3 Follow the procedures in [After working inside your computer](#).

Keyboard

Removing keyboard lattice

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Pry the keyboard lattice from one of the recess points [1] and lift the lattice from the system [2].

NOTE: Gently pull or lift keyboard lattice in clockwise or anticlockwise direction to avoid breakage.

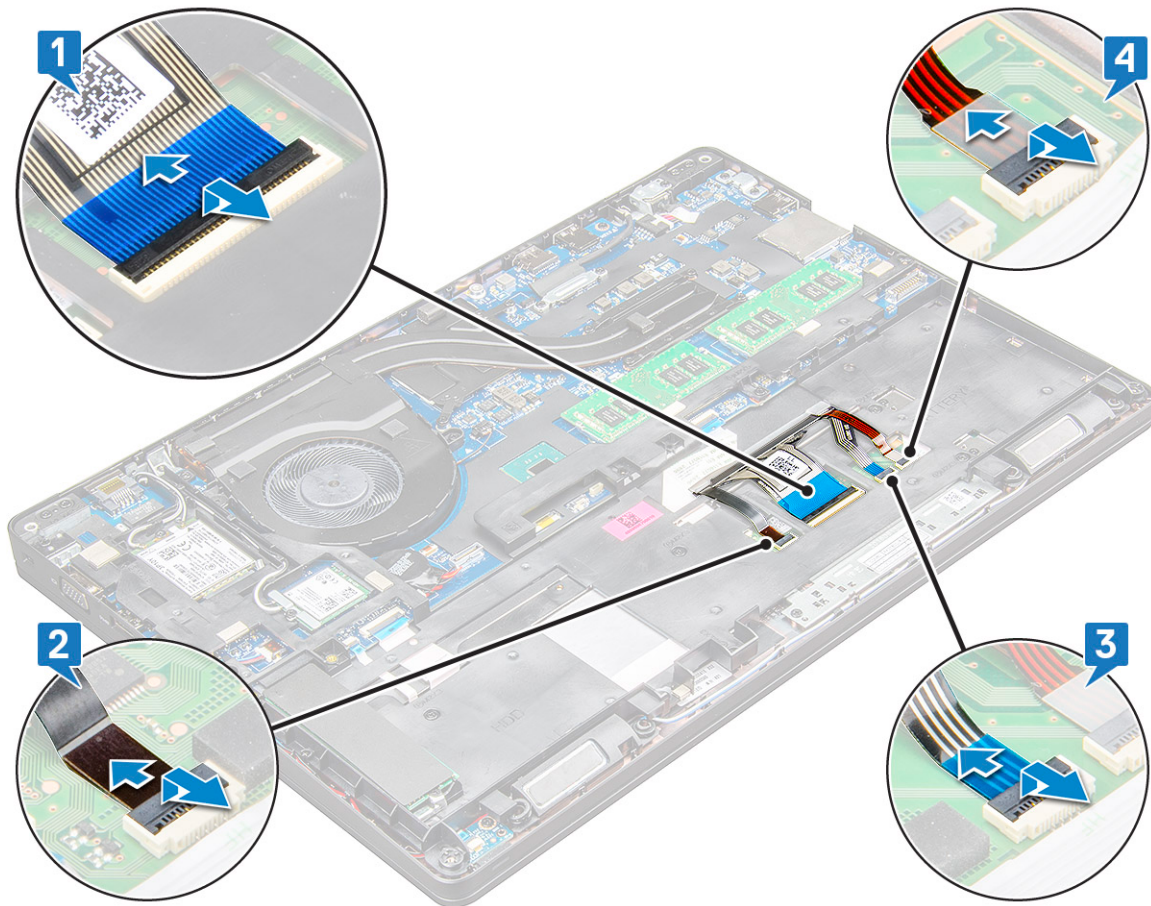


NOTE: Use a plastic scribe to pry the keyboard lattice from the pry points and move around the lattice for removal.

Removing the keyboard

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [keyboard lattice](#)
- 3 To remove the keyboard:
 - a Lift the latch and disconnect the keyboard cable from the connector on the system.
 - b Lift the latch and disconnect the keyboard backlight cable from the connector on the system [2].

 **NOTE:** Number of cables to disconnect is based on the keyboard type.



- c Lift the latch and disconnect the cable from the connector on the system board [3].
- d Lift the latch and disconnect the cable from the connector on the system board [4].
- e Turn over the system and open the laptop in front view mode.
- f Remove the M2 x 2.5 (6) screws that secure the keyboard to the system [1].
- g Flip the keyboard from the bottom and lift it from the system along with the keyboard cable and the keyboard back light cable [2].

 **WARNING:** Gently pull the keyboard cable and the keyboard back light cable routed beneath the chassis frame to avoid damaging the cables.



Installing the keyboard

- 1 Hold the keyboard and route the keyboard cable and the keyboard backlight cables through the palmrest in the system.
- 2 Align the keyboard with the screw holders on the system.
- 3 Replace the M2x2.5 screws (6) to secure the keyboard to the system.
- 4 Turn the system over and connect the keyboard cable and the keyboard backlight cable to the connector in the system.

NOTE: When reinstalling the chassis frame ensure the keyboard cables are NOT under the lattice , but run through the opening in the frame before connecting them to system board.

- 5 Install the:
 - a keyboard lattice
 - b battery
 - c base cover
- 6 Follow the procedure in [After working inside your computer](#).

Installing the keyboard trim

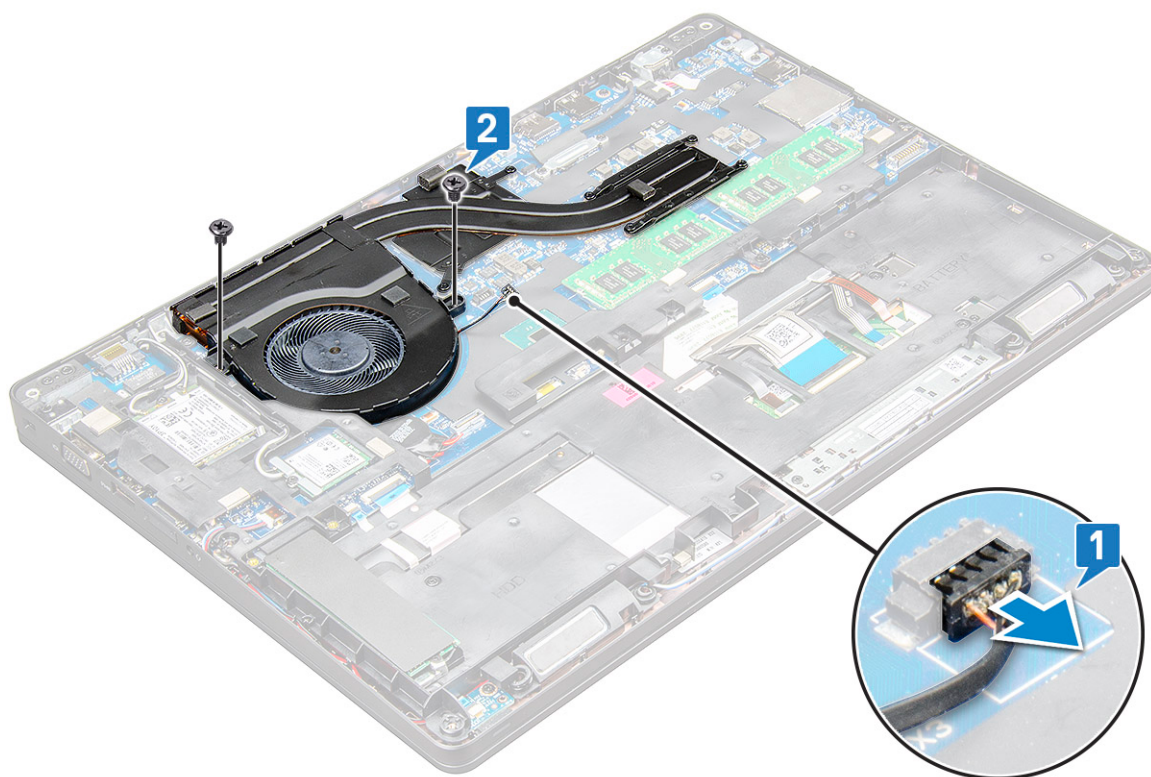
- 1 Align the keyboard trim with the tabs on the computer and press the keyboard until the keyboard clicks into place.
- 2 Follow the procedure in [After working inside your system](#).

Heat sink

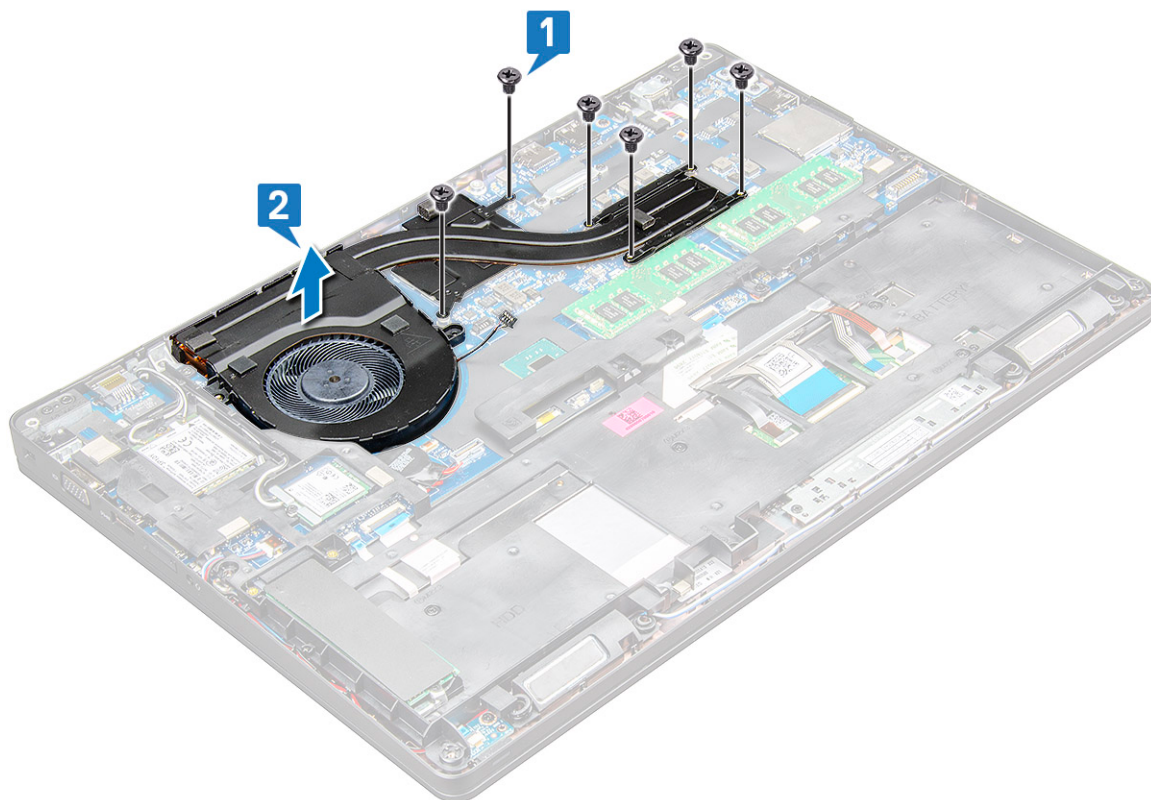
Removing the heat sink

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b battery
- 3 To remove the heat sink - :
 - a Disconnect the heat sink assembly cable and remove the screws (2) that secure on the system board[1, 2]. .

NOTE: Remove the screws that secure the heat sink .



- b Remove the M2x3 screws (6) that secures the heat sink assembly to the system board [1].
- c Lift the heat sink assembly away from the system board [2].



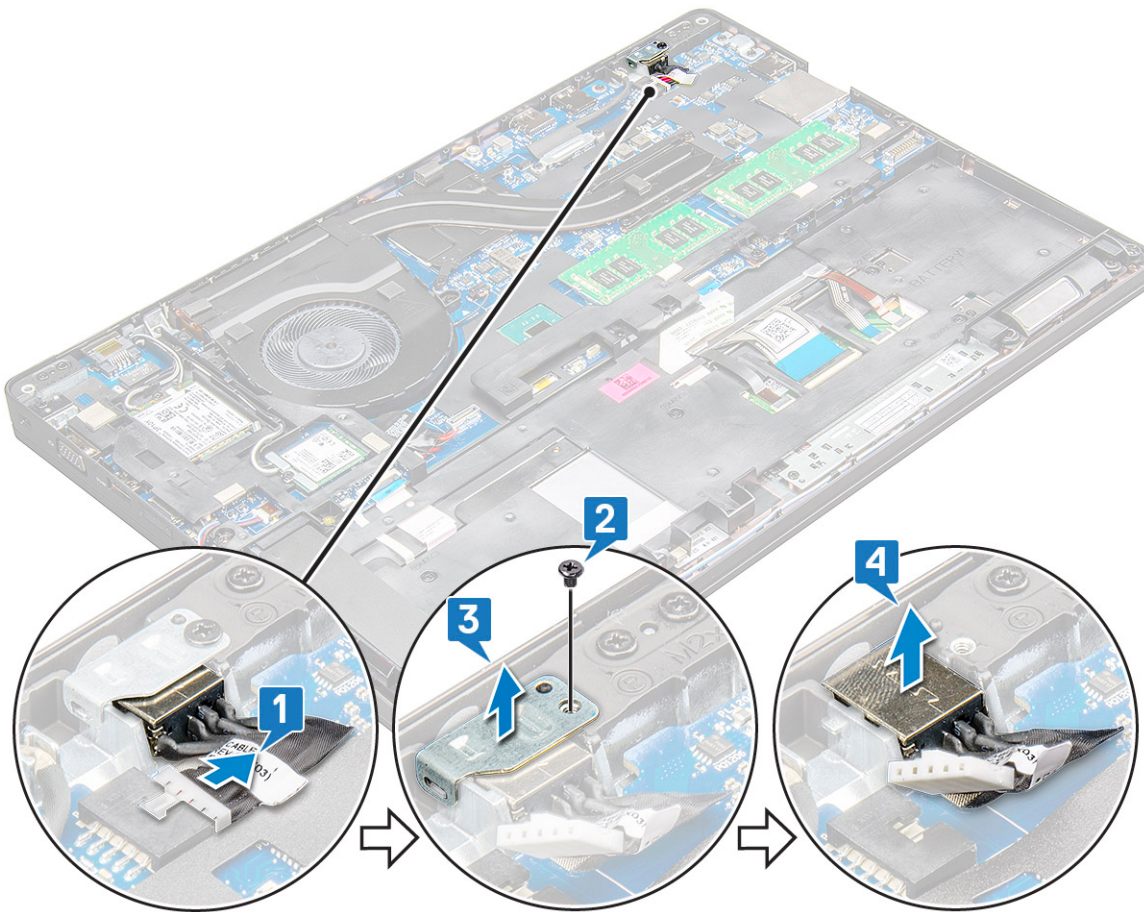
Installing the heat sink

- 1 Place the heat sink assembly on the system board and align the heat sink with the screw holders.
- 2 Tighten the M2x3 screws 8 to secure the heat sink assembly to the system board.
- 3 Connect the heat sink assembly to the connector on the system board.
- 4 Install the:
 - a [battery](#)
 - b [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

Power connector port

Removing the power connector port

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
- 3 To remove the power connector port:
 - a Disconnect the power connector port cable from the connector on the system board [1].
 **NOTE:** Use a plastic scribe to release the cable from the connector. Do not pull the cable as it may result in breakage.
 - b Remove the M2x3 screw to release the metal bracket that secures the power connector port [2].
 - c Remove the metal bracket that secures the power connector port [3].
 - d Lift the power connector port away from the laptop [4].



Installing the power connector port

- 1 Insert the power connector port into the slot on the laptop.
- 2 Place the metal bracket on the power connector port.
- 3 Tighten the M2x3 screw to secure the metal bracket to the power connector port on the laptop.
- 4 Connect the power connector port cable to the connector on the system board.
- 5 Install the:
 - a [battery](#)
 - b [base cover](#)
- 6 Follow the procedure in [After working inside your computer](#).

Chassis frame

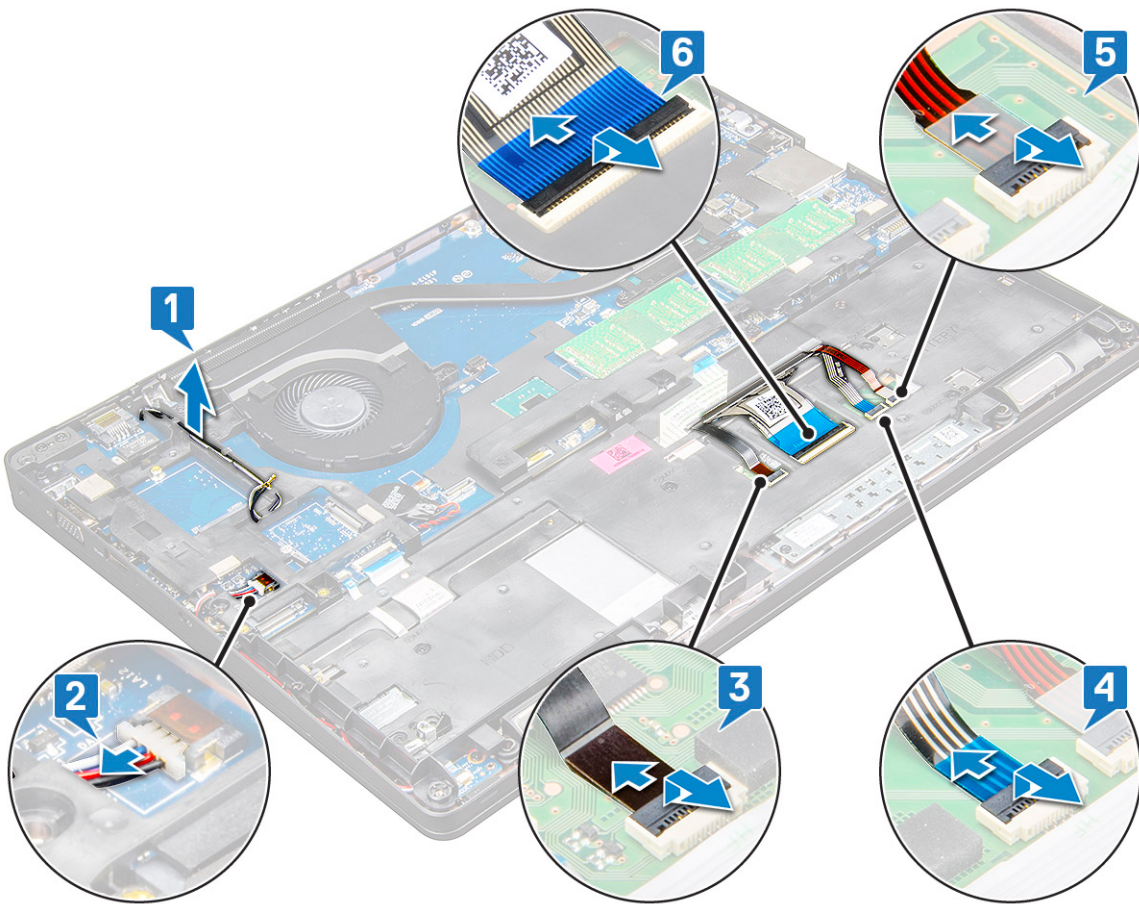
Removing the chassis frame

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [SIM card module](#)
 - b [base cover](#)
 - c [battery](#)
 - d [WLAN card](#)
 - e [WWAN card](#)

f SSD card

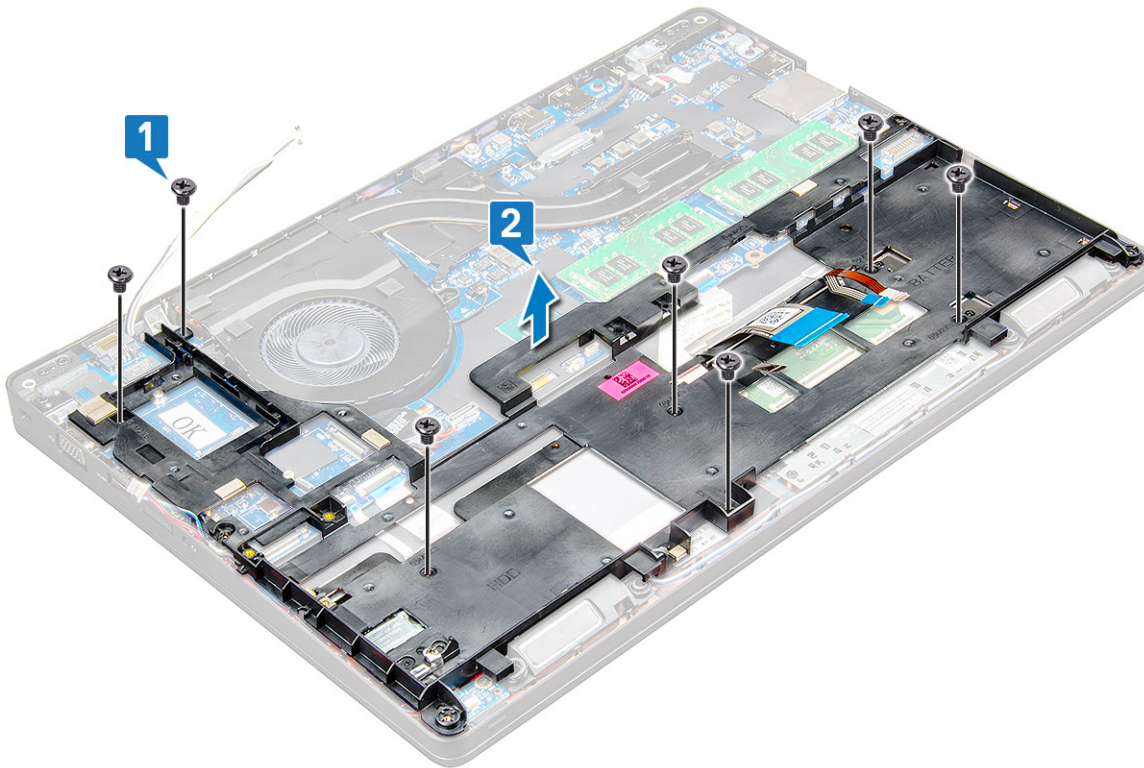
3 To release the chassis frame:

- a Release the WLAN and WWAN cables from the routing channels [1].
- b Disconnect the speaker cable from the connector on the system board [2].
- c Lift the latch to disconnect the backlight cable (optional) [3], touchpad cable [4], pointstick cable [5], and keyboard cable [6] from the connector on the system board.



4 To remove the chassis frame:

- a Remove the M2x3 (5), M2x5 (2) screws that secure the chassis frame to the laptop[1].
- b Lift the chassis frame away from the laptop [2].



Installing the chassis frame

- 1 Place the chassis frame on the computer and tighten the screws M2x5 (2), M2x3 (5).

NOTE: When reinstalling the chassis frame ensure the keyboard cables are NOT under the frame, but run through the opening in the frame.

- 2 Connect the speaker, keyboard cable, touchpad cable, pointstick cable and backlight cable(optional).
- 3 Route the WLAN and WWAN cable.

NOTE: Ensure the coin cell battery cable is properly routed in between the chassis frame and the system board to avoid damages to the cable.

- 4 Install the:
 - a SSD card
 - b WWAN card
 - c WLAN card
 - d battery
 - e base cover
 - f SIM card module
- 5 Follow the procedure in [After working inside your system](#).

System board

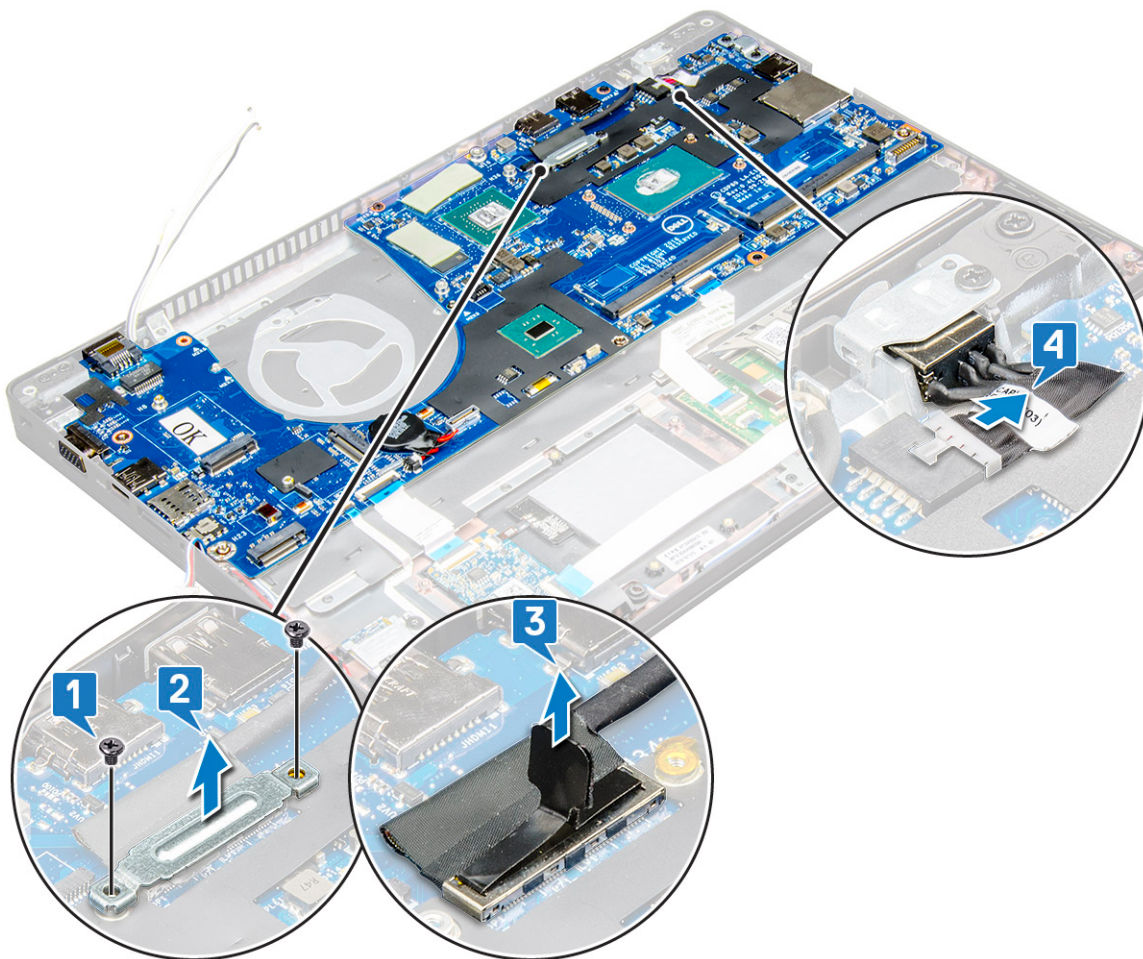
Removing the system board

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a SIM card module

- b base cover
- c battery
- d WLAN card
- e WWAN card
- f SSD card
- g memory module
- h heat sink
- i coin cell battery
- j Power connector port
- k chassis frame

3 To release the system board:

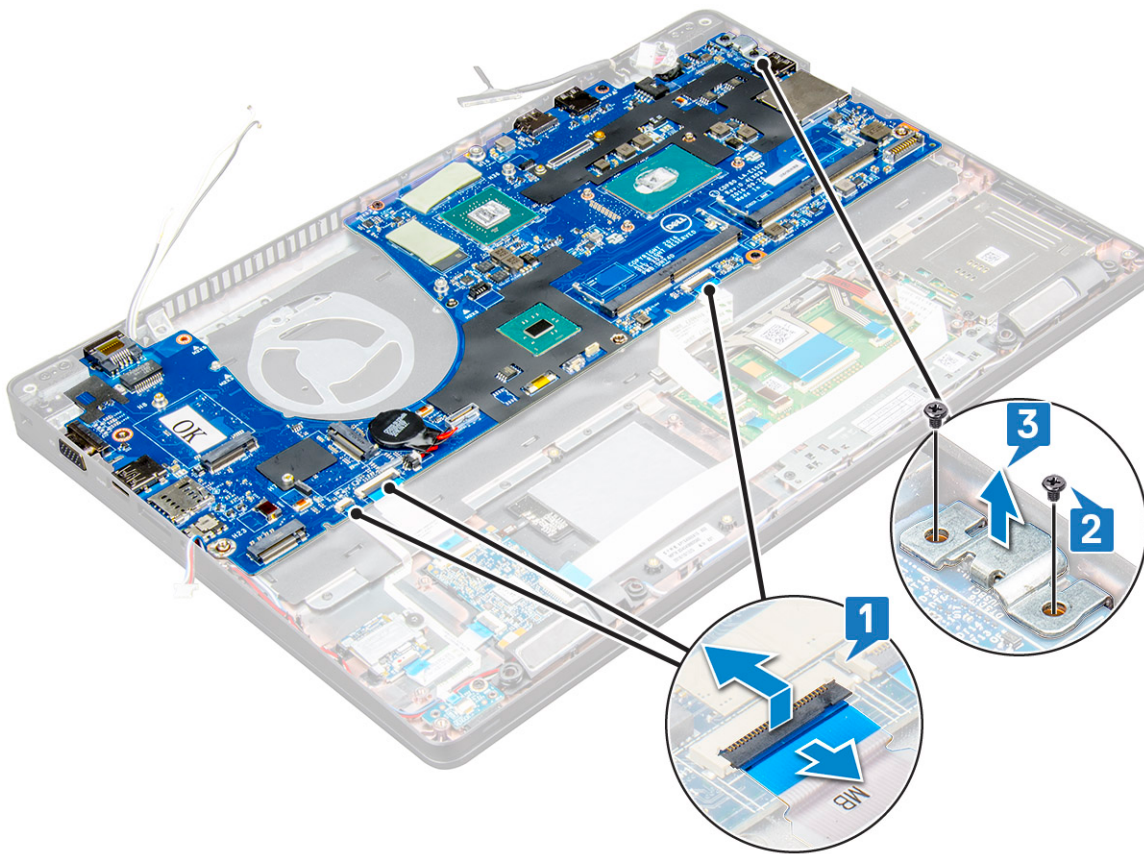
- a Remove the M2x5 screws that secures the metal bracket to the system board [1].
- b Lift the metal bracket that secures the display cable to the system board [2].
- c Disconnect the display cable from the connectors on the system board [3].



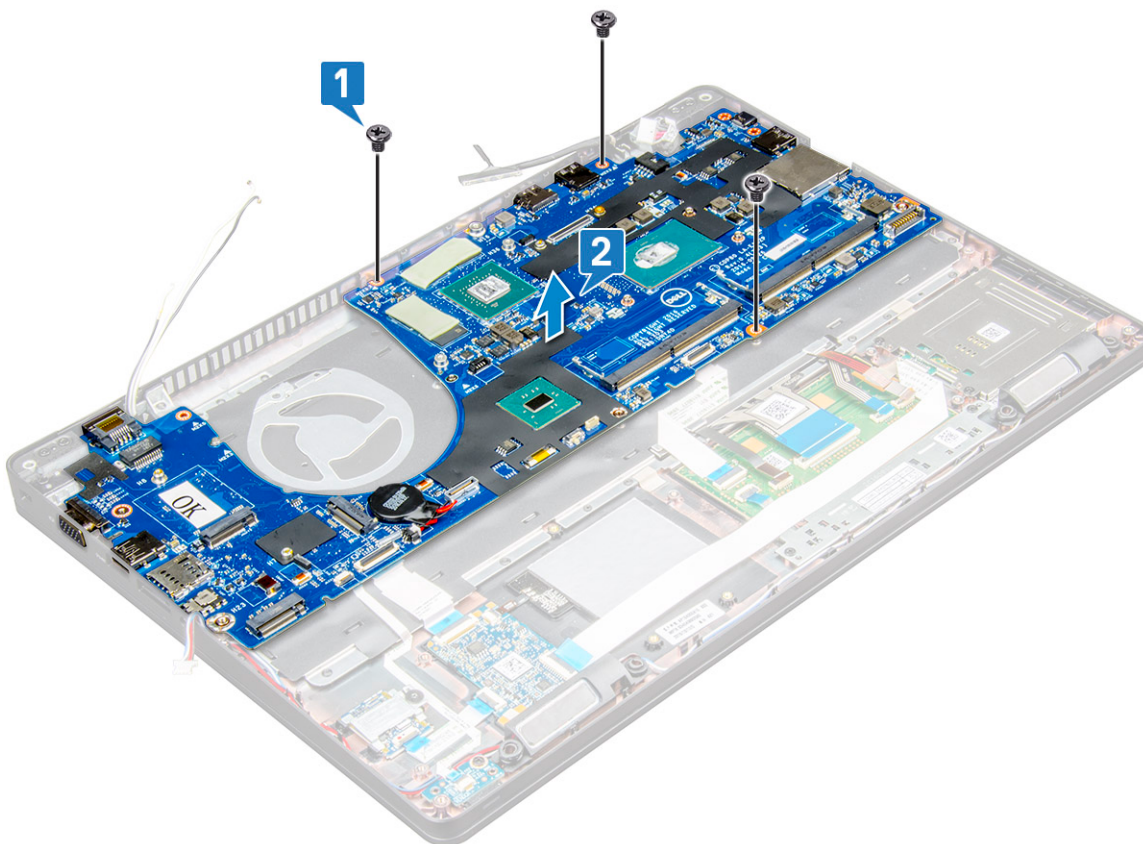
4 To remove the system board:

- a Lift the latch and disconnect the LED board, mother board and touchpad cable from the connectors on the system board [1].
- b Remove the M2x5 screws (2) that secure the metal USB-C port bracket to the system board and lift the bracket away from the system board [2,3].

NOTE: The metal bracket referred is the USB-C port bracket.



- 5 Remove the M2x3 screws (3) and lift the system board away from the computer [1, 2].



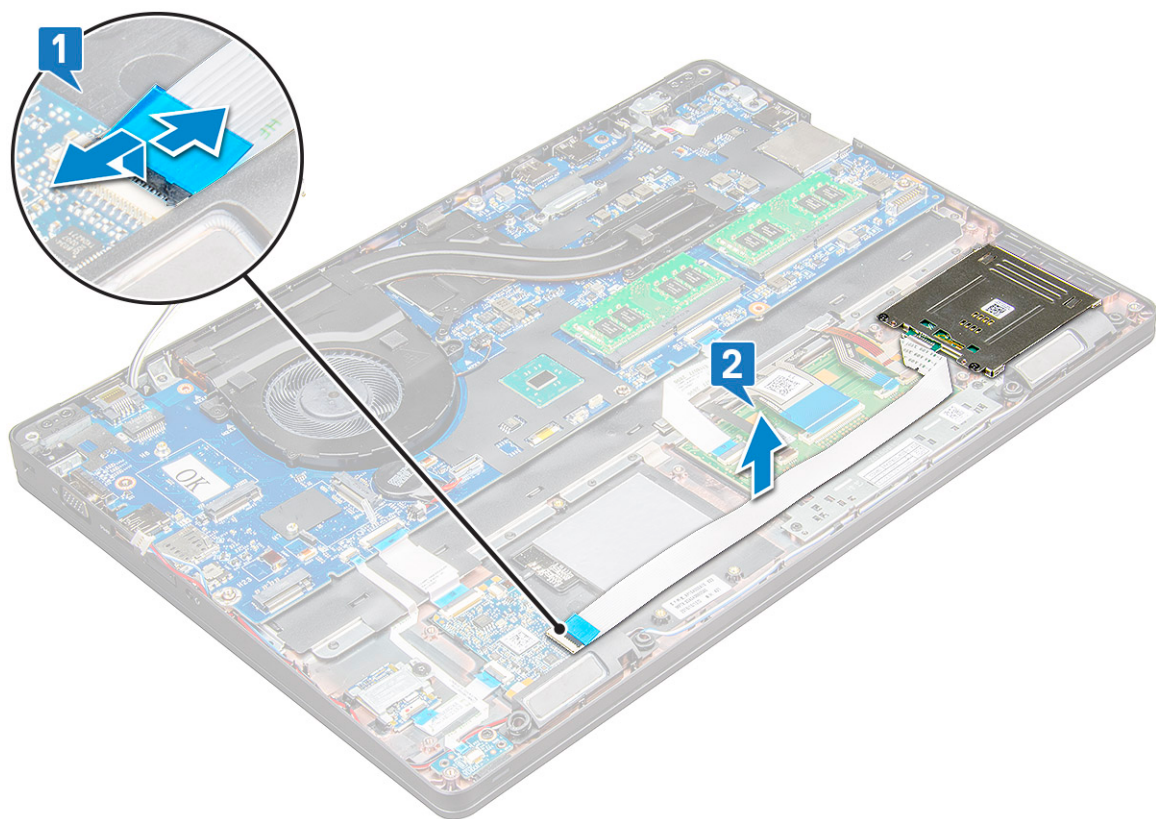
Installing the system board

- 1 Align the system board with the screw holders on the laptop.
- 2 Tighten the M2x3 screws to secure the system board to the laptop.
- 3 Place the metal USB-C bracket and tighten the M2x5 screws on the system board.
- 4 Connect the LED, mother board and touchpad cable to the system board.
- 5 Connect the display cable on the system board.
- 6 Place the eDP cable and metal bracket to system board and tighten the M2x3 screws to secure to the system board.
- 7 Install the:
 - a [chassis frame](#)
 - b [Power connector port](#)
 - c [coin cell battery](#)
 - d [heat sink](#)
 - e [memory module](#)
 - f [SSD card](#)
 - g [WWAN card](#)
 - h [WLAN card](#)
 - i [battery](#)
 - j [base cover](#)
 - k [SIM card module](#)
- 8 Follow the procedure in [After working inside your computer](#).

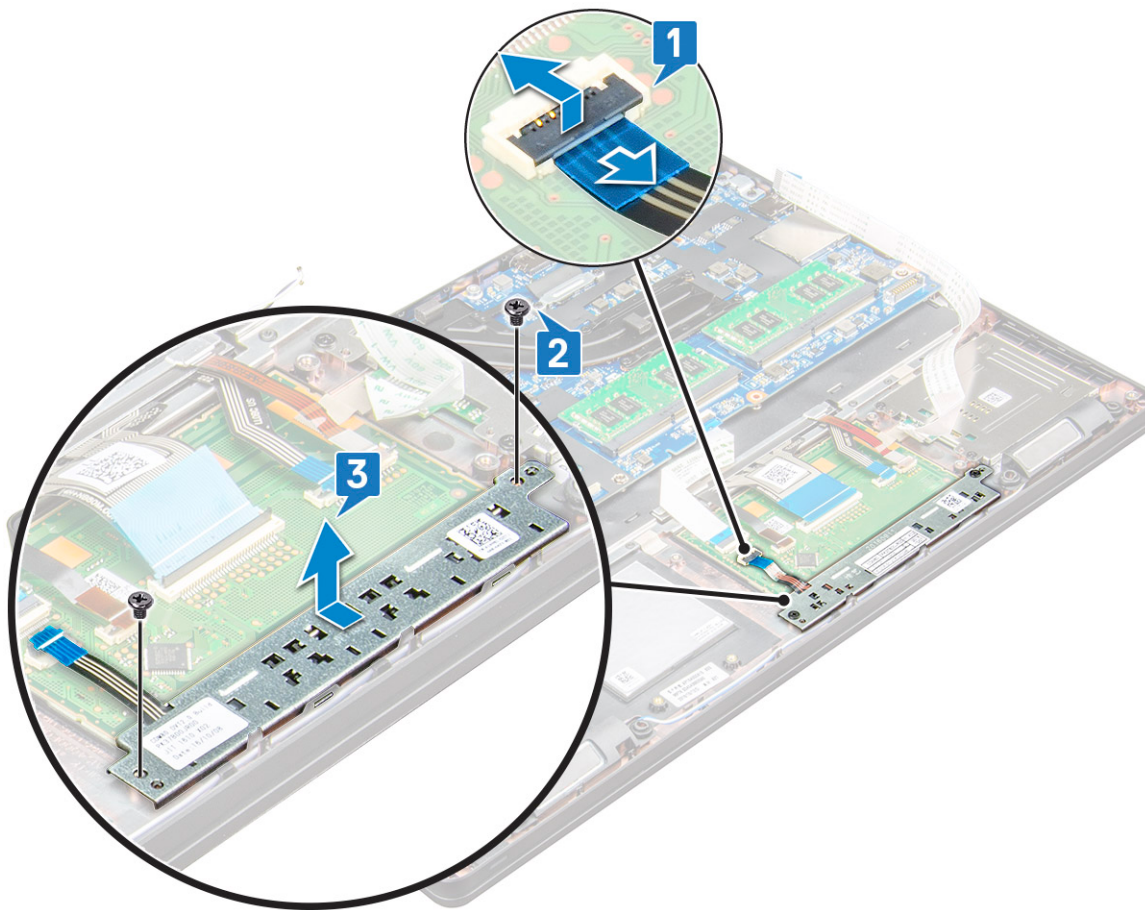
Touchpad

Removing the touchpad

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [WLAN card](#)
 - d [WWAN card](#)
 - e [SSD card](#)
 - f [chassis frame](#)
- 3 To release the touchpad panel:
 - a Lift the latch and disconnect the SmartCard reader cable from the connector on the system board [1].
 - b Peel off the SmartCard reader cable from the adhesive [2].



- 4 To remove the touchpad panel:
 - a Lift the latch and disconnect the touchpad panel cable from the connector on the system board [1].
 - b Remove the M2x3 screws (2) that secure the touchpad panel to the laptop [2].
 - c Lift the touchpad panel away from the laptop [3].



Installing the touchpad

- 1 Insert the bottom edge of the Button Board under the plastic holder tabs first when placing the buttons board back into the chassis.
- 2 Tighten the M2x3 screws to secure the touchpad panel.
- 3 Connect the touchpad cable.
- 4 Connect the SmartCard reader cable to the laptop.
- 5 Install the:
 - a chassis frame
 - b SSD card
 - c WWAN card
 - d WLAN card
 - e battery
 - f base cover
- 6 Follow the procedure in [After working inside your computer](#).

SmartCard module

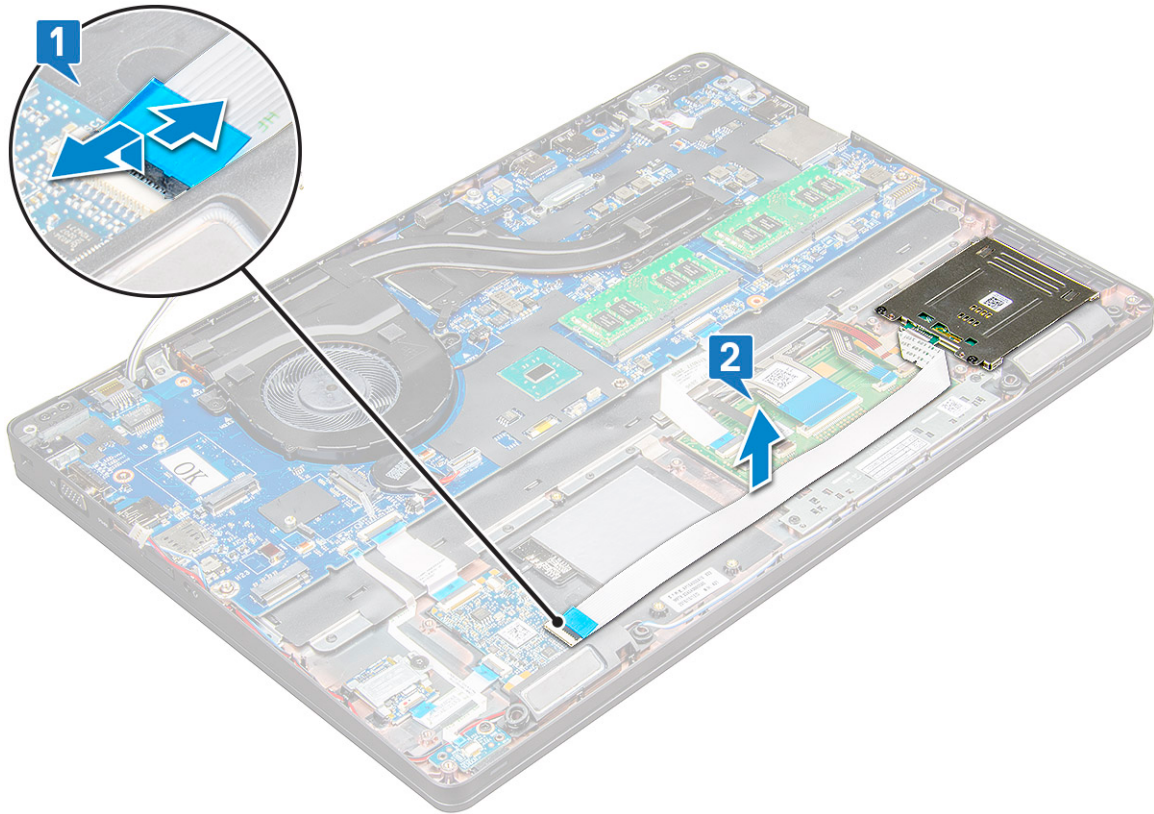
Removing the SmartCard reader

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover

- b battery
- c WLAN card
- d WWAN card
- e SSD card
- f chassis frame

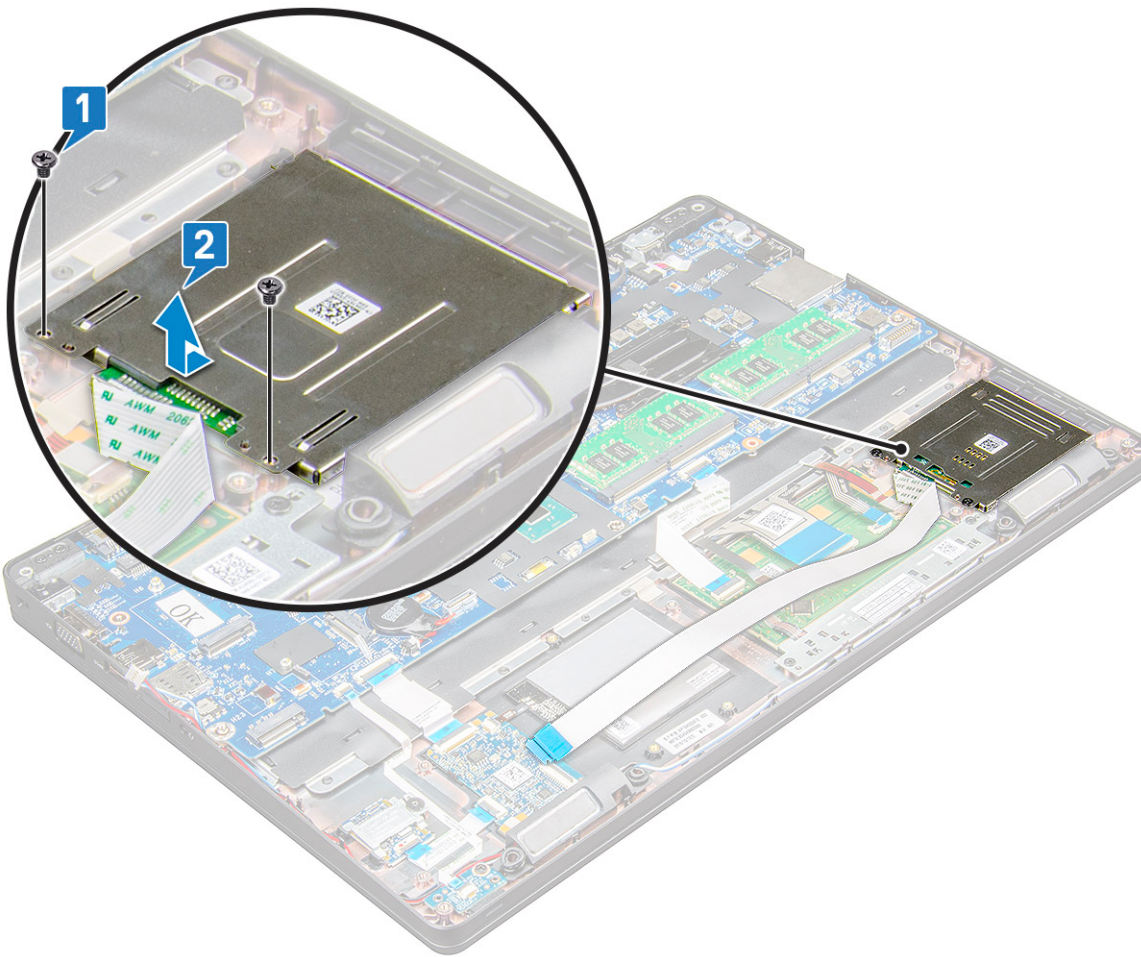
3 To release the SmartCard reader:

- a Disconnect the SmartCard reader board cable from the connector on the system board [1].
- b Peel off the cable to release from the adhesive [2].



4 To remove the SmartCard reader:

- a Remove the M2x3 screws (2) that secure the SmartCard reader board to the palmrest [1].
- b Pull the SmartCard reader board to release on the system board [2].



Installing the SmartCard reader

- 1 Place the SmartCard reader on the laptop.
- 2 Tighten the M2x3 screws to secure the SmartCard reader to the laptop.
- 3 Affix the SmartCard reader cable and connect the cable to the connector on the system board.
- 4 Install the:
 - a [chassis frame](#)
 - b [SSD card](#)
 - c [WWAN card](#)
 - d [WLAN card](#)
 - e [battery](#)
 - f [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

LED board

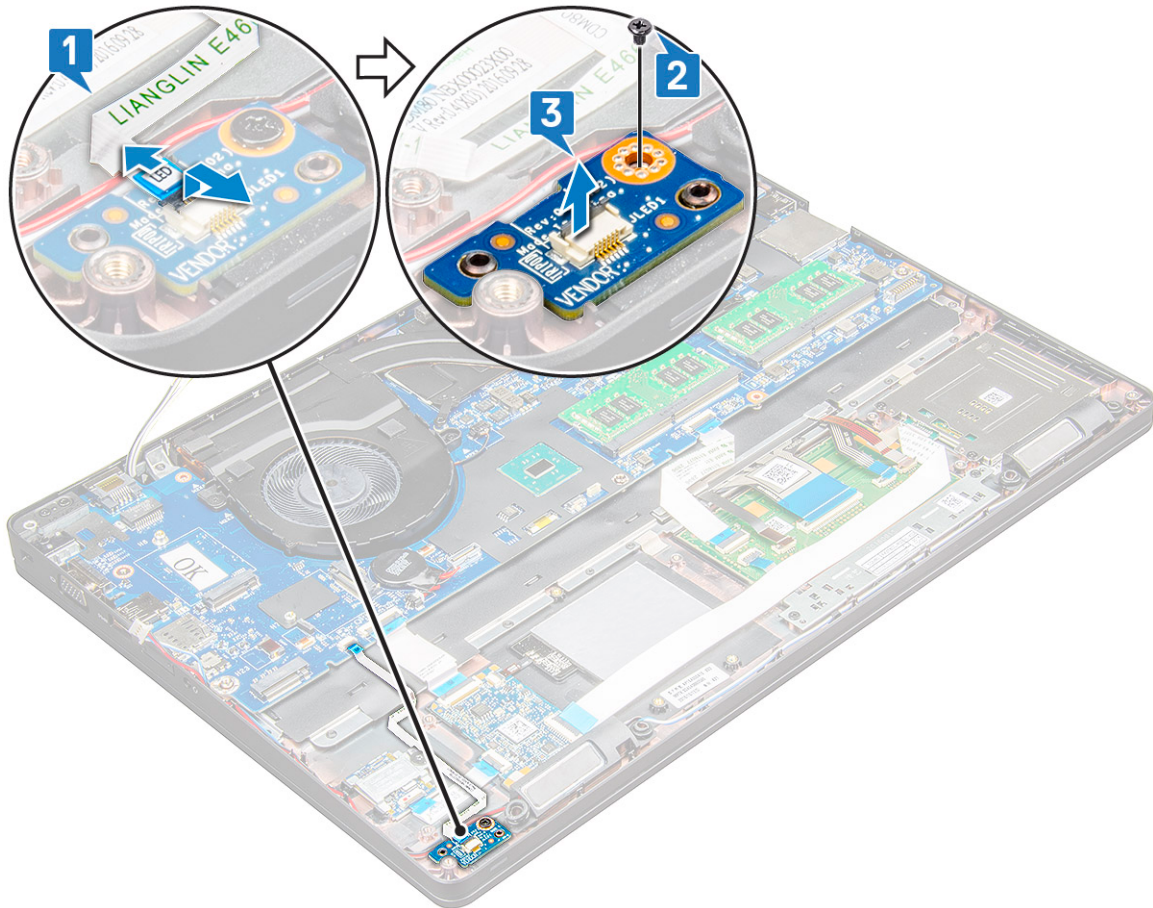
Removing the LED board

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:

- a base cover
- b battery
- c WLAN card
- d WWAN card
- e SSD card
- f chassis frame

3 To remove the LED board:

- a Lift the latch and disconnect the LED board cable from the connector on the LED board [1].
- b Remove the M2x3 screw that secures the LED board to the laptop [2].
- c Lift the LED board away from the laptop [3].



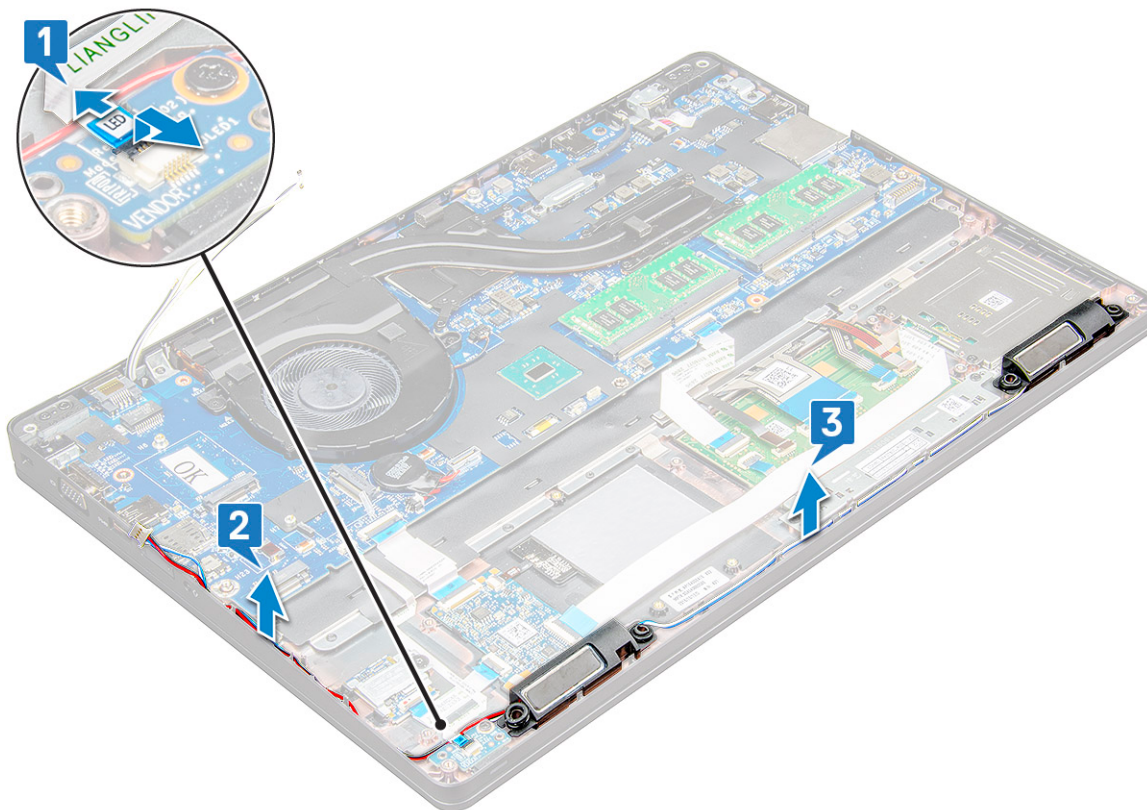
Installing the LED board

- 1 Place the LED board on the laptop.
- 2 Tighten the M2x3 screw to secure the LED board to the laptop.
- 3 Connect the LED board cable to the connector on the LED board.
- 4 Install the:
 - a chassis frame
 - b SSD card
 - c WWAN card
 - d WLAN card
 - e battery
 - f base cover
- 5 Follow the procedure in [After working inside your computer](#).

Speaker

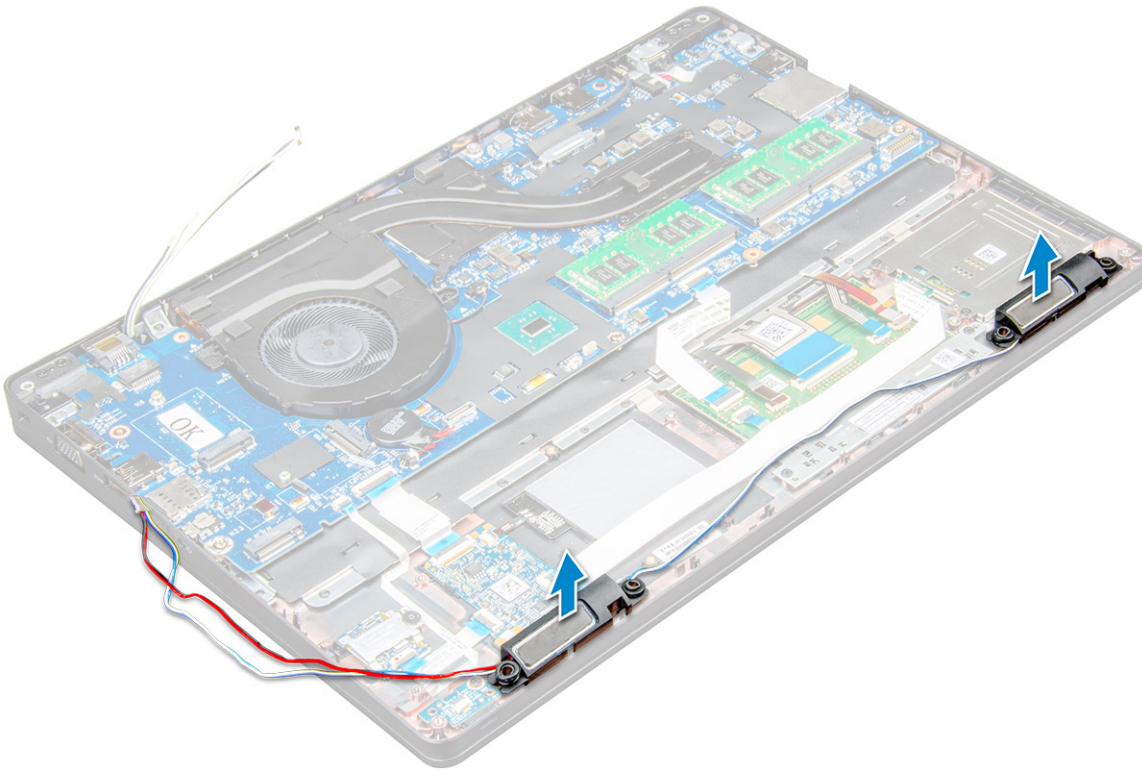
Removing the speaker

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [WLAN card](#)
 - d [WWAN card](#)
 - e [SSD card](#)
 - f [chassis frame](#)
- 3 To disconnect the cables:
 - a Lift the latch and disconnect the LED board cable [1].
 - b Disconnect and unrout the speaker cable [2].
 - c Remove the speaker cable from the routing clips [3].



- 4 Lift the speakers from the laptop.

NOTE: Speaker are fixed to the laptop in the speaker holder, lift the speaker gently to avoid damage to the holders.



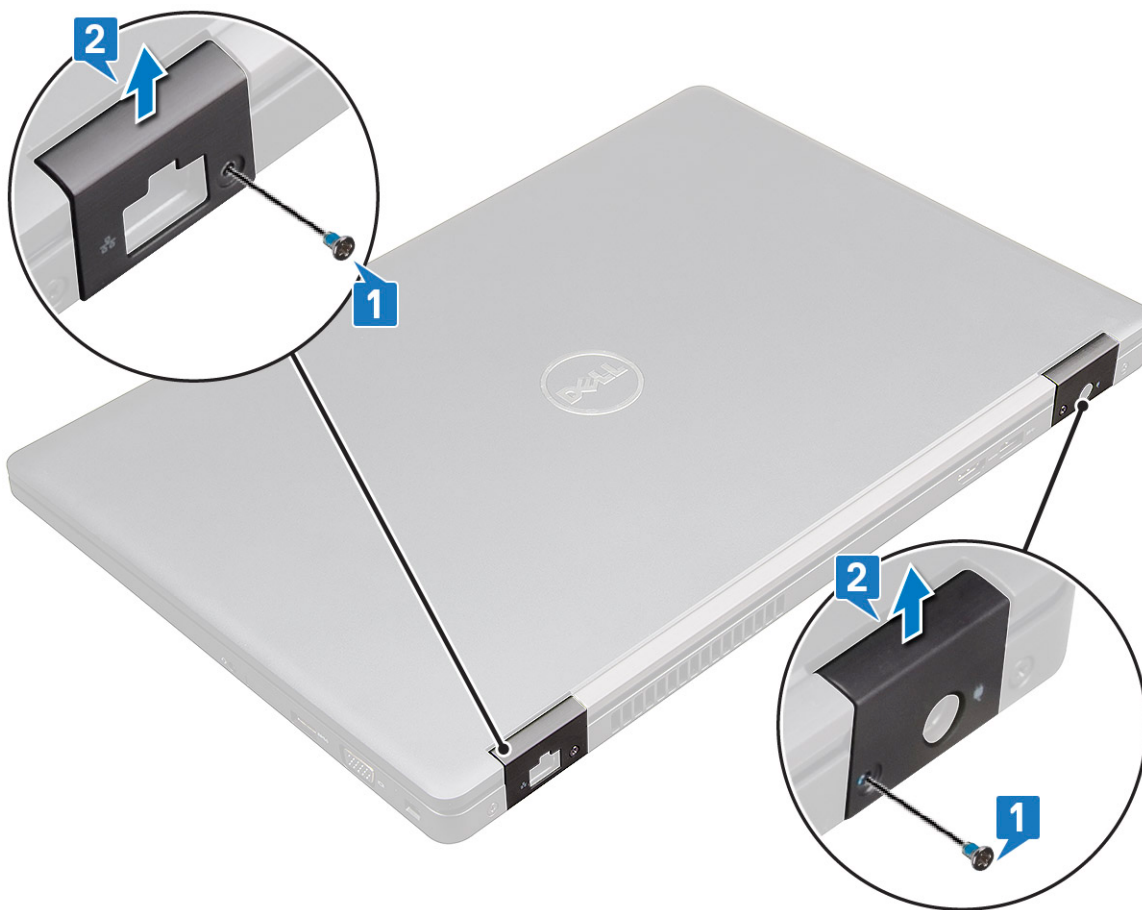
Installing the speaker

- 1 Place the speakers into the slots on the laptop.
- 2 Route the speaker cable through the retention clips through the routing channel.
- 3 Connect the speaker and LED board cable to the laptop.
- 4 Install the:
 - a [chassis frame](#)
 - b [SSD card](#)
 - c [WLAN card](#)
 - d [battery](#)
 - e [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

Hinge cap

Removing the hinge cap

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
- 3 To remove the hinge cap:
 - a Remove the M2x3 screws that secure the hinge cap to the laptop [1].
 - b Remove the hinge cap from the laptop [2].



Installing the hinge cap

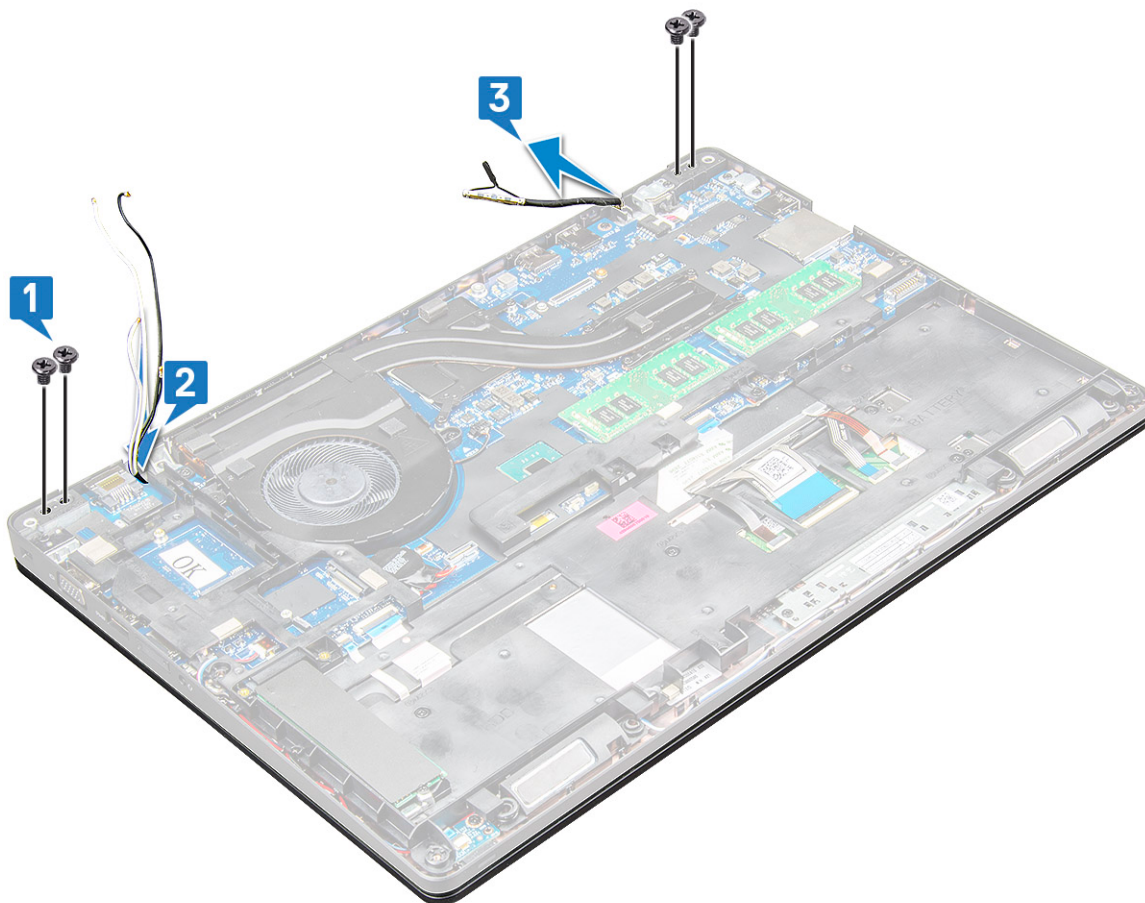
- 1 Place the hinge bracket to align with the screw holders on the laptop.
- 2 Tighten the M2x3 screws to secure the display assembly to the laptop.
- 3 Install the:
 - a [battery](#)
 - b [base cover](#)
- 4 Follow the procedure in [After working inside your computer](#).

Display assembly

Removing the display assembly

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [WWAN card](#)
 - d [WLAN card](#)
 - e [hinge cap](#)
- 3 To disconnect the display cable:
 - a Release the WLAN cable from the routing channels [1].

- b Remove the M2x3 screws (2) and lift the metal bracket that secure the display cable on the computer [2,3].
 - c Disconnect the display cable [4].
- 4 To remove hinge screws:
 - a Remove the M2x5 screws (4) that secure the display assembly to the system board [1].
 - b Release the antenna cables and display cable from the routing channel [2, 3].



- 5 Turn over the laptop.
- 6 To remove the display assembly:
 - a Remove the M2x5 screws (2) that secure the display assembly to the laptop [1].
 - b Flip to open the display [2].



- 7 Slide the display assembly away from the system base.



Installing the display assembly

- 1 Place the display assembly to align with the screw holders on the laptop.

 **NOTE:** Close the LCD before inserting the screws or turning over the laptop.

 **CAUTION:** Route the display cable and the antenna cable through the LCD hinge mount holes as LCD assembly is inserted into the base, to prevent possible cable damage.

- 2 Tighten the M2x5 screws to secure the display assembly to the laptop.
- 3 Turn over the laptop.
- 4 Connect the antenna cables and display cable to the connectors.
- 5 Place the display cable bracket over the connector and tighten the M2x5 screws to secure the display cable to the laptop.
- 6 Install the:
 - a [hinge cap](#)
 - b [WLAN card](#)
 - c [battery](#)
 - d [base cover](#)
- 7 Follow the procedure in [After working inside your computer](#).

Display bezel

Removing display bezel

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [WLAN card](#)
 - d [WWAN card](#)
 - e [display assembly](#)

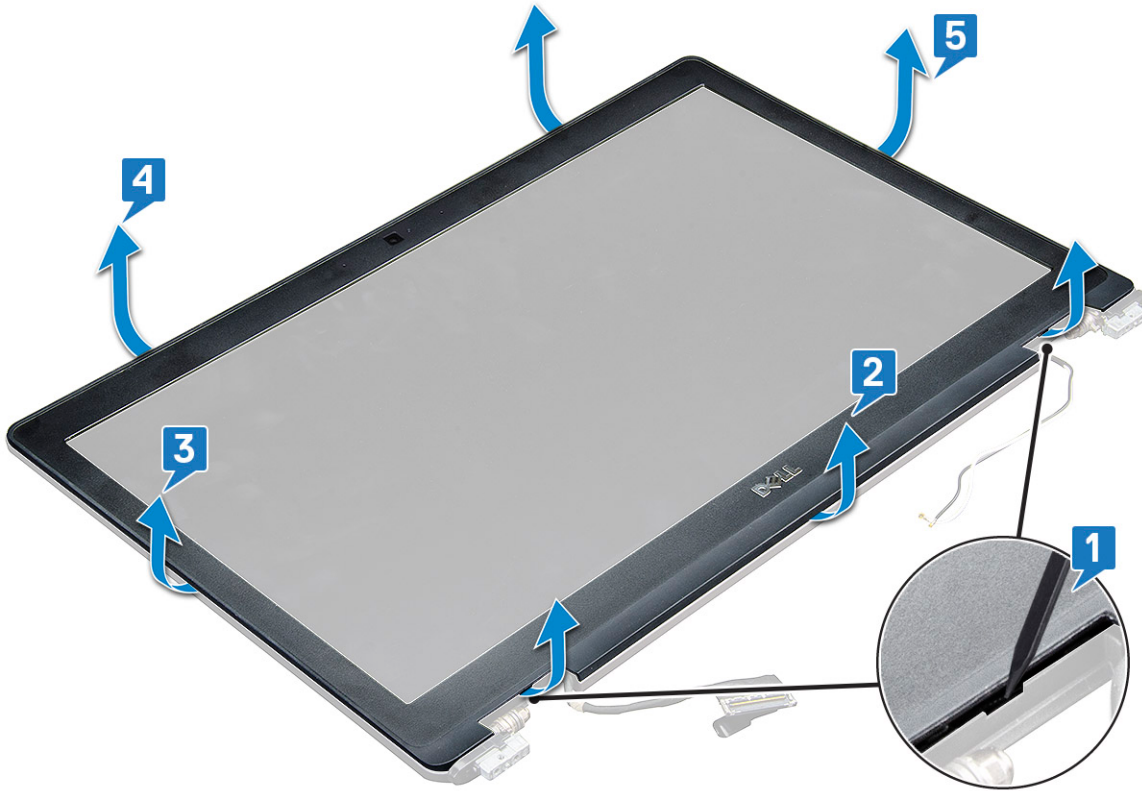
- 3 To remove the display bezel:

- a Pry the display bezel at the base of the display [1].

 **NOTE:** When removing or reinstalling the display bezel from the display assembly, technicians should note that the display bezel is secured to the LCD panel with a strong adhesive and care must be taken to avoid damage to LCD.

- b Lift the display bezel to release it [2].
- c Pry the edges on the side of the display to release the display bezel [3, 4,5].

 **CAUTION:** The adhesive used on the LCD bezel to seal it with the LCD itself, makes it hard to remove the bezel as the adhesive is very strong and tends to stay stuck to the LCD portion and can peel the layers up or crack the glass when trying to pry the two items apart.



Installing display bezel

- 1 Place the display bezel on the display assembly.
- ① **NOTE:** Remove the protective covering on the adhesive on the LCD bezel before placing on the display assembly.
- 2 Starting from a top corner, press clockwise on the display bezel and work around the entire bezel until it clicks on to the display assembly.
- 3 Install the:
 - a display assembly
 - b WWAN card
 - c WLAN card
 - d battery
 - e base cover
- 4 Follow the procedure in [After working inside your computer](#).

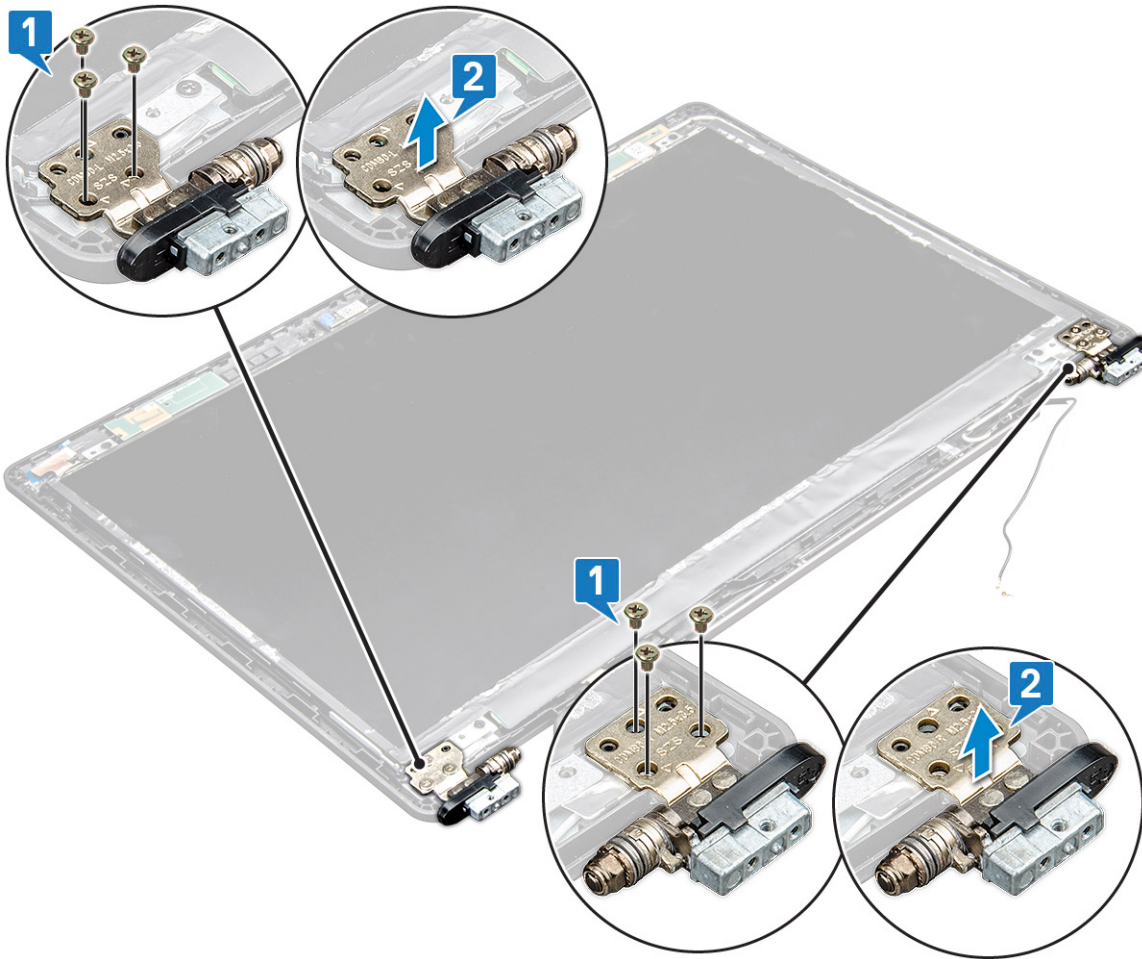
Display hinges

Removing the display hinge

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b battery
 - c WWAN card
 - d WLAN card
 - e hinge cap

- f [display assembly](#)
- g [display bezel](#)

- 3 To remove the display hinge:
 - a Remove the M2.5x3.5 screws that secure the display hinge to the display assembly [1].
 - b Lift the display hinge away from the display assembly [2].
 - c Repeat the to remove the other display hinge.



Installing the display hinge

- 1 Place the display hinge cover on the display assembly.
- 2 Tighten the M2.5x3.5 screw to secure the display hinge cover to the display assembly.
- 3 Repeat the same procedure step 1-2 to install the other display hinge cover.
- 4 Install the:
 - a [display bezel](#)
 - b [display assembly](#)
 - c [hinge cap](#)
 - d [WWAN card](#)
 - e [WLAN card](#)
 - f [battery](#)
 - g [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

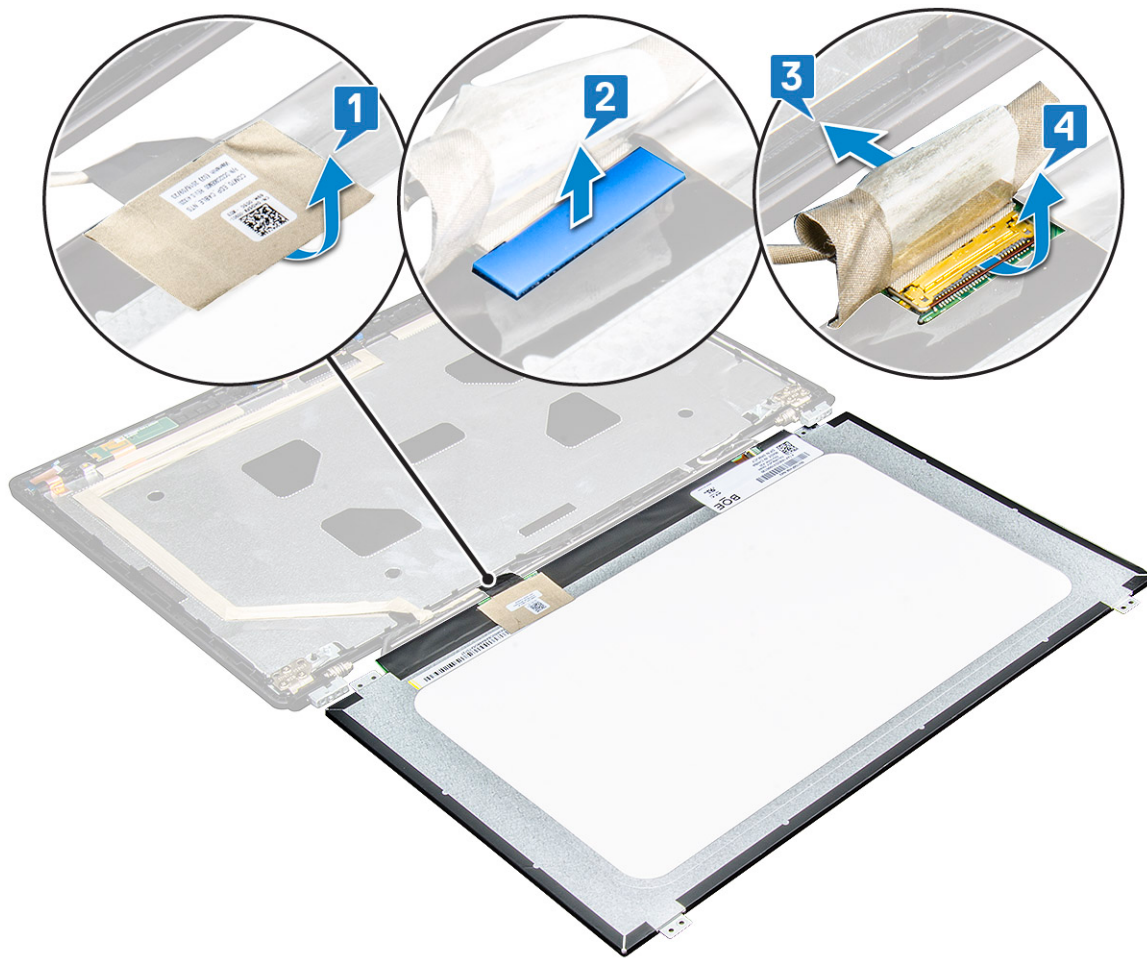
Display panel

Removing the display panel

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [WWAN card](#)
 - d [WLAN card](#)
 - e [hinge cap](#)
 - f [display assembly](#)
 - g [display bezel](#)
- 3 Remove the M2x3 screws (4) that secure the display panel to the display assembly [1] and lift to turn over the display panel to access the eDP cable [2].



- 4 To remove the display panel:
 - a Peel off the adhesive tape [1].
 - b Lift the blue tape that secures the display cable [2].
 - c Lift the latch to disconnect the display cable from the connector on the display panel [3, 4].



Installing the display panel

- 1 Connect the eDP cable to the connector and affix the blue tape.
- 2 Affix the adhesive tape to secure the eDP cable.
- 3 Replace the display panel to align with the screw holders on the display assembly.
- 4 Tighten the M2x3 screws to secure the display panel to the display assembly.
- 5 Install the:
 - a [display bezel](#)
 - b [display assembly](#)
 - c [hinge cap](#)
 - d [WWAN card](#)
 - e [WLAN card](#)
 - f [battery](#)
 - g [base cover](#)
- 6 Follow the procedure in [After working inside your computer](#).

Display (eDP) cable

Removing the eDP cable

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [WWAN card](#)
 - d [WLAN card](#)
 - e [display assembly](#)
 - f [Display Panel](#)
 - g [display bezel](#)
- 3 Peel off the eDP cable from the adhesive to remove it from the display.



Installing the eDP cable

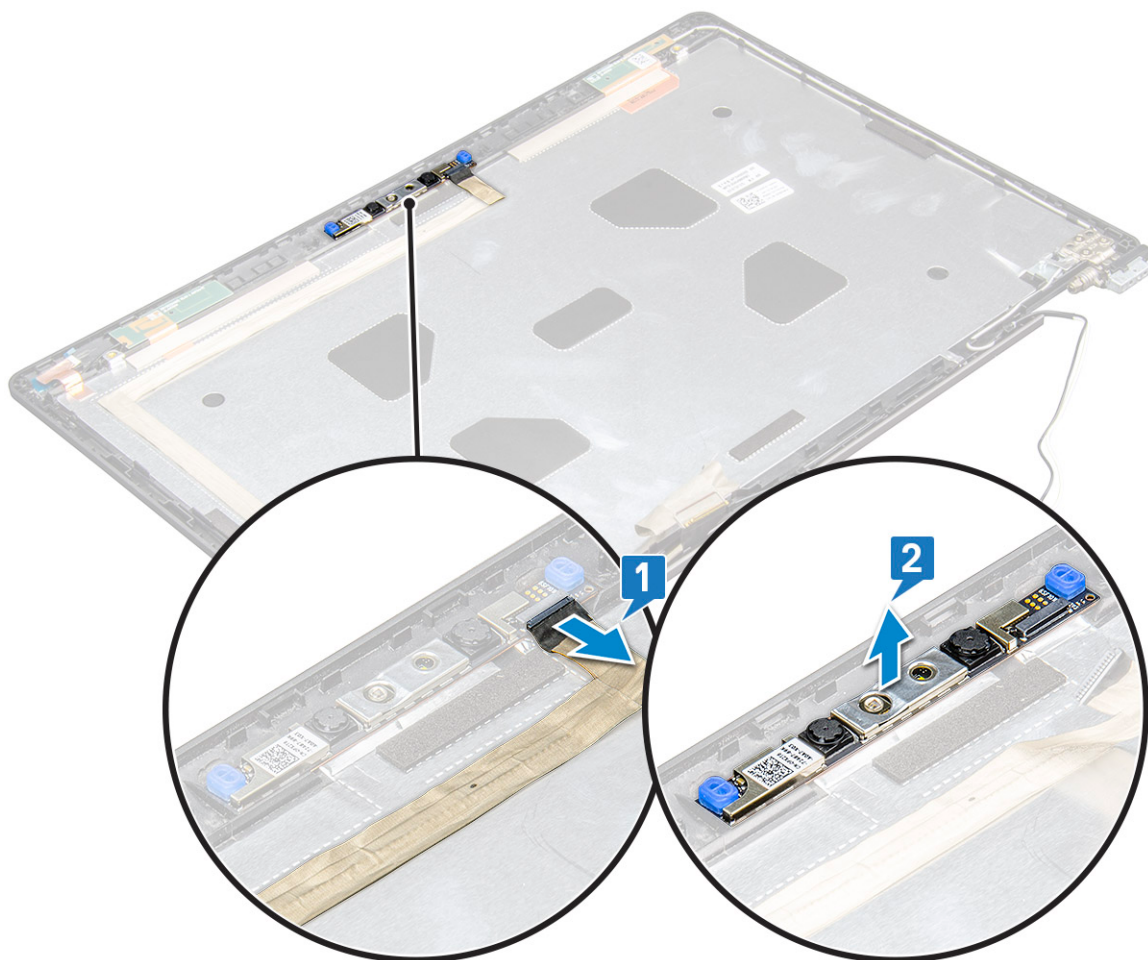
- 1 Affix the eDP cable on the display assembly.
- 2 Install the:
 - a [display panel](#)
 - b [display bezel](#)
 - c [display assembly](#)
 - d [hinge cap](#)
 - e [WWAN card](#)
 - f [WLAN card](#)
 - g [battery](#)
 - h [base cover](#)

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

Camera

Removing camera

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [WLAN](#)
 - d [WWAN card](#)
 - e [display assembly](#)
 - f [display bezel](#)
 - g [display panel](#)
- 3 To remove the camera:
 - a Disconnect the camera cable from the connector on the display panel[1].
 - b Carefully pry and lift the camera module from the display back cover [2].



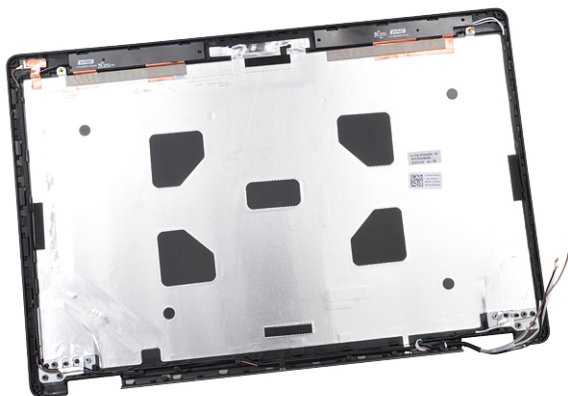
Installing camera

- 1 Insert the camera into the slot on the display back cover.
- 2 Connect the display cable to the connector.
- 3 Connect the camera cable to the connector on the camera module.
- 4 Install the :
 - a [display panel](#)
 - b [display bezel](#)
 - c [display assembly](#)
 - d [WLAN](#)
 - e [WWAN card](#)
 - f [memory module](#)
 - g [battery](#)
 - h [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

Display back cover assembly

Removing the display back cover assembly

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [WWAN card](#)
 - d [WLAN card](#)
 - e [display assembly](#)
 - f [display bezel](#)
 - g [display panel](#)
 - h [eDP cable](#)
 - i [camera](#)
- 3 The display back cover assembly is the remaining component, after removing all the components.



Installing the display back cover assembly

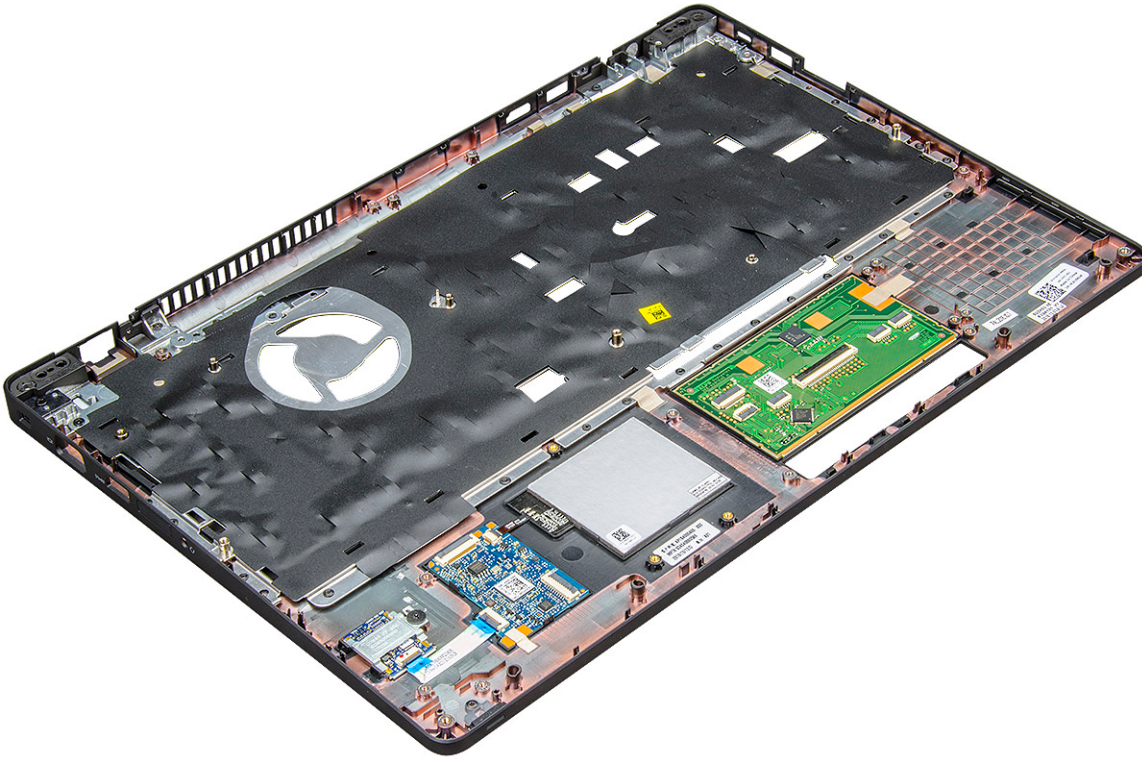
- 1 The display back cover assembly is the remaining component, after removing all the components.
- 2 Install the:
 - a camera
 - b eDP cable
 - c display panel
 - d display bezel
 - e display assembly
 - f WWAN card
 - g WLAN card
 - h battery
 - i base cover
- 3 Follow the procedure in [After working inside your computer](#).

Palm rest

Replacing the palm rest

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b battery
 - c keyboard
 - d WLAN card
 - e WWAN card
 - f SSD card
 - g memory module
 - h Touchpad
 - i heat sink
 - j coin cell battery
 - k chassis frame
 - l system board
 - m hinge cap
 - n display assembly

 **NOTE:** The component you are left with is the palm rest.



- 3 Install the following components on the new palm rest.
 - a [display assembly](#)
 - b [hinge cap](#)
 - c [system board](#)
 - d [chassis frame](#)
 - e [coin cell battery](#)
 - f [heat sink](#)
 - g [Touchpad](#)
 - h [memory module](#)
 - i [SSD card](#)
 - j [WWAN card](#)
 - k [WLAN card](#)
 - l [keyboard](#)
 - m [battery](#)
 - n [base cover](#)
- 4 Follow the procedure in [After working inside your computer](#).

Troubleshooting

Enhanced Pre-Boot System Assessment — ePSA diagnostics

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

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

 **CAUTION:** Use the system diagnostics to test only your computer. Using this program with other computers may cause invalid results or error messages.

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

Running the ePSA Diagnostics

- 1 Invoke diagnostics boot by either of the methods suggested above
- 2 Once on one time boot menu use up/down arrow key to navigate to ePSA or diagnostics and press <return> key to launch
Fn+PWR will flash diagnostics boot selected on screen and launch ePSA/diagnostics directly.
- 3 On the boot menu screen, select the **Diagnostics** option.
- 4 Press the arrow in the lower-right corner to go to the page listing.
The items detected are listed and will be tested
- 5 If there are any issues, error codes are displayed.
Note the error code and validation number and contact Dell.

To run a diagnostic test on a specific device

- 1 Press Esc and click **Yes** to stop the diagnostic test.
- 2 Select the device from the left pane and click **Run Tests**.
- 3 If there are any issues, error codes are displayed.
Note the error code and validation number and contact Dell.

Real Time Clock reset

The Real Time Clock (RTC) reset function allows you to recover your Dell system from **No POST/No Boot/No Power** situations. To initiate the RTC reset on the system make sure system is in a power-off state and is connected to power source . Press and hold the power button for 25 seconds and then release the power button.

 **NOTE:** If AC power is disconnected from the system during the process or the power button is held longer than 40 seconds, the RTC reset process is aborted.

The RTC reset will reset the BIOS to Defaults, un-provision Intel vPro and reset the system date and time. The following items are unaffected by the RTC reset:

- Service Tag
- Asset Tag
- Ownership Tag
- Admin Password
- System Password
- HDD Password
- Key Databases
- System Logs

The following items may or may not reset based on your custom BIOS setting selections:

- The Boot List
- Enable Legacy OROMs
- Secure Boot Enable
- Allow BIOS Downgrade

Getting help

Contacting Dell

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

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

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