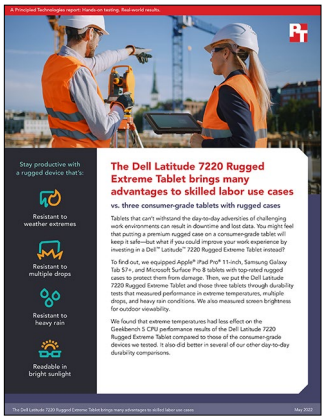

The science behind the report:

The Dell Latitude 7220 Rugged Extreme Tablet brings many advantages to skilled labor use cases

This document describes what we tested, how we tested, and what we found. To learn how these facts translate into real-world benefits, read the report The Dell Latitude 7220 Rugged Extreme Tablet brings many advantages to skilled labor use cases.

We concluded our hands-on testing on April 8, 2022. During testing, we determined the appropriate hardware and software configurations and applied updates as they became available. The results in this report reflect configurations that we finalized on January 14, 2022 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Our results

To learn more about how we have calculated the wins in this report, go to http://facts.pt/calculating-and-highlighting-wins. Unless we state otherwise, we have followed the rules and principles we outline in that document.

Table 1: Results of our Geekbench 5 testing.

Geekbench 5 CPU performance scores	Dell™ Latitude™ 7220 Rugged Extreme	Apple® iPad® Pro 11-inch	Microsoft Surface Pro 8	Samsung Galaxy Tab S7+
Baseline temperature (75°F/23.9°C)				
Geekbench 5 CPU performance scores (single-core)	1,058	1,706	1,394	950
Geekbench 5 CPU performance scores (multi-core)	2,923	7,309	5,428	3,098
Hot temperature (122°F/50.0°C)				
Geekbench 5 CPU performance scores (single-core)	1,043	171	N/A	425
Geekbench 5 CPU performance scores (multi-core)	3,240	659	N/A	2,213
Cold temperature (-20°F/-28.9°C)				
Geekbench 5 CPU performance scores (single-core)	1,004	1,681	N/A	958
Geekbench 5 CPU performance scores (multi-core)	2,979	7,299	N/A	3,212

Table 2: Results of our drop testing.

		Dell Latitude 7220 Rugged Extreme	Apple iPad Pro 11-inch	Microsoft Surface Pro 8	Samsung Galaxy Tab S7+
Drop #	Drop surface	Damage we observed			
1	Bottom				
2	Top				
3	Front			Glass screen shattered across the entirety of the screen.	
4	Left side				
5	Back			More cracking around screen but still functional.	
6	Right side			Slight additional cracking on screen.	
7	Front left edge			Additional screen cracking on left side of the screen.	
8	Back left edge				
9	Back right edge				
10	Front right edge				
11	Bottom front edge			Additional screen cracking on bottom front edge.	
12	Bottom left edge				Slight bending of bottom left speaker hole.
13	Bottom back edge				
14	Bottom right edge				
15	Top front edge		Slight wear on top edge.	Additional screen cracking along the top and near camera.	
16	Top left edge	Slight wear on edges.			
17	Top back edge				
18	Top right edge			Additional screen cracking. Some touch inputs do not respond correctly.	
19	Bottom front left corner				
20	Bottom back left corner	Slight wear on corner.		Additional screen cracking.	
21	Bottom back right corner				
22	Bottom front right corner		Slight scuffing on corner.		Slight bending of bottom right speaker hole.
23	Top Front left corner				

		Dell Latitude 7220 Rugged Extreme	Apple iPad Pro 11-inch	Microsoft Surface Pro 8	Samsung Galaxy Tab S7+
24	Top back left corner	Slight wear on corner.		Additional cracking. Screen beginning to separate from housing.	
25	Top back right corner				
26	Top front right corner	System fully functional. Slight wear on corners.	System fully functional. Slight wear on corners.	System still functional but screen cracked throughout.	System fully functional. Slight wear on corners.

Table 3: Results of rain testing after 10 minutes under a heavy spray of water.

	Dell Latitude 7220 Rugged Extreme	Apple iPad Pro 11-inch	Microsoft Surface Pro 8	Samsung Galaxy Tab S7+
Touchscreen usable during heavy downpour	No.	No.	No.	No.
Remained powered on	Yes.	No. *Shut down after 1 minute.*	No. *Shut down after 5 minutes and 30 seconds.*	Yes. *Shut down after removal from wet conditions.*
Functional after 20 minutes in dry conditions	Yes.	No. *Touchscreen unusable.*	No. *Would not power on.*	Yes.
Free from visible signs of water damage	Yes.	No. *Screen appeared damaged.*	No. *Water seeped into the screen.*	Yes.

Table 4: Results of screen brightness testing.

Screen brightness (nits) (Higher is brighter)	Dell Latitude 7220 Rugged Extreme	Apple iPad Pro 11-inch	Microsoft Surface Pro 8	Samsung Galaxy Tab S7+
Plugged in	960	417	390	329
Unplugged	820	417	340	329

System configuration information

Table 5: Detailed information on the systems we tested.

System configuration information	Dell Latitude 7220 Rugged Extreme Tablet	Microsoft Surface Pro 8	Apple iPad Pro 11-inch	Samsung Galaxy Tab S7+
Processor	Intel® Core™ i5-8365U	Intel Core i5-1135G7	Apple M1	Qualcomm® SDM865+
Processor frequency (GHz)	1.60 – 4.10	2.40 – 4.20	3.2	2.11 – 3.1
Processor cores	4	4	8	8
Memory (GB)	16	16	8	8
Storage (GB)	256	256	256	256
Bluetooth	5.2	5.1	5.0	5.2
Ports	1 x USB-A 3.1 with Power Delivery 1 x USB-C® 3.0 with DisplayPort Alt Mode/ PowerShare	2 x USB-C with USB 4.0/ Thunderbolt™ 4	1 x USB-C with USB 4.0/ Thunderbolt 4	1 x USB-C
Battery type	Lithium-ion	Lithium-ion	Lithium-polymer	Lithium-ion
Battery capacity (Wh)	2 x 34.00	51.50	40.88	39.04
Display size (in.)	11.6-inch	13-inch	11-inch	12.4-inch
Display resolution (w x h)	1,920 x 1,080	2,880 x 1,920	2,388 x 1,668	1,752 x 2,800
OS (version)	Windows 10 Pro 10.0.19043	Windows 10 Home 10.0.19043	Apple iPadOS® 15.2.1	Google™ Android™ 12
System weight (lbs.)	3.31	1.96	1.04	1.27

Table 6: Details on the protective covers we used.

	Dell Latitude 7220 Rugged Extreme*	Apple iPad Pro 11-inch**	Microsoft Surface Pro 8***	Samsung Galaxy Tab S7+[4]
Brand and model	N/A (built-in protective design)	OtterBox® Defender Series Pro	Urban Armor Gear Plasma Series case for the Microsoft Surface Pro 8	SaharaCase® Defense Protection Case
Compliant standards	• MIL-STD-810G • MIL-STD-810H • **IEC 60529 ingress protection13:** IP-65 (dust-tight, protected against pressurized water) • **Hazardous locations certification:** ANSI/ISA.12.12.01 certification (Class I, Division 2, Groups A, B, C,D) • **Electromagnetic interference:** MIL-STD-461F and MIL-STD-461G	• MIL-STD-810G 516.6	• MIL-STD 810G 516.6 • Medical Grade	• None listed
Rugged	Yes	Yes	Yes	Yes

*Dell Technologies, "Latitude 7220 Rugged Extreme," accessed April 26, 2022, https://www.delltechnologies.com/asset/pl-pl/products/tablets/technical-support/latitude-7220-rugged-extreme-spec-sheet.pdf.
**CDW, "OtterBox Defender Series Pro - back cover for tablet," accessed April 26, 2022, https://www.cdw.com/product/otterbox-defender-series-pro-back-cover-for-tablet/6542288.
***Amazon, "URBAN ARMOR GEAR UAG," accessed April 26, 2022, https://www.amazon.com/URBAN-ARMOR-GEAR-Feather-Light-Translucent/dp/B09GQQGPSD/.

Cost details

Table 7: Cost details on the devices we tested. These are the per-line U.S. dollar amounts listed on our purchase order confirmations. These prices do not include shipping or taxes.

	Dell Latitude 7220 Rugged Extreme *	Apple iPad Pro 11-inch**	Microsoft Surface Pro 8**	Samsung Galaxy Tab S7+ ***
Tablet	$3,123.55	$1,199.00	$1,299.00	$699.00
Protective cover *We used protective covers in every test*	N/A (built-in protective design)	OtterBox Defender Series Pro	Urban Armor Gear Plasma Series case for the Microsoft Surface Pro 8	SaharaCase Defense Protection Case
	$0.00	$89.95	$99.99	$59.99
Stylus *We used styluses only in the rain test*	Dell Rugged Active Pen (included)	Apple Pencil	Surface Slim Pen 2	Samsung S Pen
	$0.00	$129.00	$129.99	$59.99
Total	**$3,123.55**	**$1,317.95**	**$1,528.98**	**$818.98**

*Tablet purchased on 12/15/21
**Tablets purchased on 12/16/21
***Tablet purchased on 12/17/21

Table 8: Starting prices of the tablets as of May 12, 2022. These are the per-line U.S. dollar amounts available from online retailers. These prices do not include shipping or taxes.

	Dell Latitude 7220 Rugged Extreme*	Apple iPad Pro 11-inch"**	Microsoft Surface Pro 8***	Samsung Galaxy Tab S7+****
Total	**$2,009.00**	**$799.00**	**$939.99**	**$549.99**

*Dell, "Rugged laptops and tablets" accessed May 12, 2022, https://www.dell.com/en-us/work/shop/dell-laptops-and-notebooks/sf/rugged-laptops.
**Apple, "iPad Pro," accessed May 12, 2022, https://www.apple.com/shop/buy-ipad/ipad-pro.
***Samsung, "Galaxy Tab S7 11.0"," accessed May 12, 2022, https://www.samsung.com/us/tablets/tab-s7/buy/.
****Microsoft, "Surface," accessed May 12, 2022, https://www.microsoft.com/en-us/d/surface-pro-8/8QWCRTQ8V8XG

How we tested

Low/high/room temperature benchmark testing

Measuring weather extreme resistance

Running the Geekbench 5 benchmark for room temperature testing

1. Power on the devices, and log in.
2. Download Geekbench 5 onto the devices.
3. With the Climate Control Chamber at roughly 75 degrees Fahrenheit (23.9 degrees Celsius), place the device, powered-on to its home screen, in the Climate Control Chamber, and plug in the power cable.
4. Launch Geekbench 5.
5. Click Run CPU Benchmark, and close the Climate Control Chamber door.
6. When the test completes, open the Climate Control Chamber door, and record the score.
7. Repeat steps 1-6 two more times.
8. Report the median score.

Running the Geekbench 5 benchmark for extreme cold temperature testing

1. Power on the device, and log in.
2. With the Climate Control Chamber at roughly 75 degrees Fahrenheit (23.9 degrees Celsius), place the device, powered-on to its home screen, in the Climate Control Chamber, and plug in the power cable.
3. Close the chamber, and cool the device to -20 degrees Fahrenheit (-28.9 degrees Celsius). Once the chamber reaches -20 degrees Fahrenheit, continue to cool the device for an additional 30 minutes.
4. After 30 minutes, open the chamber, start the CPU benchmark in Geekbench 5, and close the chamber.
5. When the CPU benchmark is complete, open the chamber, record the score, and restart the system.
6. Allow the tablet to return to temperature by leaving it out at room temperature for an hour.
7. Repeat steps 1-6 two more times.
8. Record the median score.

Running the Geekbench 5 benchmark for extreme heat temperature testing

1. Power on the device, and log in.
2. With the Climate Control Chamber at roughly 75 degrees Fahrenheit (23.9 degrees Celsius), place the device, powered-on to its home screen, in the Climate Control Chamber, and plug in the power cable.
3. Close the chamber, and heat the device to 122 degrees Fahrenheit (50 degrees Celsius). Once the chamber reaches 122 degrees Fahrenheit, continue to heat the device for an additional 30 minutes.
4. After 30 minutes, open the chamber, start the CPU benchmark in Geekbench 5, and close the chamber.
5. When the CPU benchmark is complete, open the chamber, record the score, and restart the system.
6. Allow the tablet to return to temperature by leaving it out at room temperature for an hour.
7. Repeat steps 1-6 two more times.
8. Record the median score.

Durability testing

Measuring multiple drop resistance

We fitted each consumer-grade device with its corresponding rugged case before testing. We executed 26 drops from a four-foot height with different orientations (angles) for each drop. We tested each device in the same drop order.

26 orientations: 1. Bottom; 2. Top; 3. Front; 4. Left side; 5. Back; 6. Right side; 7. Front left edge; 8. Back left edge; 9. Back right edge; 10. Front right edge; 11. Bottom front edge; 12. Bottom left edge; 13. Bottom back edge; 14. Bottom right edge; 15. Top front edge; 16. Top left edge; 17. Top back edge; 18. Top right edge; 19. Bottom front left corner; 20. Bottom back left corner; 21. Bottom back right corner; 22. Bottom front right corner; 23. Top front left corner; 24. Top back left corner; 25. Top back right corner; 26. Top front right corner.

1. Set the height of the platen on the Lansmont Precision Drop Tester to 48 inches above the drop surface.
2. Place the device on the platen of the drop tester in the first orientation.
3. Drop the device onto a 2-inch thick plywood surface.
4. Wait until the device is completely still.
5. Observe the device for any visible damage or functionality issues.

6. Note any damage or functionality issues.
7. Continue dropping the device in each of the 26 orientations in order, noting any damage or functionality issues along the way.
8. If a device experiences a critical failure before you complete all 26 drops, record this data, and stop testing.

Measuring heavy rain resistance

We fitted each consumer-grade device with its corresponding rugged case before testing. We also put the 7220 into Rain Touch mode. To simulate heavy rain-like conditions, we placed each device under a shower for ten minutes. To test the touch screen functionality of the Dell system in water mode, open the eGalaxDr.Touch program, navigate to the TouchMode tab, and select the water setting.

1. Position the device in portrait orientation under the shower.
2. Leave it there for five minutes.
    a. During this time, test functionality, observe any damage, and note damage where applicable.
3. If a device experiences a critical failure before five minutes have elapsed, record this data, and stop testing.
4. After five minutes in portrait orientation, reposition the device to landscape orientation.
5. Leave it there for five minutes.
    a. During this time, test functionality, observe any damage, and note damage where applicable.
6. Remove device from the shower.
7. Allow device to sit in dry conditions for at least 20 minutes, and note any damage or functionality issues.

Measuring readability in bright sunlight

Before testing, we turned off all automatic brightness adjustment settings and we set the brightness of each display to 100 percent.

1. To bring up a white screen, open a web browser, and type `about:blank` in the address bar.
2. Using the luminance meter, measure the screen brightness of the display while the device is plugged in.
3. Record the screen brightness for each device.
4. Unplug the devices.
5. Repeat steps 1-4 for each device.

Read the report at https://facts.pt/m7tncNX ▶

This project was commissioned by Dell.

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