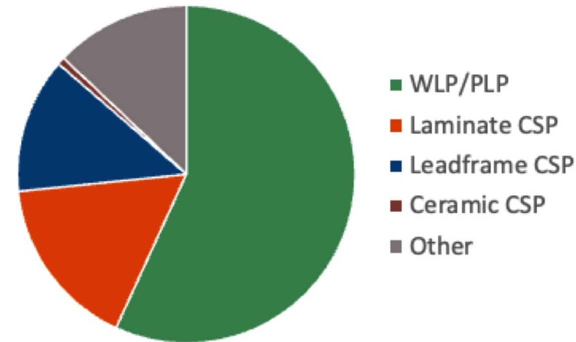
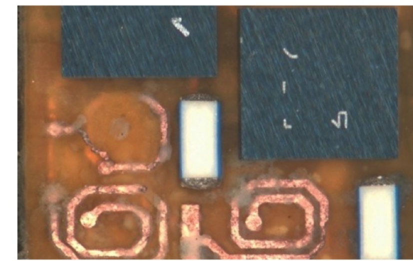
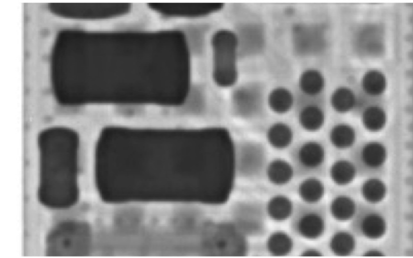
Apple Watch Series 8 (GPS + Cellular)

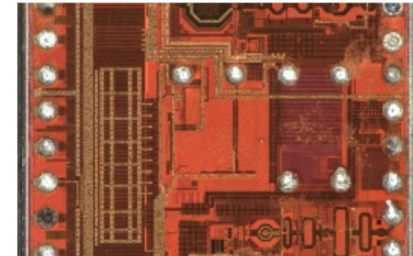
Teardown from TechSearch International, Inc.

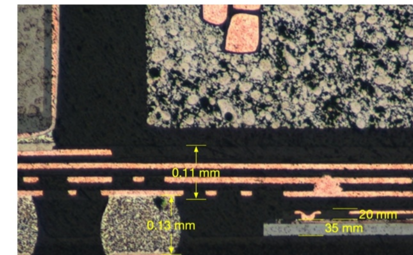
139 Packages Examined

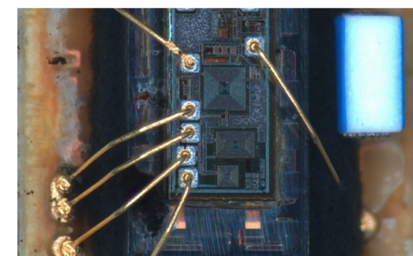


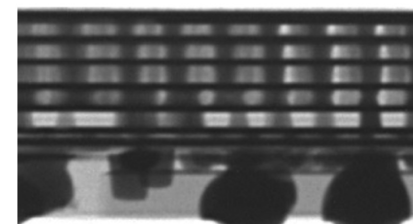












Contents and Highlights

- 145-page report with photos of packages (before and after decapsulation), x-rays, package dimensions, and die metrics and images
- 22 slides with extra details covering advanced packaging technology characteristics and interesting finds
- The watch and the wireless charger that ships with it contain a total of 139 packaged chips, of which 57% are wafer-level packages (WLPs); there are a total of 172 die and of those 33% use wire bond interconnect
- S8 highly integrated module contains 38 packaged devices encapsulated within and each of these were extracted from the module for further examination

Teardowns backed by 36 years serving as the industry's trusted source for semiconductor packaging trend analysis

- Examination of all chips with emphasis on assembly and packaging technologies
- Superb quality photographs and x-ray images
- Both the packages and the die within are identified and characterized
- Detailed construction analysis of key chips and packages

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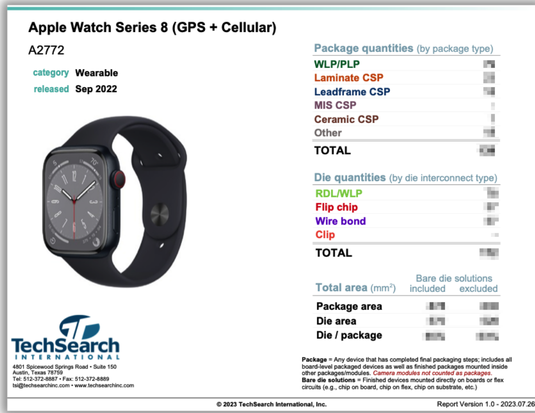
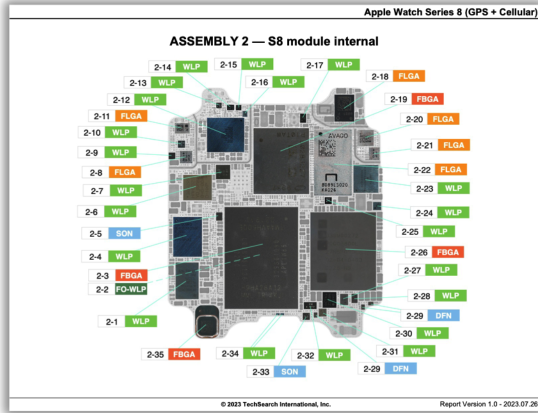
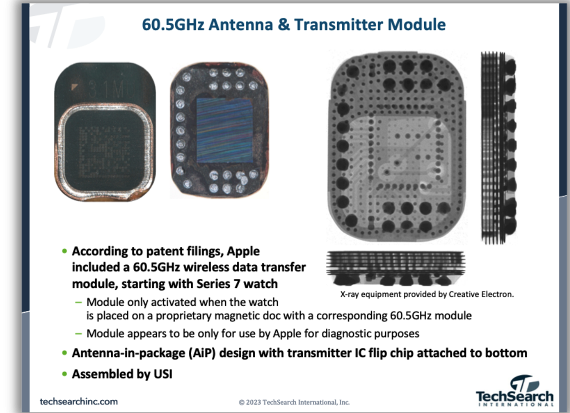
Sample pages from the report and slides







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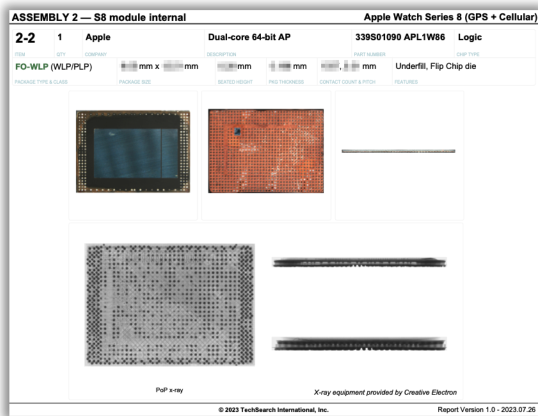
PACKAGE QUANTITY DETAILS

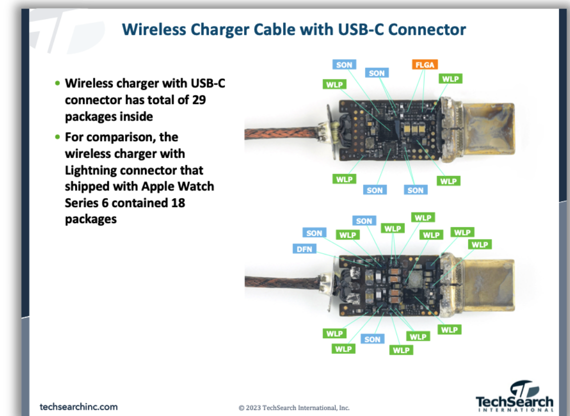
Board-level assembled packages: WLP/PLP, Laminate CSP, Leadframe CSP, MIS CSP, Ceramic CSP, Bare die on board/flex, Other, TOTAL

Package-level assembled packages: WLP/PLP, Laminate CSP, Leadframe CSP, MIS CSP, Ceramic CSP, Other, TOTAL

Board-level / Package-level: WLP, mWLP, FO-WLP, FO-PLP, FBGA, FLGA, CSP-L, QFN, SON, DFN, MIS CSP, CBGA, CLGA, CSP-C, FC, WB, Other, TOTAL

Board-level = Packaged devices mounted to boards, flex circuits, etc. during electronics assembly
Package-level = Pre-packaged devices assembled inside other encapsulated packages or modules
L = Laminate substrate; C = Ceramic substrate





Apple Watch Series 8 (GPS + Cellular)

PACKAGES BY SUPPLIER LOCATION

Supplier HQ: China, Europe, Japan, Korea, N America, SE Asia, Taiwan, Other, unknown, TOTAL

Geographic quantities based on headquarters location of chip suppliers; includes bare die solutions

PACKAGE AREA BY CHIP TYPE

Chip Type: Analog/Mixed-signal, RF analog, Logic, Memory, Sensor-Actuator, Image sensor, Discrete, Opto, RF Passive, IPD, unknown, TOTAL

Measured width x length; includes bare die solutions

ASSEMBLY 4 — Sensors flex circuits

Apple Watch Series 8 (GPS + Cellular)

Component Details Pre-packaged chip count: 5

4-1-1 Analog Devices — Analog front-end IC
4-1-2 Nexperia — ESD protection diode
4-1-3 Infineon — TVS diode for ESD protection
4-1-4 Infineon — TVS diode for ESD protection
4-1-5 Infineon — TVS diode for ESD protection

List of Packages

Item	Qty	Company	Part number	Description	Chip type	Package
1.1	1	Skyworks	SKY78248-4	RF PAM (LB)	RF Analog	FBGA
1.2	1	USI		GNSS receiver module with Broadcom BCM4777	RF Analog	FLGA
1.2.1	1	Broadcom	BCM4777	GPS/satellite receiver	RF Analog	WLP
1.3	1	Bosch Sensortec	BMI28x	6-axis IMU	Sensor-Actuator	FLGA
1.4	1	USI		UWB module with U1 chip	RF Analog	FLGA
1.4.1	1	Apple	338S00641	U1 UWB receiver IC	RF Analog	WLP
1.5	2	unknown supplier		ESD protection diode	Discrete	WLP
2.1	1	Broadcom	BCM59366	Wireless charger	Analog/Mix-Sig	WLP
2.2	1	Apple	339S01090 APL1W86	Dual-core 64-bit AP	Logic	FO-WLP
2.3	1	SK Hynix	H9HA28A12M ML	MCP (12Gb LPDDR4X and 32GB NAND)	Memory	FBGA
2.4	1	Broadcom	BCM15924	Custom sensing/link control unit (LCU) ASIC	Logic	WLP
2.5	1	Texas Instruments	LSF0101DTQR	Voltage level translator	Logic	SON
2.6	1	NXP	SN230	NFC controller	RF Analog	WLP
2.7	1	STMicroelectronics	VA9414B	PMIC	Analog/Mix-Sig	WLP
2.8	1	Skyworks		RF FEM	RF Analog	FLGA
2.9	1	Renesas (Silego)	SLG59M series	Power switch	Analog/Mix-Sig	WLP
2.10	1	Sony Semiconductor	CXA4502	Antenna switch	RF Analog	WLP
2.11	1	Murata		5G receiver	RF Analog	FLGA
2.12	1	Apple	338S00638	Wi-Fi/Bluetooth IC	RF Analog	WLP
2.13	1	Sony Semiconductor	CXA4503	Antenna switch	RF Analog	WLP

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For pricing, please call +1-512-372-8887