INFORMATION SYSTEMS DEPARTMENT

OPERATING SYSTEM ASSIGNMENT

Mobile Phone Evaluation Report: Huawei

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1. Performance

Processor / Chipset (Speed, Generation, Efficiency).

A. **Flagship Tier (High-End)**

HISilicon Kirin 9030 / 9030 Pro (Mate 80 Series)

- Latest flagship for Huawei's top phones
- Octa-core design with high-performance and efficiency cores (big + mid + little).
- Manufactured on a 7 nm-class node (SMIC N+3) — progress for Huawei but trailing leading 5 nm+ nodes from TSMC/Samsung in absolute efficiency/perf.
- Expected to deliver competitive CPU performance in flagship class.

B. **Upper Mid-Range Tier**

HiSilicon Kirin 9020 (Pura 80 Pro / Ultra, Mate 80)

- 8-core layout with high, mid, and efficiency cores.
- CPU performance good for daily tasks and moderate workloads.
- Made on 7 nm process tech, balancing performance with power efficiency.

HiSilicon Kirin 9010 / 9000S (Earlier generation)

- Solid mid-to-upper performance for devices like Huawei Pura 70 / Nova series.

GPU Performance

GPU Performance (Gaming & Graphics)

A, High-End GPU

Kirin 9030 Pro (Maleoon 935 GPU)

- Latest GPU in flagship Huawei phones.
- Designed to offer strong graphics performance for AAA mobile games and high-end content creation.

B, Mid-Tier GPU

Kirin 9020 (Maleoon 920 GPU)

- Good for casual to moderate gaming, but falls behind Snapdragon/MediaTek flagship GPUs.

C, Older GPUs

Chips like Kirin 9000 / 9000S use older GPU cores decent once but less competitive today compared to Snapdragon/Apple GPUs.

RAM Capacity & Type

RAM Type:

- Most recent flagship Huawei phones (Mate 80 Pro, etc.) use LPDDR5X RAM faster and more power efficient than older LPDDR5.
- Earlier models used LPDDR5 or LPDDR4X depending on generation.

RAM Capacities:

- Flagships offer 12 GB to 16 GB RAM.
- Some high-end configurations (e.g., Mate 80 RS) may go even higher (up to 20 GB reported in leaks).

LPDDR5X gives improved bandwidth and efficiency, useful in multitasking, high-fps gaming, and AI tasks.

Storage Speed & Type

Storage Types Used:

- Flagships models like **Mate 80 Pro** come with **UFS 4.0** storage standard is very fast sequential and random read/write, beneficial for quick app load times, large file transfers.
- Mid-range or slightly older models may use **UFS 3.1**.
- Earlier chips (older Huawei phones) might stick with **UFS 2.1 / 3.0** depending on price tier.

Nano Memory:

Huawei also developed Nano Memory (proprietary card format) for expandable storage in some earlier models, but flagships focus on fast internal storage.

Thermal Management / Throttling Behavior

Flagship Thermal Traits

- Huawei's flagship devices with Kirin chips tend to run warm under heavy loads (e.g., long gaming), partly due to 7 nm-class node and High Power draw of GPU/CPU clusters.
- Passive cooling in slim phones limits how much sustained peak performance is maintained over long sessions this is typical of modern smartphones without advanced

cooling.

Throttling Observations

- **Mid-tier chips** like **Kirin 9020** show throttling under prolonged graphics stress tests.
- Newer chips like **Kirin 9030/Pro** are designed for better balance, but still cannot match the highest power efficiency of competitor SoCs made on advanced nodes (4 nm/3 nm).

2, Real- world performance

App Launch Speed

- **HarmonyOS (Huawei's OS)** includes predictive app loading it preloads apps based on usage patterns, helping most apps open instantly or with very little wait time.
- Devices with **Kirin 9030/9030 Pro** (found in Mate 80 Pro series) have strong CPU performance which translates to quick launches and smooth UI interactions.
- Very snappy in daily use — fast app starts thanks to HarmonyOS optimizations.

Multitasking Ability

- Huawei phones with 12–20 GB of RAM (depending on model) handle multiple apps in the background with good retention you can switch between many open apps without reloading.
- Strong lots of apps stay in memory and switch quickly.

Gaming & FPS Stability

• In many games (e.g., Honor of Kings, Genshin Impact):

Medium to high settings play smoothly.

• Flagship (Mate 80 Pro): good performance at medium/high settings, generally stable.

• Mid/upper (Pura 80): okay for casual games; heavy 3D may need lower settings.

Heat Generation Under Load

• Mate 80 Pro stays cooler with better thermal design.

• Mid-range hardware can warm up and throttle under long heavy use.

AI / NPU Performance

• Strong real-world AI features (camera, smart predictions), not top raw benchmarks but effective in daily tasks.

- Solid AI performance that influences camera and system features noticeably, though peak raw AI throughput might trail some competitors.
- Good for daily AI tasks

3, Display

Display Type:

LTPO OLED / Color OLED screen

• These models use OLED panels with LTPO (Low-Temperature Polycrystalline Oxide) technology for adaptive refresh rates better power efficiency and smooth motion.

✔ **Huawei Pura 80 Pro / Ultra:** LTPO OLED display (1–120 Hz adaptive).

✔ **Huawei Mate 80 Pro:** Color OLED with high refresh (typically 120–144 Hz).

Size (inches):

• 6.7–6.9 diagonal screen size.

Resolution: FHD+ to ~1.5K

• Typical values: 1080×2400, 1224×2700, or 1280×2848

• Sharp enough for daily use, media, and gaming

• QHD+ is rare; Huawei focuses on efficiency + clarity

Mostly FHD+ / 1.5K resolution

Refresh Rate:

60 Hz – 120 Hz

• 60 Hz →

• 90 Hz →

• 120 Hz (often LTPO 1–120 Hz) →

Mostly up to 120 Hz, adaptive on flagships for smoothness and battery saving.

Touch Sampling Rate:

• Up to ~300 Hz (good for gaming responsiveness).

Brightness:

Typical Brightness: ~500–600 nits (indoor/day-to-day use)

Peak Brightness (HDR / sunlight): ~1000–3000 nits on flagships

Color Accuracy & Gamut:

• 1B colors, wide P3 gamut (rich and accurate color).

HDR Support:

• HDR10 / HDR10+ / HDR Vivid (varies by model/region).

Screen Protection:

• Kunlun Glass 2 / Huawei Kunlun Glass (tough proprietary glass).

Screen-to-Body Ratio:

• Around ~89–90% (slim bezels).

PWM / Flicker (Eye Comfort):

• High-frequency PWM dimming (e.g., 1440 Hz or higher) reduces visible flicker and eases eye strain for many users.

4, Camera System

Number of Lenses

- Usually 3–4 lenses:
- Main: high-res, large sensor.
- Ultrawide: captures wide scenes.
- Telephoto: optical zoom.
- Optional: macro, depth, or ToF sensor.

Sensor Size

- Large sensors for better light capture: ~1/1.3" to 1/1.7" common in flagships.
- Larger sensor →

Megapixels

- Main: typically 40–50 MP.
- Secondary lenses: 8–48 MP.

Note: More megapixels ≠ better quality; sensor size and processing matter more.

Aperture Size

- Wide apertures for low-light and bokeh.
- Some models have variable aperture for more flexibility.

Stabilization

- OIS (Optical Image Stabilization): reduces shake in photos/videos.
- EIS (Electronic Image Stabilization): software stabilization for smooth video.

Zoom

- Optical zoom: true lens zoom usually 3×–5×.
- Hybrid/digital zoom: extends further but quality decreases at high digital zoom.
- Periscope lenses often used for higher optical zoom.

Low-Light Performance

- Large sensors + wide apertures + RYYB filter →
- AI and night modes improve clarity and reduce noise.

Video Recording

- Usually 4K video at 30–60 fps; some flagships support 8K.
- Stabilization combines OIS + EIS for smooth footage.
- Slow-motion and time-lapse modes often included.

Image Processing

- HDR for better contrast.
- Night mode for low-light.
- AI scene recognition for optimized settings automatically.
- Computational photography enhances detail, colors.

Front Camera

Sensor Type

Usually small to medium-sized CMOS sensors.

Resolution ranges from 16 MP to 32 MP on most modern devices.

Some premium models use wide-angle sensors for group selfies.

2. **Autofocus**

Many Huawei front cameras have fixed focus, but flagship models often include autofocus for sharper selfies, especially at close distances.

3. Portrait Mode Accuracy

Front cameras use AI and depth sensing to separate the subject from the background.

Accuracy is generally good in well-lit conditions, slightly weaker in low light.

Supports bokeh (blurred background) effects.

4. **Video Capabilities**

Usually supports 1080p at 30/60 fps.

Flagship models can record 4K video at 30 fps.

Some devices offer electronic stabilization (EIS) for smoother selfies/videos.

5, Huawei Battery & Charging

1. **Battery Capacity**

Most modern Huawei smartphones have batteries ranging from 4000 mAh to 5000 mAh.

Flagship “Pro” models often lean toward the 4800–5000 mAh range.

2. **Real-World Endurance**

Screen-on time (SOT) typically 6–9 hours depending on usage (web browsing, social media, video).

Heavy gaming may reduce endurance significantly.

Huawei’s EMUI power optimization often improves battery life.

3. **Wired Charging Speed**

Standard wired charging ranges from 22.5 Watt to 66 Watt on mid-range and flagship models.

Latest high-end devices may reach 100 W+ fast charging.

4. **Fast-Charging Standards**

Huawei uses Supercharge (proprietary) as main fast-charging technology.

Some devices are also compatible with USB PD for universal fast charging.

QC (Quick Charge) support may vary by device.

5. **Wireless Charging**

Supported in most Huawei flagships.

Typical speeds: up to 50 Watt on high-end devices.

6. **Reverse Wireless Charging**

Many Huawei phones can charge other devices wirelessly, typically up to 5–10 W.

7. **Charger in the Box**

Older Huawei devices include the charger.

Newer models may exclude charger in some regions to reduce e-waste (similar to other brands).

8. **Battery Health & Longevity**

Huawei batteries are designed to retain ~80% capacity after ~800 full charge cycles.

Optimizations in EMUI limit overcharging and heat, improving lifespan.

6, Huawei Software / OS

1. **Operating System**

Huawei phones use Android-based HarmonyOS (for China and global models, new phones

mostly run HarmonyOS 3/4)

Older Huawei phones shipped with EMUI (Huawei's Android skin).

iOS is exclusive to Apple devices (Huawei does not use iOS).

2. **OS Version at Launch**

Huawei flagships typically launch with the latest stable HarmonyOS version (or EMUI version if still on Android).

Example: HarmonyOS 4.x or EMUI 13.x depending on model and region.

3. **Update Policy**

Major OS updates: Typically 2–3 years.

Security patches: Usually 3–4 years of monthly/quarterly updates.

Update speed may vary due to region and app store (Google services may not be included on newer models due to US restrictions).

4. **UI / Skin Experience**

HarmonyOS / EMUI provides:

Smooth animations, multitasking features

Smart widgets

Control center customization

AI optimizations for battery, memory, and performance

5. **Bloatware**

Huawei phones may come with preinstalled apps, including:

Huawei apps (Gallery, AppGallery, Themes, Health, etc.)

Some third-party apps depending on region

Moderate bloatware, usually removable.

6. **Ads**

Generally minimal to no ads in the system UI.

Some preinstalled apps (like Themes or AppGallery) may show promotions.

7. **Customization Options**

Extensive options:

Themes, wallpapers, icons, fonts

Control center layout

Gestures and navigation

Multi-window apps and split-screen mode

8. **Preinstalled Apps Quality**

Huawei apps are generally high quality and functional.

AppGallery is improving but still smaller than Google Play Store; some apps may need APK installation.

9. **Smoothness and Stability**

Huawei's software is generally smooth and stable on launch.

Over time:

Heavy apps and multitasking may slightly reduce performance

EMUI/HarmonyOS features like AI memory management help maintain smoothness

7, Build Quality & Design

Materials: Mostly glass and metal; some plastic on mid-range; occasional eco-friendly options.

Durability: Strong build; many have Gorilla Glass and IP53–IP68 ratings.

Weight & Thickness: Balanced, slightly heavier on flagships; slim designs (~7–9 mm).

Ergonomics & Grip: Comfortable; foldables require care.

Buttons & Haptics: Solid tactile feedback.

Aesthetics: Sleek finishes, multiple color options; foldable screens have reinforced hinges.

8, Connectivity

5G: Sub-6 GHz; mmWave limited.

4G LTE: Wide coverage globally.

Wi-Fi: Wi-Fi 5–6/6E on newer devices.

Bluetooth: v5.0+

NFC: Usually supported.

GPS: Accurate; supports multiple GNSS.

USB: USB-C; speeds vary (USB 2.0–3.2).

SIM: Dual-SIM or eSIM; IR blaster rare; headphone jack uncommon.

9, Audio

Speakers: Stereo on flagships; mono on budget.

Sound Quality: Balanced mids, decent bass; volume loud enough.

Microphones & Noise Cancellation: Clear voice; active noise reduction.

Extras: Some support Hi-Res audio or Dolby Atmos; call quality good.

10, Storage & Memory

Configurations: Commonly 6–12 GB RAM + 128–512 GB storage.

Expandable Storage: Limited; microSD rare.

Speed: UFS 3.1/4.0 on flagships.

RAM Management: Efficient; AI-assisted memory optimization.

11. Security

Biometrics: Fingerprint scanners (side/in-display), face unlock (2D/3D).

Hardware Security: Secure enclave present; software sandboxing.

Performance: Fast and reliable.

12. Price & Value

Price-to-Performance: Good for mid-range and flagships.

Longevity: Strong build + updates give good long-term value.

Resale: Decent, slightly lower than Samsung/Apple.

Competitors: Xiaomi, Samsung, OnePlus in similar brackets.

13. Special Features

Stylus support limited (mainly Mate series).

Foldable / rollable screens on premium models.

Some models support satellite SOS.

Gaming features: cooling systems, triggers, high refresh displays.

Desktop mode: Huawei's Easy Projection similar to Samsung DeX.

AI features: on-device processing for camera, text, and voice.

14. Accessories & Ecosystem

Works well with Huawei smartwatches, tablets, laptops.

Official cases, screen protectors widely available.

Ecosystem integration with Huawei devices; smart home support.

15. Reliability & Brand Support

Brand reputation: Strong in China, growing globally.

Customer service: Good, varies by region.

Repair: Authorized centers available; parts moderately accessible.

Warranty: Standard 1-2 years; repairability decent.