



# EcoRIS™

## Liquid Crystal RIS

Powered by liquid crystal panel



## Minimal energy. Maximum coverage.

2W ultra-low power with dynamic, steerable beam control

YTTEK EcoRIS is a 24-inch liquid-crystal Reconfigurable Intelligent Surface (RIS) with ultra-low 2W power consumption. It allows real-time adjustment of beam direction and reflection angle, making RIS deployment more flexible and efficient. Supporting n257 and n258 bands, EcoRIS helps extend 5G mmWave coverage and enhance signal performance, while paving the way for future 6G research.

### 2W low power, built on AUO's liquid crystal panel technology

Built on AUO's liquid crystal panel technology, EcoRIS consumes just 2W—up to 25x less power than conventional RIS solutions using PIN diodes or varactors, which can draw up to 50W. This ultra-efficient design helps 5G mmWave service providers cut power costs and deploy greener networks.

|                    | Others | YTTEK          |
|--------------------|--------|----------------|
| Technology         | Diode  | Liquid crystal |
| Power              | 50W    | 2W             |
| Number of elements | 1000   | 33,154         |

### Applications

5G FR2 mmWave, 6G

### Key features

- Liquid-crystal RIS with ultra-low 2W power consumption
- Electronically steerable beam at arbitrary angles
- Micro-scale metasurface with 33,154 cells delivers 2x efficiency
- Large surface boosts total gain up to 70 dB for stronger signals
- Supports FR2 n257 and n258 bands
- Dual linear polarization
- IP65 water-resistance

### Electronically steerable beam at arbitrary angles

Powered by liquid crystal technology, which can individually control each unit cell, EcoRIS enables electronic beam steering at arbitrary angles within  $\pm 60^\circ$  in both azimuth and elevation—allowing signal reflection toward designated directions. An intuitive GUI offers seamless control and configuration.



### Built for 5G, and ready for the 6G future

EcoRIS supports 5G mmWave applications with two frequency versions: n257 and n258. The n257 version is deployed in regions including the USA, Japan, and South Korea, while the n258 version targets Europe, supporting private 5G networks and early-stage trials. With high-speed wireless connectivity and future-ready flexibility, EcoRIS is ideal for research, development, and testing of next-generation 6G technology.

### Dual linear polarization enhances signal stability and reliability

EcoRIS supports dual linear polarization, enhancing compatibility with various incident signal orientations. This ensures more robust reflections and stable signal performance, especially in environments with arbitrarily oriented linear polarization, such as rotating devices or mobile terminals.

### Micro-scale, high-resolution RIS for precise beams, clean spectrum, and sharp spatial control

Built on micro-scale metasurface technology, EcoRIS integrates 33,154 unit cells across a 520 mm x 300 mm surface. Each unit cell measures approximately  $\lambda/5$  at n257 frequencies (26.5–29.5 GHz) and can control the phase independently, enabling precise beamforming, reduced sidelobe radiation, and enhanced spatial resolution, while maximally concentrating the signal energy from the large-area metasurface.

### IP65 water-resistance for outdoor environments

Rated IP65 for water and dust resistance, EcoRIS is ideal for both indoor and outdoor deployments, including building facades, utility poles, and streetlights.

### Specifications

| Item                 | Spec                                       |
|----------------------|--|
| Operation frequency  | n257/n258 band                             |
| Operation bandwidth  | 2 GHz                                      |
| Number of unit cells | 33,154                                     |
| Spacing              | $\approx \lambda/5$                        |
| Polarization         | Dual (Linear)                              |
| Tunable phase range  | $\geq 160$ deg                             |
| Phase resolution     | 8-bit (non-linear)                         |
| Total gain           | 70 dB (typ.)                               |
| DC input power       | 12 VDC                                     |
| Power consumption    | $\leq 2$ W                                 |
| Control base         | UART interface: USB-A                      |
| Dimensions           | 550 × 425 × 30 mm                          |
| Storage temperature  | $-20^\circ\text{C}$ to $+60^\circ\text{C}$ |



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