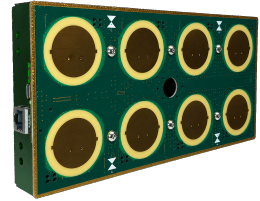


ESPARGOS One

8-channel, phase-coherent 2.4 GHz WiFi measurement array

ESPARGOS One passively measures the **Channel State Information (CSI)** of ambient 2.4 GHz WiFi signals, phase-coherently across 8 dual-polarized antennas. It streams real-time, per-packet CSI to your computer, exposing the spatial and polarimetric structure of the WiFi channel for measurement and research.



Key Features

- **Phase-coherent** CSI across all 8 antennas: resolve angle of arrival and multipath
- **Passive (receive-only) by default:** no interference with other WiFi devices
- **Dual-polarized** elements for polarimetric measurements
- **Scalable** to larger coherent arrays via SMA synchronization links
- **Turnkey:** PoE, web interface, open-source pyespargos library

Applications

- WiFi channel sounding and per-subcarrier CSI measurement
- Angle-of-arrival and spatial-spectrum estimation (e.g. MUSIC)
- Azimuth-delay and multipath analysis
- Antenna radiation-pattern and coverage measurement
- Polarization measurement and visualization (incl. augmented reality)
- MIMO and array-processing research; reproducible CSI datasets

Technical Specifications

Antenna array	
Arrangement	2 × 4 grid (8 elements); dual slant-polarized ($\pm 45^\circ$) patch antennas, 60 mm ($\lambda/2$) spacing
Polarization	Per-element RF switch; one polarization (or reference) selected at a time
Radio & CSI	
Frequency band	2.4 GHz ISM band (channels 1–13; 2.412–2.472 GHz center)
Standards	IEEE 802.11b/g/n/ax (passive / promiscuous receive)
CSI bandwidth	20 MHz (802.11g/n/ax); 40 MHz only via 802.11n HT40 channel bonding
CSI output	Per-subcarrier complex CSI for every received packet (L-LTF, HT-LTF, HE-LTF)
CSI resolution	L-LTF 12-bit; HT-LTF / HE-LTF 8-bit (I and Q per subcarrier)
Reference	Shared 40 MHz clock and 2.4 GHz phase reference (internal microstrip network)
Gain control	Automatic per-antenna AGC, or manual global / per-sensor gain
Operation	Receive-only (passive) by default. The array <i>can</i> also transmit, e.g. for active WiFi radar; transmission is disabled by default and may be enabled only by an operator authorized to transmit on the selected channel
Interfaces & power	
Ethernet	100BASE-TX (RJ45); PoE input IEEE 802.3at Type 1, Class 3
USB-C	5 V / 2 A power; UART/serial; reduced-throughput CSI streaming
Sync I/O	2 × SMA (SYNC IN / OUT): 40 MHz + 2.4 GHz reference, 3.3 V DC bias
Power	~3.5 W typical (receive-only)
Software	
Streaming	Real-time CSI over Ethernet (WebSocket / UDP) or USB-C
Control	Built-in web interface (live CSI views, spectrum analyzer, device settings, over-the-air updates) and a JSON HTTP/RPC control API; open-source pyespargos Python library for configuration and real-time CSI; IPv4 / IPv6 with mDNS discovery
Mechanical & environment	
Dimensions	240 × 120 × 26.5 mm; VESA 100 mm (M4), ¼"-20 tripod, side M4 holes
Operating environment	Indoor use only; 0 °C to +50 °C; 20–80 % RH non-condensing

Scope of delivery: ESPARGOS One array, RJ45 network cable, and Quick Start Manual.

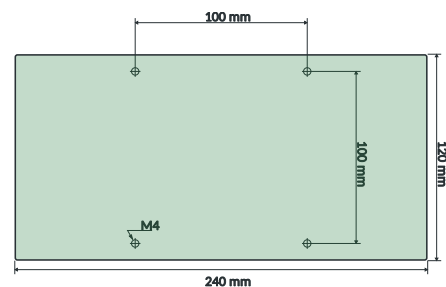
Supported WiFi Standards

Standard	HW	FW	Header	CSI
802.11b	✓	✓	✓	×
802.11g	✓	✓	✓	✓
802.11n (HT20)	✓	✓	✓	✓
802.11n (HT40)	✓	✓	✓	✓
802.11ax	✓	✓	✓	✓

✓ supported × not supported

HW hardware FW firmware CSI channel state info
802.11b headers are decoded, but no CSI is available.

Mechanical



VESA 100 mm (M4) mounting pattern (back panel); ¼"-20 tripod thread on the underside.

Usage & Operating Notes

- Supplied B2B for professional, research, and educational use within the EU; indoor use only.
- Operate on a private, secured network; do not expose it to the public internet.
- Set the correct WiFi country code before first use; enable transmission only if you are authorized to transmit (e.g. as a licensed radio amateur).
- The operator is responsible for the lawful, privacy-compliant use of the captured data.

Regulatory & Compliance



ESPARGOS One bears the **CE** mark and is covered by an **EU Declaration of Conformity** (full text at espargos.net/ce), declaring conformity with the **EMC Directive 2014/30/EU** (emission and immunity tested to DIN EN 55032 / DIN EN 55035) and the **RoHS Directive 2011/65/EU**. The crossed-out wheeled-bin (**WEEE**) mark indicates separate disposal; under **REACH** the product contains no SVHC above 0.1 % by weight beyond those inherent to standard electronic assemblies. Specifications are subject to change without notice.