01 Understand Read the context | **02 Measure** Drive the bench | **03 Infer** Diagnose the result

Board	HW-131 Breadboard Power Supply
Part number	AMS1117-3.3
Vendor	Advanced Monolithic Systems
Package	SOT-223
Domain	Power · LDO
Scenario	Marginal ripple
Backend	mock
Bench	Simulator

OVERALL: FAIL

1 of 3 checks failed.

Measurements

TP	Check	Limit	Measured	Outcome
tp1	Output voltage (500 mA load)	—	3.3022 V	PASS
tp2	Output voltage (no load)	—	3.3048 V	PASS
tp3	Output ripple (500 mA load)	—	0.0481 V	FAIL

Diagnosis

High output ripple, DC regulation clean — output capacitor.

Output ripple measured **[TP 3: 0.048 V]** pp against a 15 mV limit (3.2× over spec).

DC output voltage is within spec at every load point **[TP 1: 3.302 V]**, **[TP 2: 3.305 V]**, so the pass device, the reference and the feedback loop are healthy. A ripple-only failure of this magnitude points to the output capacitor —

most likely an under-valued or high-ESR COUT, or poor placement near the regulator.

Root cause	Output capacitor — high ESR or under-valued
Next step	Verify the COUT value and ESR against the datasheet's stability requirements, then re-test.
Confidence	86%

Appendix A — SCPI log

tp1 — Output voltage (500 mA load)

```
PSU → SOUR:VOLT 9.000
PSU → OUTP ON
LOAD → SOUR:CURR 0.500
LOAD → INP ON
DMM → CONF:VOLT:DC 10
DMM → MEAS:VOLT:DC?
DMM ⇐ 3.3022
```

tp2 — Output voltage (no load)

```
PSU → SOUR:VOLT 9.000
PSU → OUTP ON
LOAD → SOUR:CURR 0.000
LOAD → INP ON
DMM → CONF:VOLT:DC 10
DMM → MEAS:VOLT:DC?
DMM ⇐ 3.3048
```

tp3 — Output ripple (500 mA load)

```
PSU → SOUR:VOLT 9.000
PSU → OUTP ON
LOAD → SOUR:CURR 0.500
LOAD → INP ON
SCOPE → :CHAN1:COUP AC
SCOPE → :CHAN1:SCAL 0.02
SCOPE → :TIM:SCAL 1e-3
SCOPE → :MEAS:VPP? CHAN1
SCOPE ⇐ 0.04809
```