

USB-C cable power-path validation

Reference A / 1.0 m / c_sample1

16 October 2026 | 100 Vac / 50 Hz | Record: RA-20261016-100V-01

PASS EVIDENCE FOR ALL 29 CASES, ACROSS RUNS. Not a single uninterrupted or single-version completion.

Selected cases	120 s holds	48 V / 5 A
29 / 29 PASS	7 / 7 PASS	PASS

The 48 V / 5 A setpoint completed a 120 s hold. Median ASD input values were 47.259 V / 5.000 A / 236.295 W. The nominal 240 W setpoint is not a measurement of 240 W at the ASD input.

Test setup

Item	Recorded setup
Cable	Reference A, 1.0 m, detachable; c_sample1
Operator-entered rating	240 W; CH32 advertised range: 5 A / 48 V
Connected source	Framework FRANDVCH00, C1; FRANDVCH00_s_sample1; 240 W port rating
Power path	SRC > Cable > CY4500-EPR > ASD-PD31
Control path	COM3 with an RS232 isolator (operator-reported)
AC condition	100 Vac / 50 Hz (operator-entered metadata)
Orientation	as-connected; ASD cable-set cc2; no loaded plug-reversal coverage
Suite settings	full; current step 0.2 A; 3 readings/step; holds 120 s; inter-case wait 5 s
Software	M01/M02: v5.8.9, immediate hold sampling; M03: v5.8.10, hold-settle 1 s

Screening checks: voltage within +/-1.0 V of the setpoint; current within +/-max(2% of the load setpoint, 0.050 A). Safety ceilings: 252 W, 5.25 A and 80 degrees C ASD internal temperature. These are procedure settings, not USB certification criteria.

The communication failure and low-current startup stop are retained unchanged. Later successful complete blocks supply the selected case evidence: 1,779 steady readings and seven separate precheck readings. Failed/duplicate attempts and standalone diagnostics are excluded from selected-case statistics.

Loaded holds and path metrics

Each hold was configured for 120 s, with 120 readings at 1 s intervals spanning 119 s. M03 adds a 1 s startup wait outside the hold duration. Voltage, current and power are measured at the ASD input.

Run	Target V/A	V min	V median	V max	I median	P median W	N
M01	5/3	4.975	4.978	4.983	3.000	14.934	120
M01	9/3	8.676	8.679	8.682	3.000	26.037	120
M01	15/3	14.671	14.674	14.678	3.000	44.022	120
M02	20/5	19.369	19.376	19.386	5.000	96.880	120
M02	28/5	27.258	27.266	27.275	5.000	136.330	120
M03	36/5	35.245	35.253	35.261	5.000	176.265	120
M03	48/5	47.252	47.259	47.267	5.000	236.295	120

Droop using before/after light-load baselines

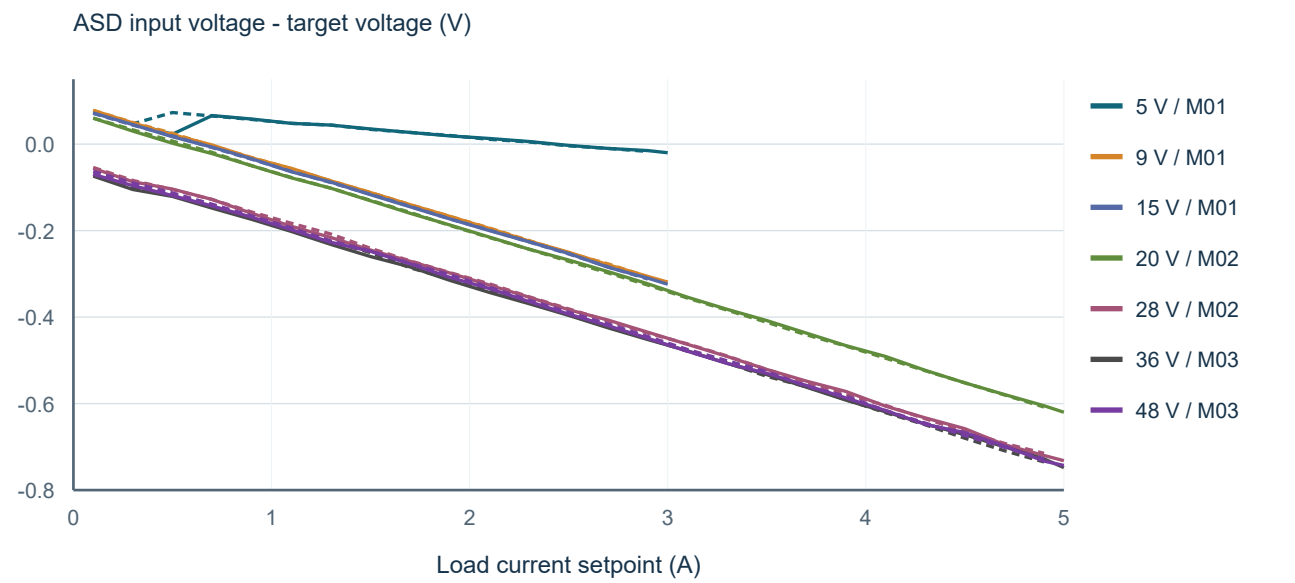
Run	Target V	Droop V	Apparent path mΩ	Baseline drift mV
M01	5	0.0955	32.93	-3.0
M01	9	0.3985	137.41	-1.0
M01	15	0.3970	136.90	+0.0
M02	20	0.6810	138.98	+2.0
M02	28	0.6795	138.67	-1.0
M03	36	0.6745	137.65	+6.0
M03	48	0.6800	138.76	+4.0

Droop is the mean of before/after 0.1 A voltage medians minus loaded voltage median. Apparent resistance divides that droop by the measured high/low current difference. Baseline drift is after minus before voltage. Each voltage uses before/hold/after data from one acquisition run.

This is not isolated cable resistance. It includes source regulation, connectors, CY4500-EPR and the ASD input. The different 5 V result reinforces this limitation. No matched reference-cable comparison was performed, and software/settling conditions differ between runs.

Current sweeps and targeted checks

Each plotted point is the median of three readings. Solid/dashed traces show the two sweep legs; labels identify the acquisition run. Voltage deviation from nominal does not isolate cable loss.



Diagnostics after the stops

ID	Condition	Result
D01	Same cable, 20 V, 4-to-5-to-4 A, 0.1 A steps	63 steady readings passed, zero bad measurement CRCs. At 5 A: 19.374 - 19.378 V.
D02	Fixed 36 V / 0.1 A, 1 s startup settling, 10 readings	10/10 readings at 0.100 A, 35.929 - 35.932 V. Normal completion.

The operator reports that both ASD and the RS232 isolator were restarted before D01; this does not identify the responsible component. The old finished/aborted message printed at normal D02 cleanup was not an abort verdict.

D02 is a separate startup-timing diagnostic; it does not rewrite the failed M02 reading. M03 added the same 1 s wait to timed holds and passed both 36 V light-load baselines, loaded holds, the 48 V cases and the final 5 V return.

Stop history and procedure changes

Run	Attempted cases	Raw status	Hold startup
M01	13 PASS / 1 failed	FAILED	v5.8.9; no explicit wait
M02	8 PASS / 1 failed	FAILED	v5.8.9; no explicit wait
M03	9 PASS / 0 failed	INCOMPLETE	v5.8.10; 1 s wait

I01: control communication error during 20 V current sweep

M01-T14 produced valid data through 4.5 A, ending at 19.448 V / 4.500 A. The 4.7 A setting response and subsequent ADC response failed CRC; the case stopped with measurement decode failed. LOAD_OFF verification also failed. This is not a measured VBUS-collapse event; the communication log does not establish the final load state.

D01 did not reproduce the error; M02 also passed the complete 20 V current sweep and 120 s hold. This is consistent with a transient control-path issue, but does not determine the root cause among ASD, isolator, wiring, source or other components.

I02: under-current on the first 36 V light-load reading

M02-T21 requested 36 V / 0.100 A and read 35.899 V / 0.047 A first. The -0.053 A error exceeded the +/-0.050 A tolerance, stopping at one reading logged at t=0.2 s. CRC and LOAD_OFF verification were normal. Persistence of the under-current was not measured.

M03: timed holds start after 1 s settling

Version v5.8.10 waits 1 s after LOAD_ON before the first reading and hold clock. Tracking tolerance and voltage/power/current-limit checks on acquired samples remain in place; no ADC values are acquired during this wait. The responsible part of the common path, including CY4500-EPR, remains undetermined.

Raw FAILED / INCOMPLETE statuses are preserved. M03 remains INCOMPLETE because it contains only the resumed subset, although all nine cases passed. The composite finding reconciles case-level pass evidence across runs and is not a single-run pass claim.

Selected evidence for all 29 cases

For each voltage, select the latest run with a complete passing four-case block: before baseline, current sweep, loaded hold and after baseline. Use M03 for the final transition. All 32 attempted cases, including failures/duplicates, remain in attempt_ledger.csv.

ID	Target V	Phase	Run	Steady N
T01	5	Low-load before	M01	3
T02	5	Current round trip	M01	93
T03	5	Loaded hold, 120 s	M01	120
T04	5	Low-load after	M01	3
T05	9	Low-load before	M01	3
T06	9	Current round trip	M01	93
T07	9	Loaded hold, 120 s	M01	120
T08	9	Low-load after	M01	3
T09	15	Low-load before	M01	3
T10	15	Current round trip	M01	93
T11	15	Loaded hold, 120 s	M01	120
T12	15	Low-load after	M01	3
T13	20	Low-load before	M02	3
T14	20	Current round trip	M02	153
T15	20	Loaded hold, 120 s	M02	120
T16	20	Low-load after	M02	3
T17	28	Low-load before	M02	3
T18	28	Current round trip	M02	153
T19	28	Loaded hold, 120 s	M02	120
T20	28	Low-load after	M02	3
T21	36	Low-load before	M03	3
T22	36	Current round trip	M03	153
T23	36	Loaded hold, 120 s	M03	120
T24	36	Low-load after	M03	3
T25	48	Low-load before	M03	3
T26	48	Current round trip	M03	153
T27	48	Loaded hold, 120 s	M03	120
T28	48	Low-load after	M03	3
T29	48	48 V to 5 V return	M03	6

Every selected case in this table is PASS. M01 supplies T01 - T12, M02 T13 - T20, and M03 T21 - T29. The detailed CSV records controller version, settling time and package-relative original file paths.

Identity, measurement basis and scope

Item	CH32 observation
Cable	Passive; 5 A; max PD voltage 48 V
VID / PID	WITHHELD / WITHHELD
Cable VDO	WITHHELD
USB speed field	usb4_gen3 (advertised only; transfer performance untested)
Sessions	C01 session_0001 / CC2; C02 session_0002 / CC1; same cable VDO
Physical association	CH32 asset labels are blank; operator notes associate the capture with this c_sample1.

ASD-PD31 did not read the E-Marker. CH32 Identity declarations and loaded measurements are separate evidence. The operator-entered 240 W rating is not an independent verification of retail labeling. Two CH32 CC observations do not establish loaded coverage of all plug orientations.

Data populations

Population	Readings	Treatment
Selected 29 cases	1,779 steady + 7 precheck	Basis of hold/sweep statistics
All 32 attempts	1,860 rows; 1 invalid ADC	Preserve stops/duplicates separately
5 V recovery checks	64 total; 58 selected	Separate from case measurements
Standalone diagnostics	D01: 63 steady + 1 precheck; D02: 10 steady	Supplementary diagnostic evidence

Steady statistics exclude original modes ending in -precheck or -ramp; original mode has no literal steady value. Normalized CSV adds measurement_phase and retains original mode, line number and relative path. Originals are anonymized for publication; manifest_sha256.csv records sizes and SHA-256.

Items outside this record

ASD internal temperature is fan-dependent and was not used to assess source/cable/plug heating. PPS/AVS loading, USB data performance, insulation/endurance, certification, all orientations, 230 Vac and matched reference-cable comparison are outside this record.

If an uninterrupted single-version record or automatic reference-comparison baseline is required, rerun full from the start with v5.8.10 or later and matched settling settings. This package documents the actual composite evidence acquired here.