ESP32-C3

Wi-Fi performance under Light-Sleep

Version1.0
Espressif Systems

About This Document

This test report is for Wi-Fi performance of ESP32-C3 in low-power situation.

Release notes

Data	Version	Release Notes
Dec 2021	V1.0	Test the Wi-Fi performance under light-sleep

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1. Test Introduction

This test is for Wi-Fi single live-wire switch demo. The effects of distance and obstacles on Wi-Fi performance and power consumption under light sleep are tested. We tested mainly under indoor environment as the application scenario of switch.

1.1. Test Environment

The test environment is like Figure 1-1, ABCDEF are six test points, the room A is also the location of Router. Black parts in the figure are walls, and the numbers in the figure are the distance and wall thickness in cm.

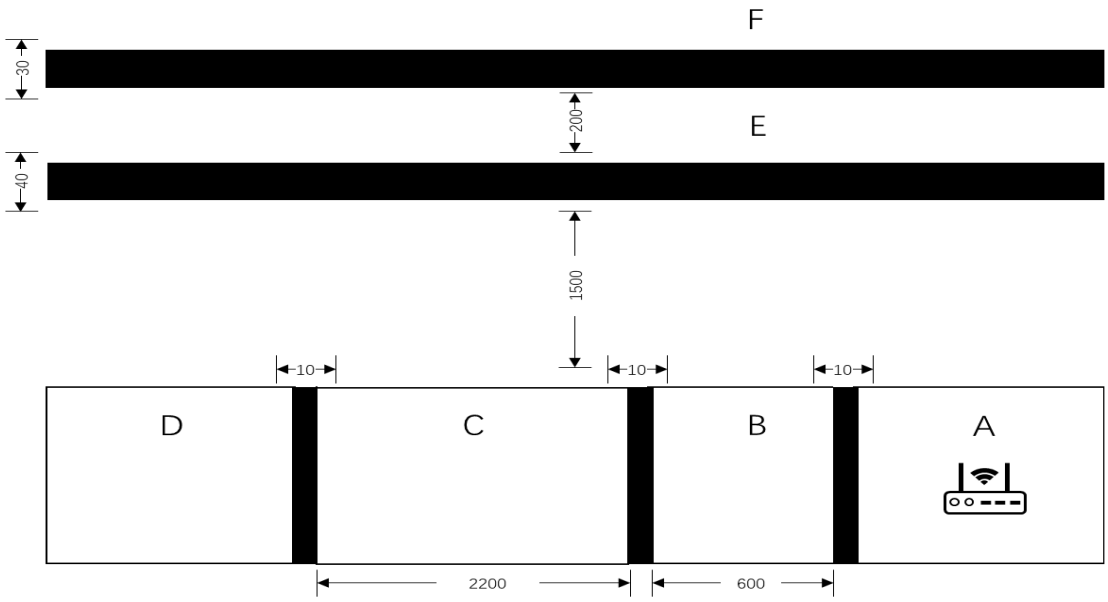

Figure 1-1 Test Environment

1.2. Test Tools

- A Windows computer with joulescope_ui ;
- Joulescope JS 110
- An ESP32-C3 board with single live-fire demo

1.3. Test Process

- Use Qcloud mini program at point A to connect to router;
- Send control commands to the switch at A ~ F test point;
- Record the control effect and power consumption under different point.

2. Test Results

Average current under different points are shown in Table 2-1, the value of current at point F is none as a result of disconnection.

Table 2-1. Test Results under Different Point

Test Ponit	Distance to Router / m	Average current for keep Wi-Fi alive / mA	Average current for control / mA
A	3	0.58	3.9
B	5 (with 10 cm wall)	0.71	4.5
C	20 (with 20 cm wall)	0.77	6.28
D	30 (with 30 cm wall)	3	29
E	17 (with 40 cm wall)	2.73	32.89
F	20 (with 70 cm wall)	/	/

2.1. Test Result of A

The keep-alive power consumption graph and control power consumption graph at point A are shown in Figure 2-1 and Figure 2-2, the network at A is the best, no beacon lost, lowest power consumption and no control delay.

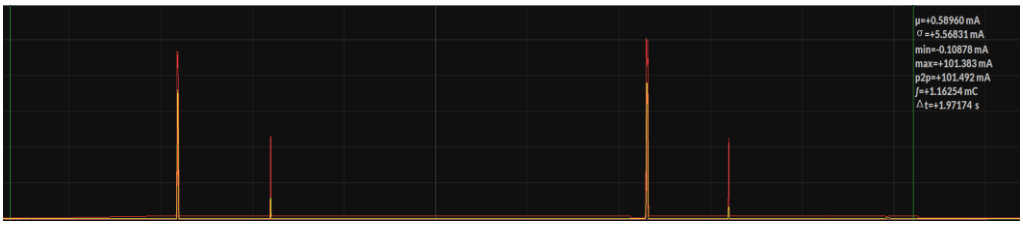

Figure 2-1 Keep-alive Power Consumption Graph at A

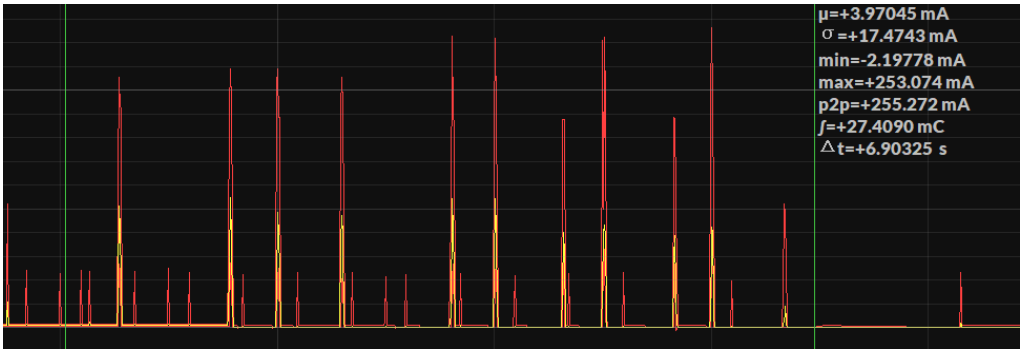

Figure 2-2 Control Power Consumption Graph at A

2.2. Test Result of B

The keep-alive power consumption graph and control power consumption graph at point B are shown in Figure 2-3 and Figure 2-4, there is nearly no beacon lost at B and the control effect is like A.

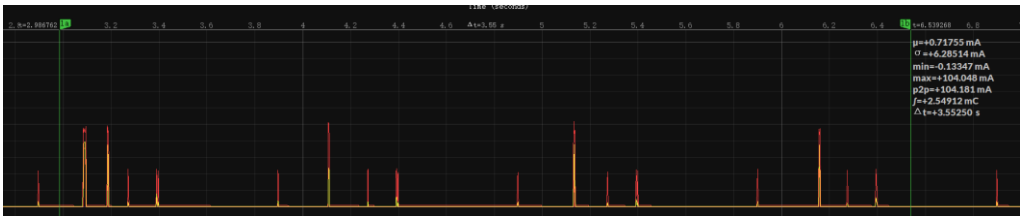

Figure 2-3 Keep-alive Power Consumption Graph at B

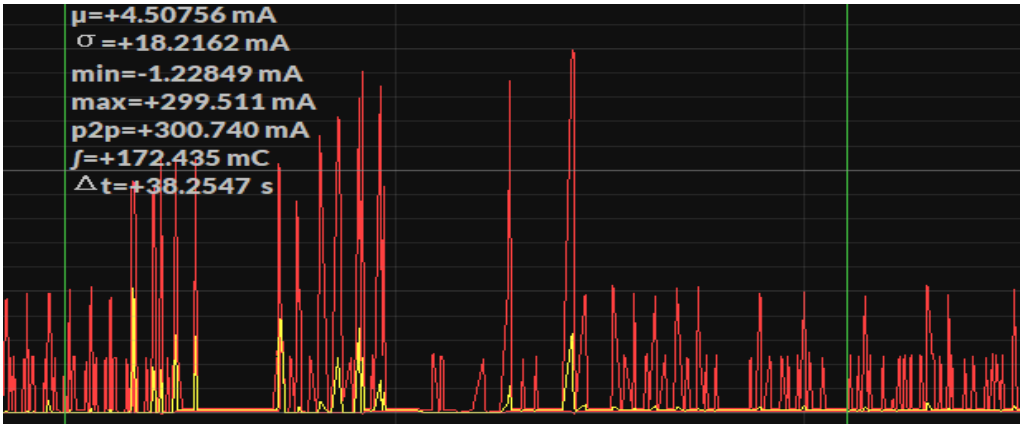

Figure 2-4 Control Power Consumption Graph at B

2.3. Test Result of C

The keep-alive power consumption graph and control power consumption graph at point C are shown in Figure 2-5 and Figure 2-6, there are some beacon loss at C, according to the strategy, it will keep waiting for times when beacon is lost, so the power consumption increases and there will be control delay in 1~2 S sometimes.

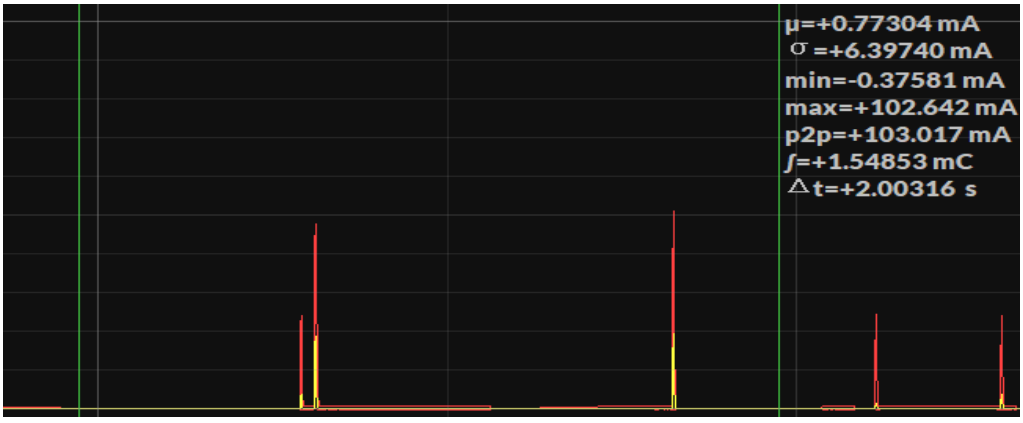

Figure 2-5 Keep-alive Power Consumption Graph at C

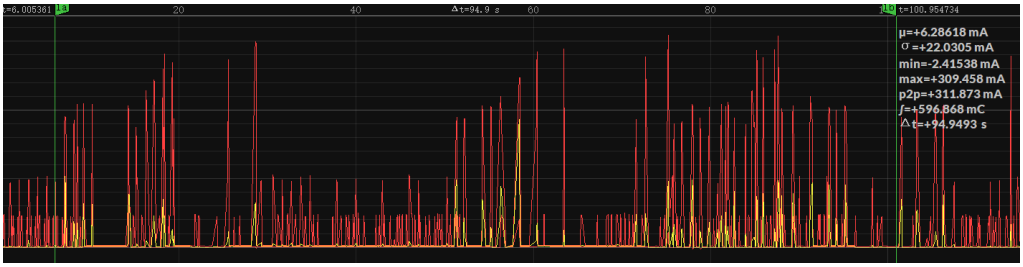

Figure 2-6 Control Power Consumption Graph at C

2.4. Test Result of D

The keep-alive power consumption graph and control power consumption graph at point D are shown in Figure 2-7 and Figure 2-8. Device can still be controlled but the beacon is lost more times. The power consumption and control delay increase.

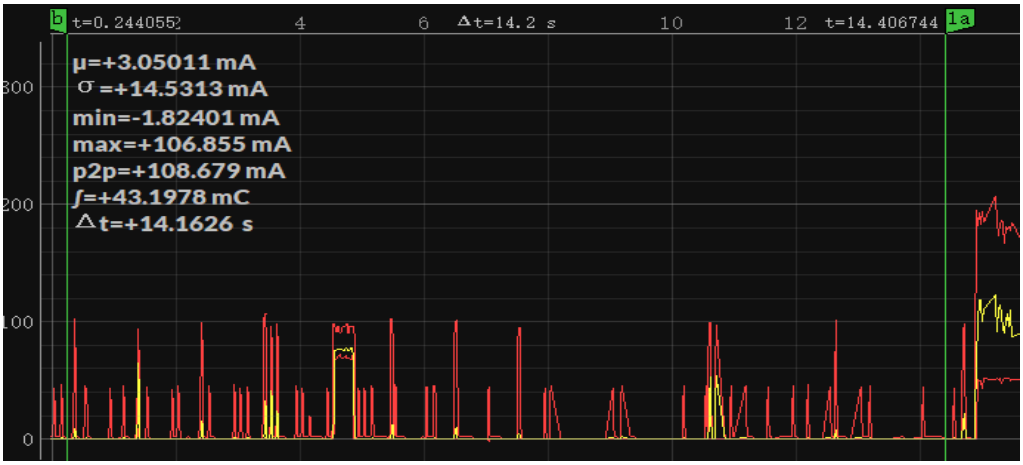

Figure 2-7 Keep-alive Power Consumption Graph at D

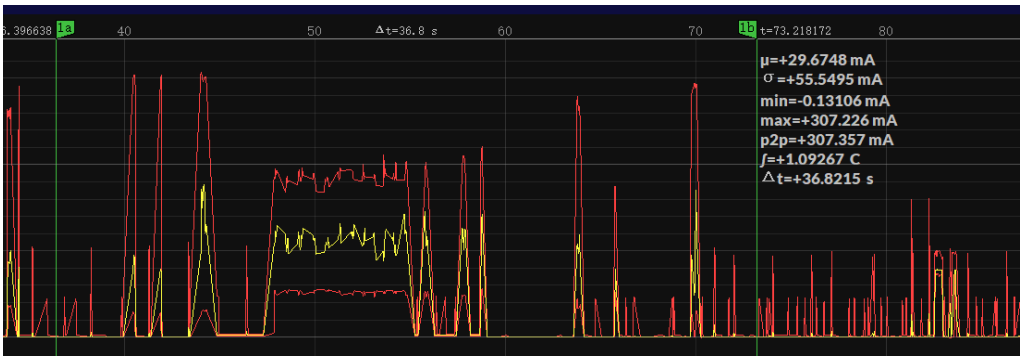

Figure 2-8 Control Power Consumption Graph at D

2.5. Test Result of E

Performance at E is like D, and the keep-alive power consumption graph and control power consumption graph at point E are shown in Figure 2-9 and Figure 2-10.

Figure 2-9 Keep-alive Power Consumption Graph at E

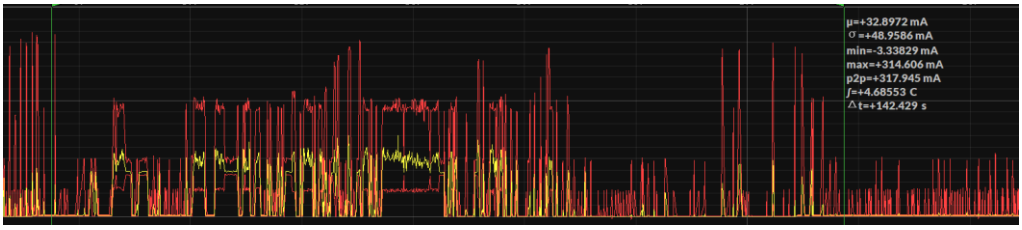

Figure 2-10 Control Power Consumption Graph at E

2.6. Test Result of F

Device is disconnected at F.