After-sales Problem Solving Report

Bugs level	Description	Note
Suggestive issue	Does not affect the performance and use of the product, but acceptable optimization and improvement.	
General issue	Does not affect the performance of the product, the product under pressure or extreme state of the performance of the occasional problems	
Serious problem	Probabilistic issues affecting use	
Fatal problem	The inevitable problem that affects the use	

Item	Description	Note
Issue tracking No.	KUS550 Ultrasonic Level Sensor_2022_10_12_KH8002209290527_Suggestive defects	
Issue description	The interval between two message frames of KUS550 ultrasonic level sensor is less than the requirement of Modbus protocol in RTU mode, which the message frames must be distinguished by an idle interval of at least 3.5 characters.	
Solution	In order to meet the requirements of Modbus protocol, the frame interval of KUS550 ultrasonic level sensor is extended at different baud rates.	

The products affected by this change are KUS550 ultrasonic level sensor

Related products are KUS600 ultrasonic level sensor, KUS630 ultrasonic level sensor, KUS550L low power consumption ultrasonic ranging sensor, KSLV605 Capacitive Level Sensor

The protocol used is RS485（https://www.detailedpedia.com/wiki-RS-485）与 Modbus Protocol interface（https://www.detailedpedia.com/wiki-Modbus）_6.1 Modbus RTU frame format

The code length time for different baud rates is calculated as follow：

| Baud rate	Code length (ms) 35bit for one frame of data
300	116.667
600	58.334
1200	29.167
2400	14.584
4800	7.294
9600	3.646
19200	1.823
38400	0.912
57600	0.608
115200	0.304

# The test results of each baud rate of KUS550 ultrasonic level sensor after code merge are as follows：
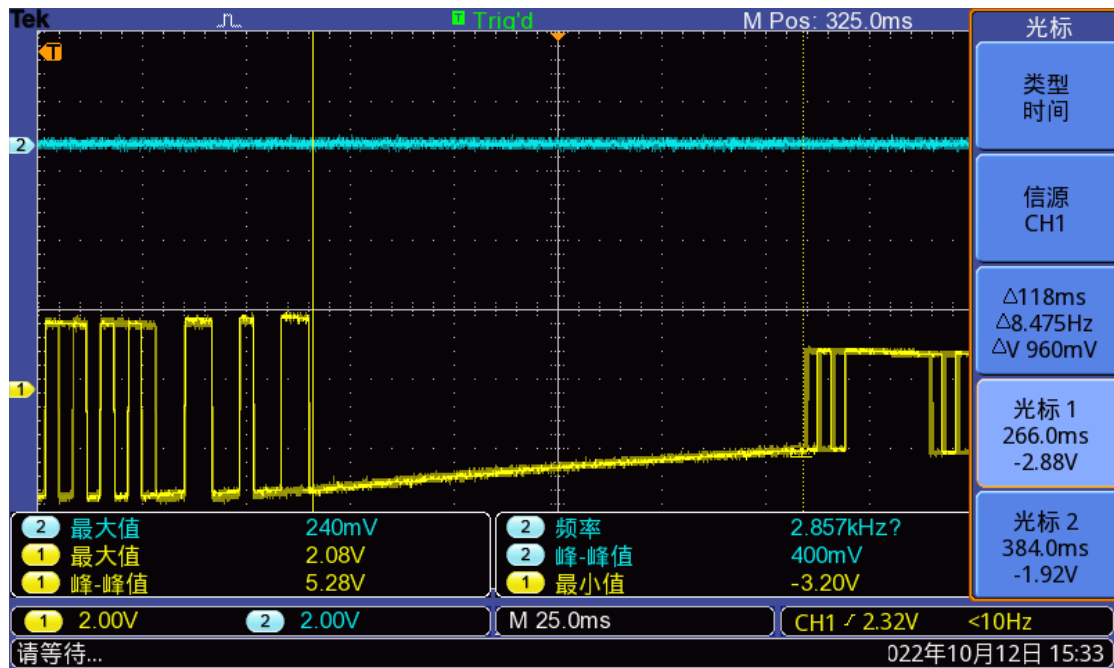
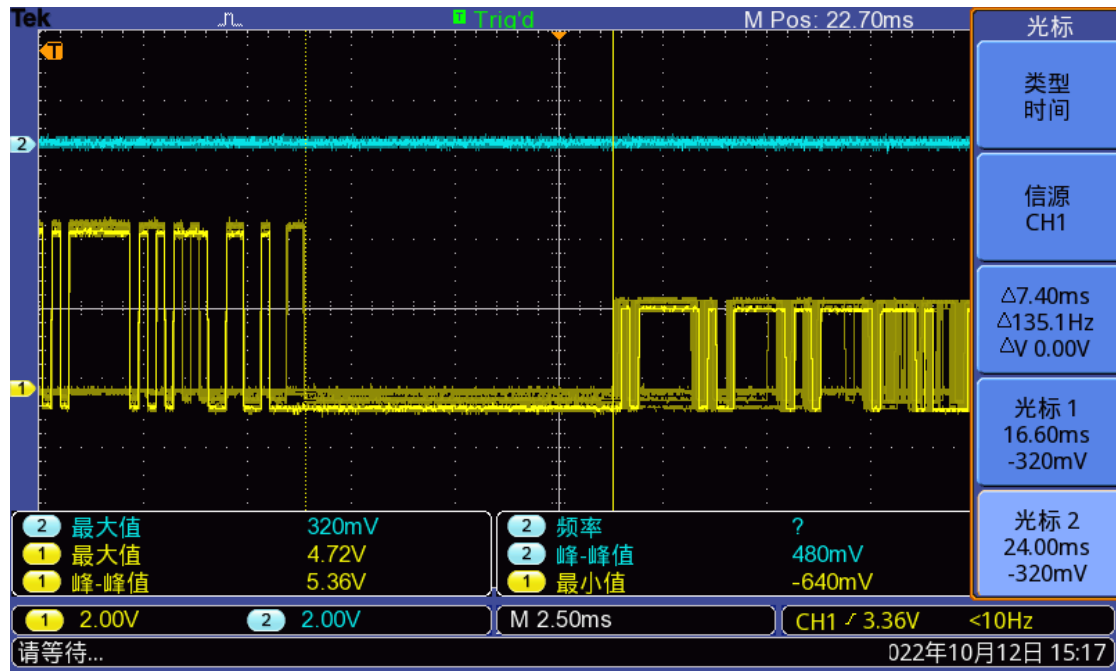| Test case number	Test result	Test conclusion
01	At 300 baud rates, after a long-time long afterglow test of oscilloscope, the interval between framer is designed to be 118ms, which meets the requirement of Modbus protocol greater than 116.667ms	OK
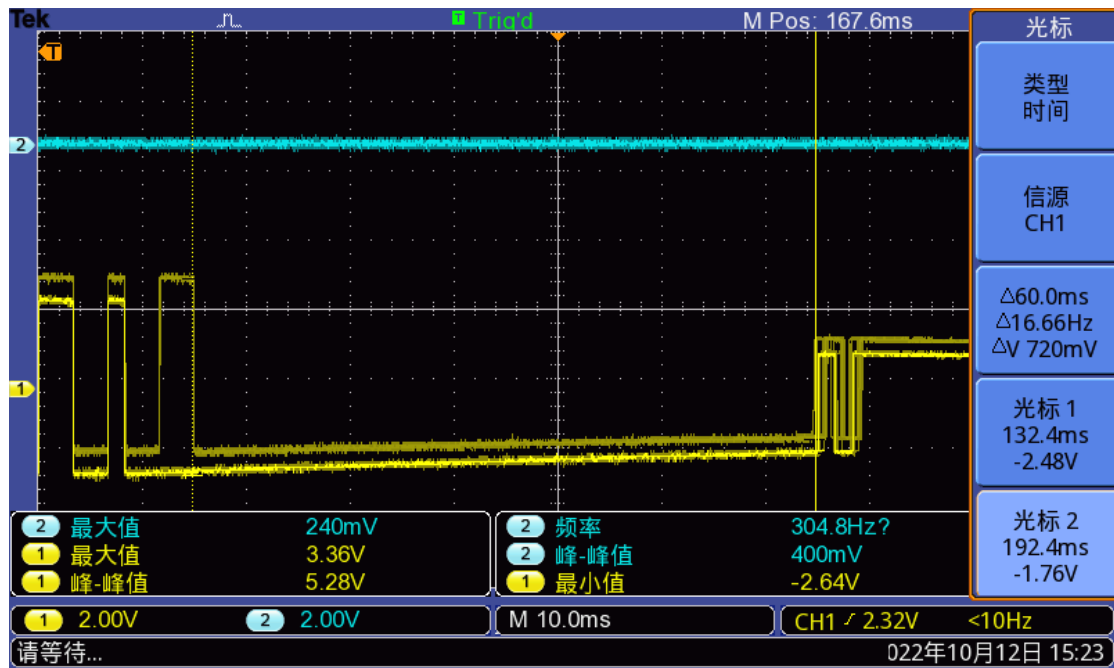
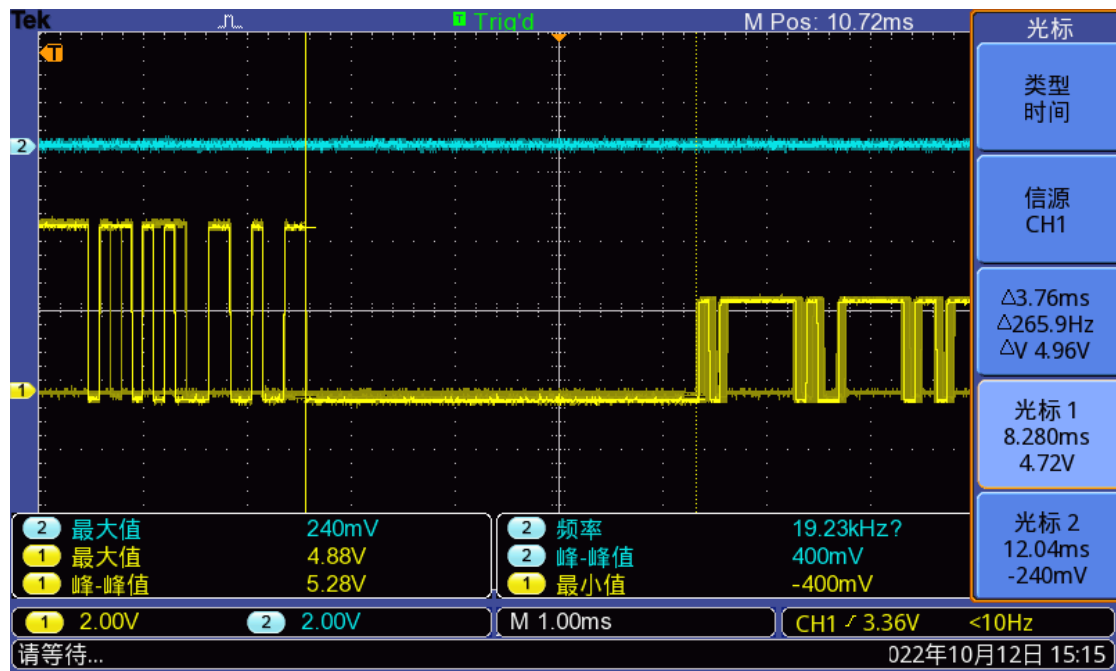| Test case number	Test result	Test conclusion
02	At 600 baud rates, after a long-time long afterglow test of oscilloscope, the interval between framer is designed to be 60ms, which meets the requirement of Modbus protocol greater than 58.334ms	OK
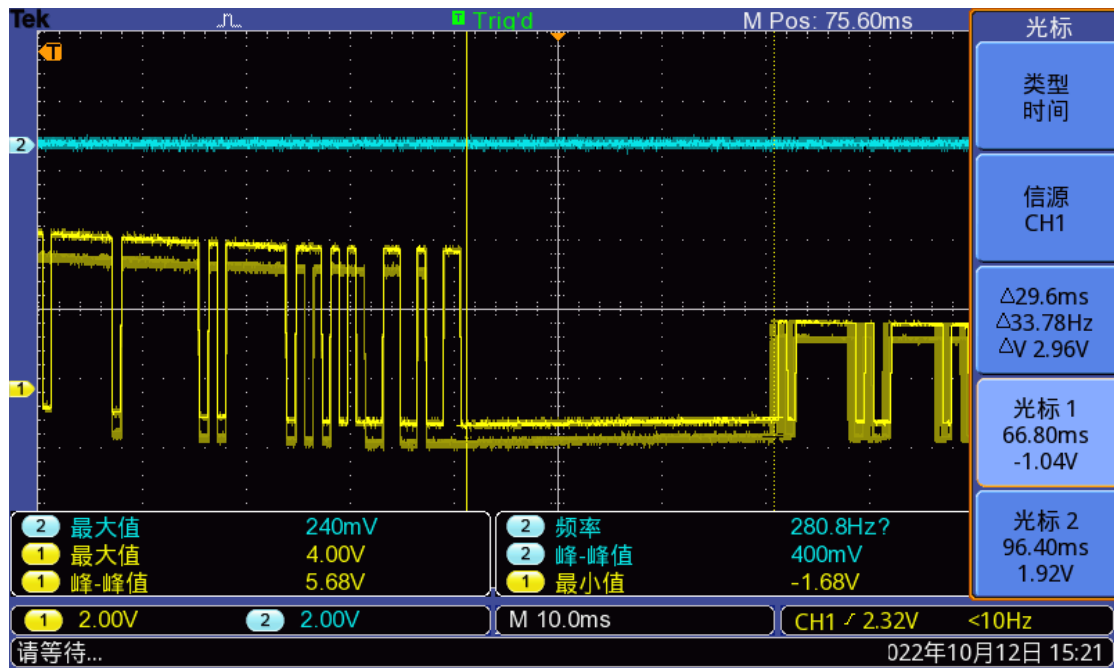
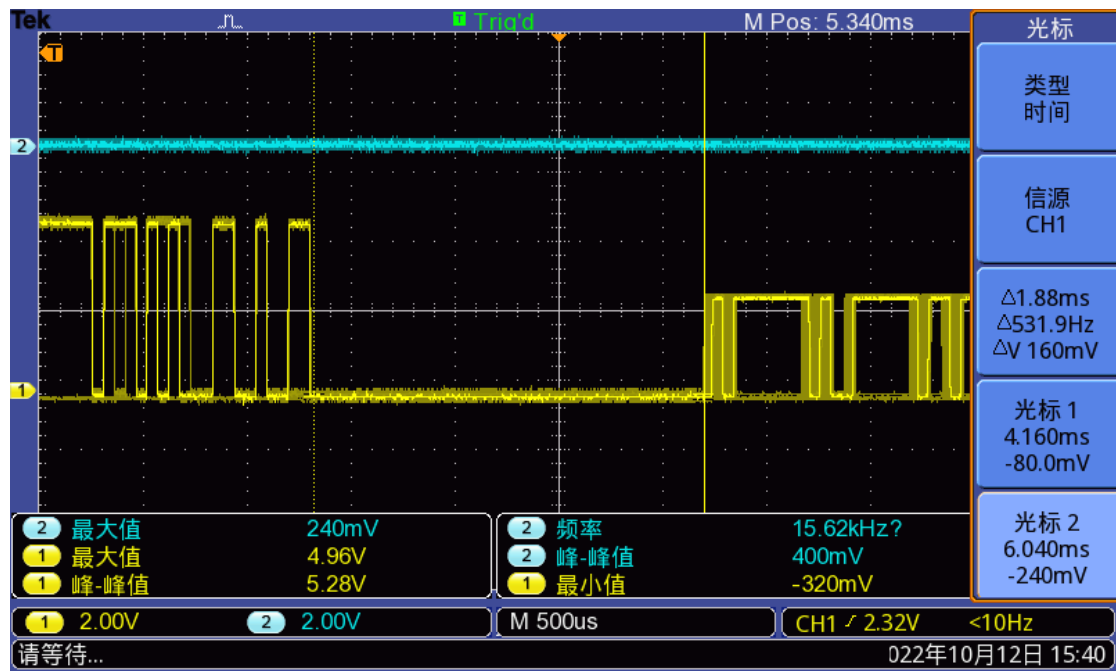| Test case number	Test result	Test conclusion
03	At 1200 baud rate, after a long time long afterglow test of oscilloscope, the interval between framer is designed to be 29.6ms, which meets the requirement of Modbus protocol greater than 29.167ms	OK
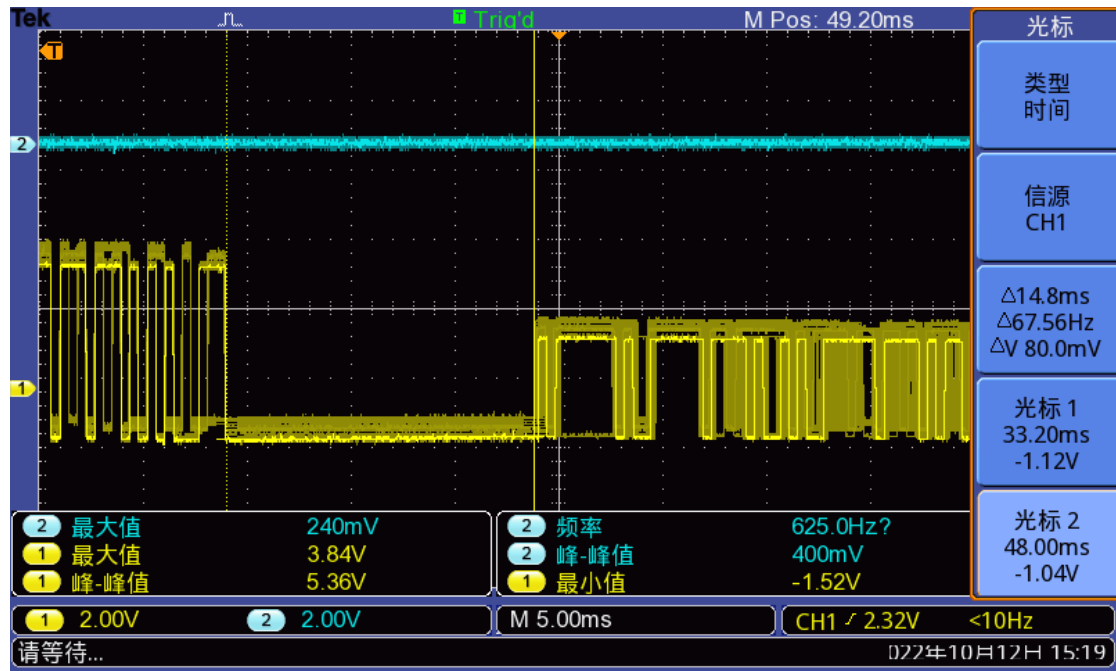
Test case number	Test result	Test conclusion
04	At 2400 baud rate, after a long-time long afterglow test of oscilloscope, the interval between framer is designed to be 14.8ms, which meets the requirement of Modbus protocol greater than 14.584ms	OK

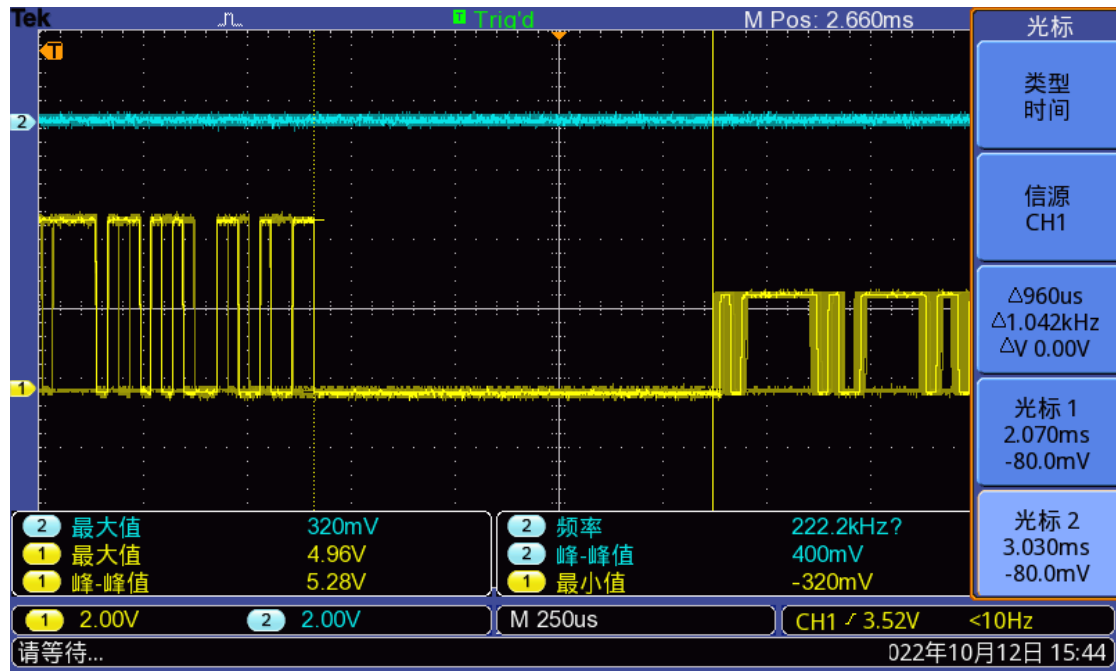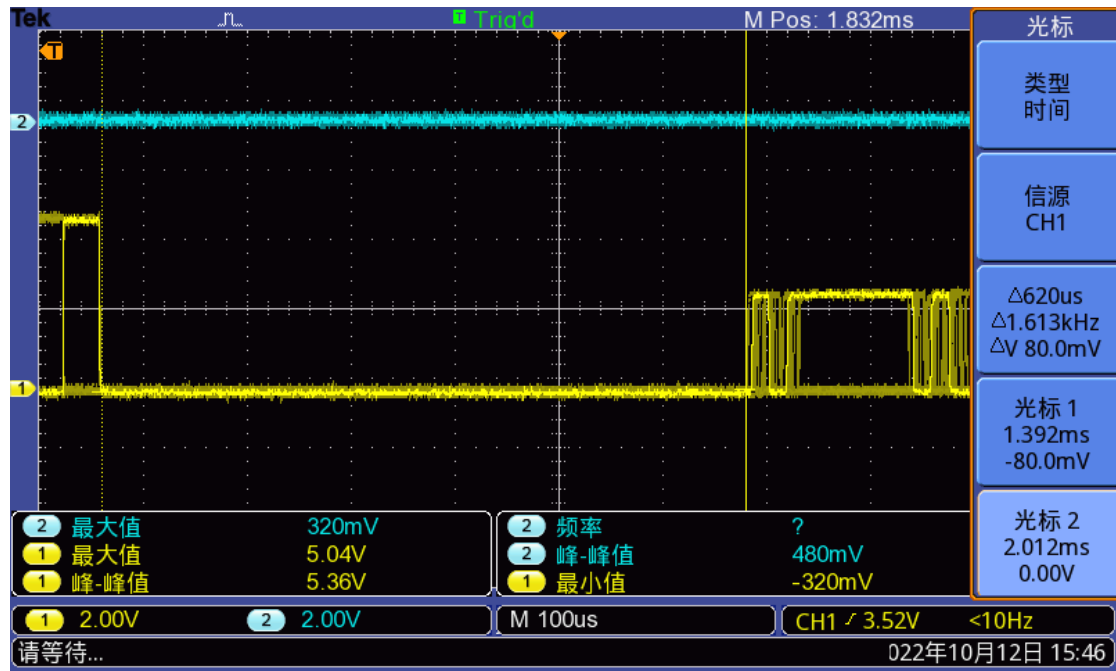| Test case number	Test result	Test conclusion
05	At 4800 baud rates, after a long-time long afterglow test of oscilloscope, the interval between framer is designed to be 7.4ms, which meets the requirement of Modbus protocol greater than 7.294ms	OK

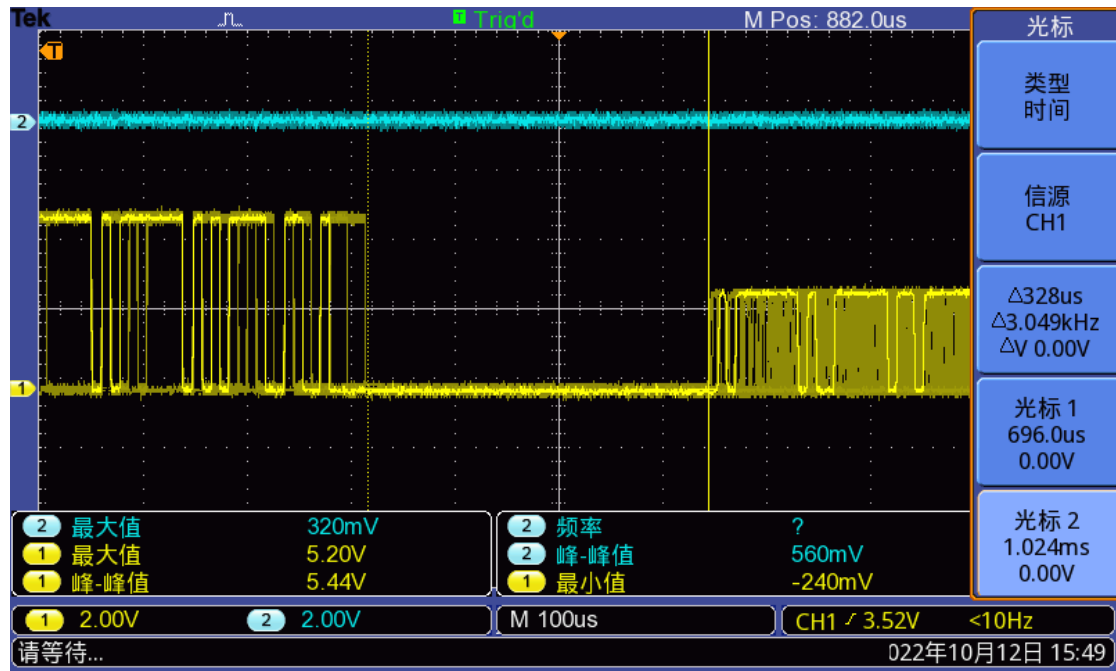| Test case number	Test result	Test conclusion
06	At 9600 baud rates, after a long-time after glow test of oscilloscope, the interval between framer is 3.76ms, which meets the requirement of Modbus protocol greater than 3.646ms	OK

Test case number	Test result	Test conclusion
07	At 19200 baud rates after long time afterglow test of oscilloscope, the interval between framer design is 1.88ms to meet the Modbus protocol requirements greater than 1.823ms	OK

Test case number	Test result	Test conclusion
08	At 38400 baud rates is tested by oscilloscope for a long time and long afterglow, the interval between the designed framer is 0.96ms to meet the requirements of Modbus protocol greater than 0.912ms	OK

Test case number	Test result	Test conclusion
09	At 57600 baud rates, after a long-time long afterglow test of oscilloscope, the interval between framer is 0.62ms, which meets the requirements of Modbus protocol greater than 0.608ms	OK

Test case number	Test result	Test conclusion
10	At 115200 baud rates is tested by oscilloscope for a long time and long afterglow. The interval between the designed framer is 0.328ms, which meets the requirements of Modbus protocol greater than 0.304ms	OK

Reporter: 冯博 **Checker:** ~~~ **Date:** 2022、10、12