

# Clock issues (EN)

# Clock issues from customers I

**Preface:** I2S clk is one of the important clock sources for smartamp, any issue from I2S clk is the potential risk, which will cause smartamp doesn't work well, such as no sound issue, noise issue audio volum fluctuation, or even speaker voice coil burnt.

- **Case 1: Smartamp did not work well in VoIP case at one MTK platform**

**Method:** After log investigation, VoIP samplerate is 44.1kHz, while SmartPA was config to 16kHz samplerate

**PS:** Kindly take care the sample rate in different audio cases

- **Case 2: In one mobile phone platform, the freq of I2S BCLK for hand-off tone playback is extremely abnormal during handsfree hangup. The actual value measured by scope in 2.6xxMHz, while the correct value must be 2.822MHz ( $44.1\text{kHz} \times 64$ ) and the duty cycle of the clk is also abnormal, while the correct value must be 50%. See the waveform at next page.**

# Clock issues from customers II

**Analysis:** I2S clk is one of the important clock sources for smartamp, any issue from I2S clk is the potential risk, which will cause smartamp doesn't work well, such as no sound issue, noise issue audio volum fluctuation, or even speaker voice coil burnt. The duty cycle and freq of bck from the platform is so abnormal that smartamp couldn't work well.

**Solution:** Kindly consult platform vendor for further support.

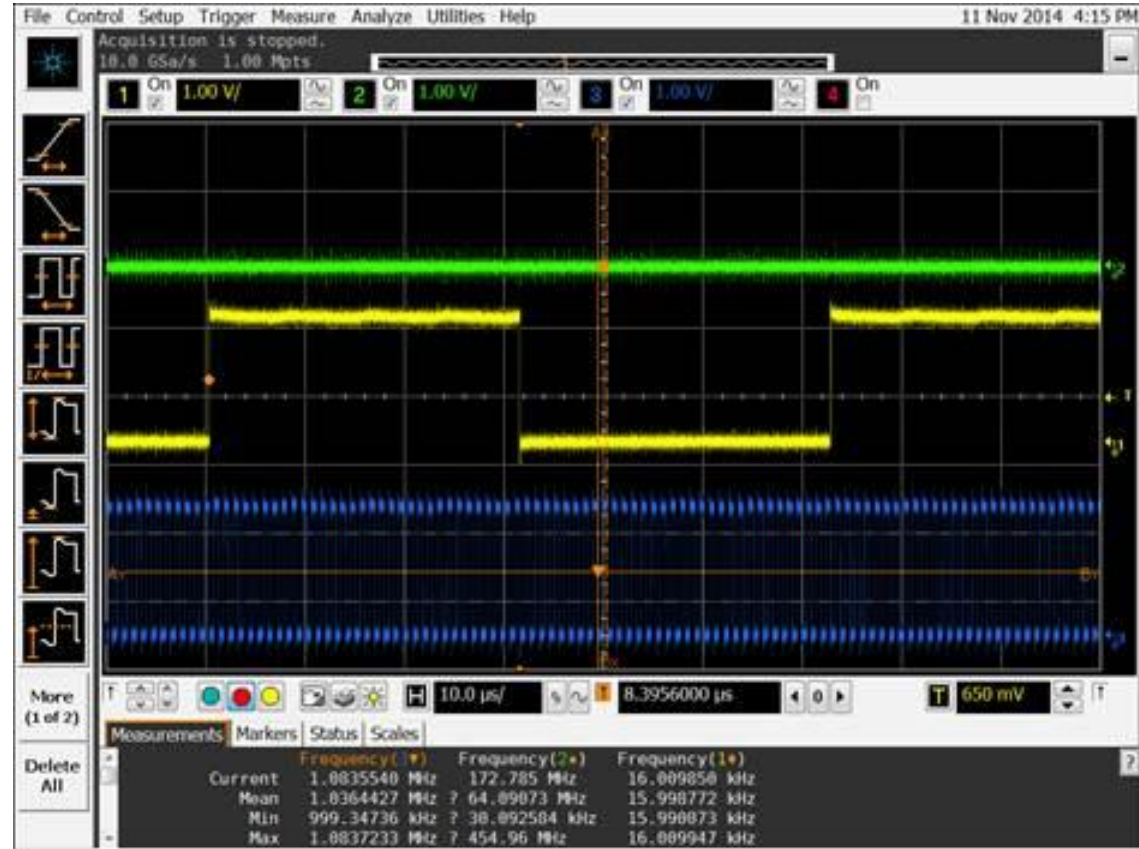


# Clock issues from customers III

- **Case 3:** In one mobile phone platform, the freq of I2S BCLK in mode is extremely unstable, the error is  $\pm 2\%$  of the correct value, which cause dsp can't calculate the correct temperature of the speaker voice coil, finally the voice coil was burnt.



coil temperature



TEXAS INSTRUMENTS

# Clock issues from customers IV

- **Case 4: No sound issues on both TAS2563 and TAS2572 in MT8188.**

1. TAS2563 was set to auto samplerate detection(B0P0R6:b4), no sound output. If fixed the samplerate to 48kHz, tas2563 worked.
2. In the same MT8188, connect TAS2572 instead of TAS2563, no sound output again.

Case analysis:

After measuring the I2S BCK with scope, we found that the rise time and fall time of BCK from MT8188 were not match our spec.

AMP Side(U7506)								
Signal Name	Parameter	Timing Spec			Unit	Measurement		Note
		MIN	TYPE	MAX		Measure	Result	
SBCK_L	Frequency	0.512	-	24.57	MHz	1.536	Pass	
	high period(tH)	20	-	-	ns	319.284	Pass	
	low period(tL)	20	-	-	ns	318.791	Pass	
	rise time(tr)	-	-	8	ns	22.468	Fail	
	fall time(tf)	-	-	8	ns	22.814	Fail	
	VIL	-	-	0.63	V	0.037	Pass	
	VIH	1.17	-	-	V	1.787	Pass	

# Clock issues from customers V

## 5.9 TDM Port Timing Requirements

$T_A = 25\text{ }^{\circ}\text{C}$ ,  $V_{DD} = 1.8\text{ V}$ , 20 pF load on all outputs (unless otherwise noted)

			MIN	NOM	MAX	UNIT
$t_H(\text{SBCLK})$	SBCLK high period		20			ns
$t_L(\text{SBCLK})$	SBCLK low period		20			ns
$t_{SU}(\text{FSYNC})$	FSYNC setup time		6.5			ns
$t_{HLD}(\text{FSYNC})$	FSYNC hold time		6.5			ns
$t_{SU}(\text{SDIN})$	SDIN setup time		6.5			ns
$t_{HLD}(\text{SDIN})$	SDIN hold time		6.5			ns
$t_d(\text{DO-SBCLK})$	SBCLK to SDOUT delay	50% of SBCLK to 50% of SDOUT			29	ns
$t_r(\text{SBCLK})$	SBCLK rise time	10% - 90 % Rise Time			8	ns
$t_f(\text{SBCLK})$	SBCLK fall time	90% - 10 % Fall Time			8	ns

# Clock issues from customers VI

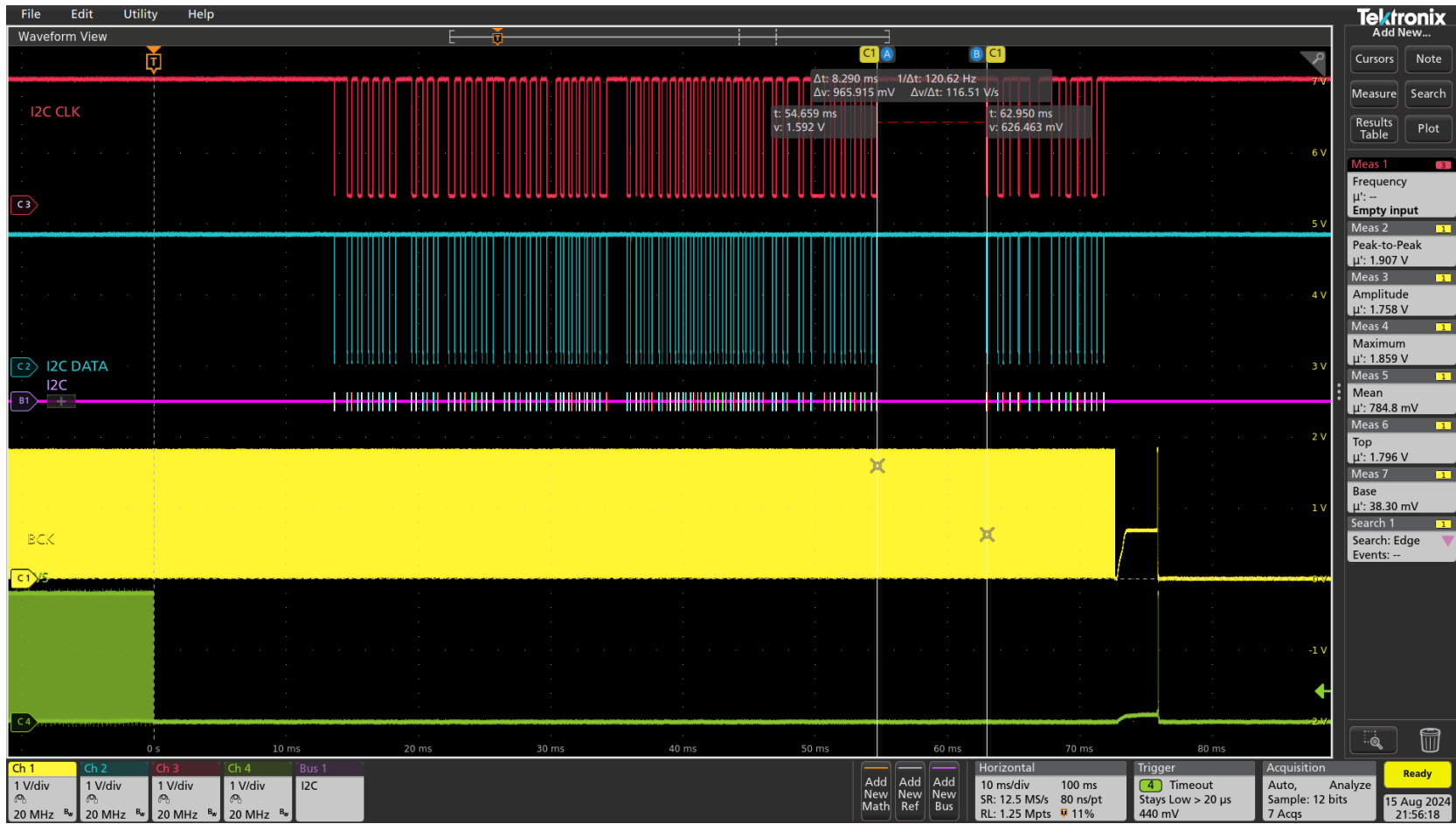
- **Case 5: Noise issues tas2563 after stress test on play-pause multiple times.**

Case analysis:

The root cause is the i2c/i2s sequence issue during playback pause. After measuring the i2s and i2c clk with scope during, we found that ws clk has been shutdown before tas2563s power off. Sometimes the i2c bck has been already shutdown, while the all of the tas2563s were not shutdown. For the sequence plot, see next three pages, [Clock issues from customers VII | wrong sequence I](#), [Clock issues from customers VIII | wrong sequence II](#), [Clock issues from customers IX | wrong sequence III](#).

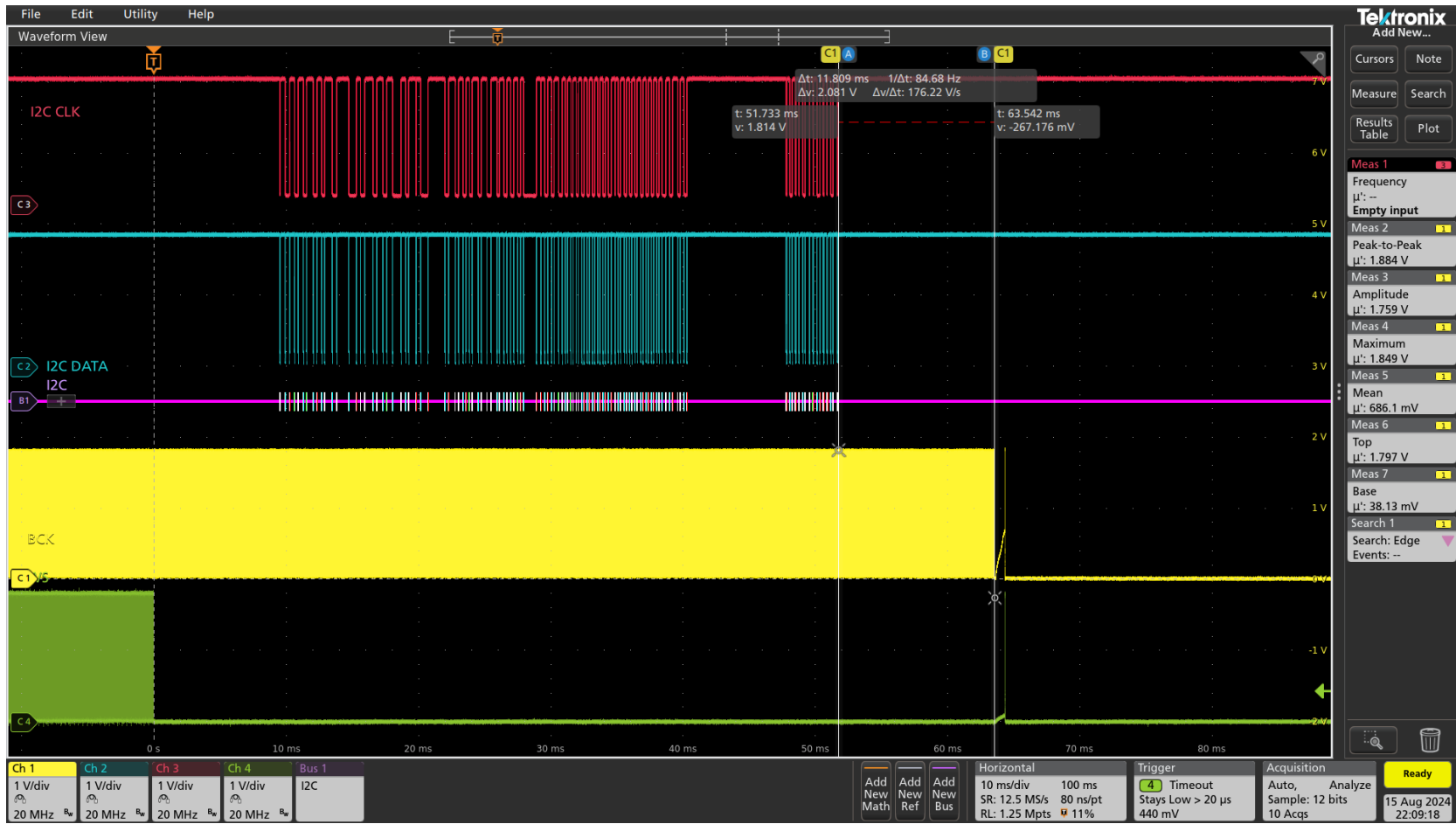
After consultant from platform vendor, this sequence issue has been fixed. For the correct power off sequence, see [Clock issues from customers X | correct sequence](#).

# Clock issues from customers VII | wrong sequence I

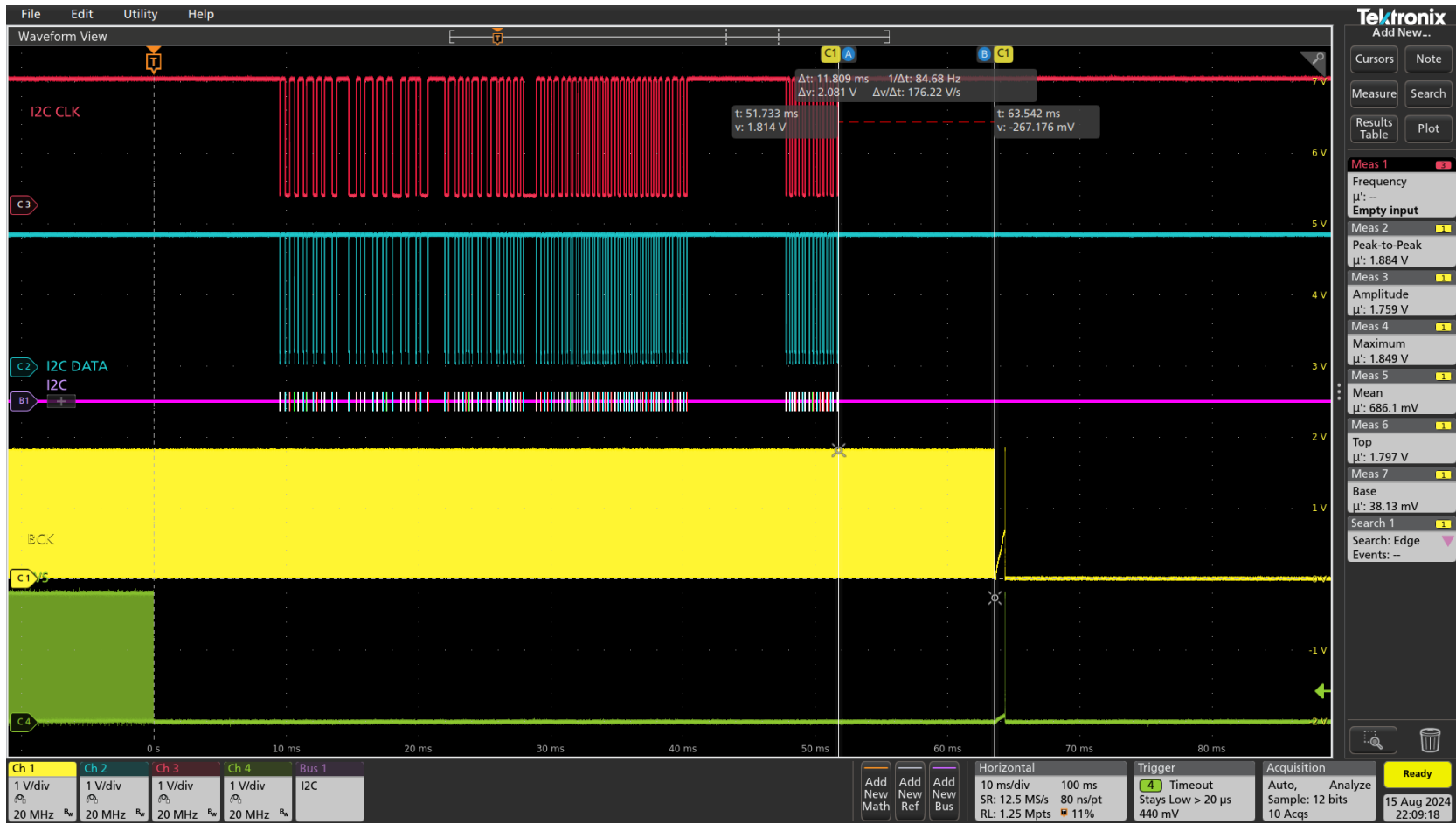




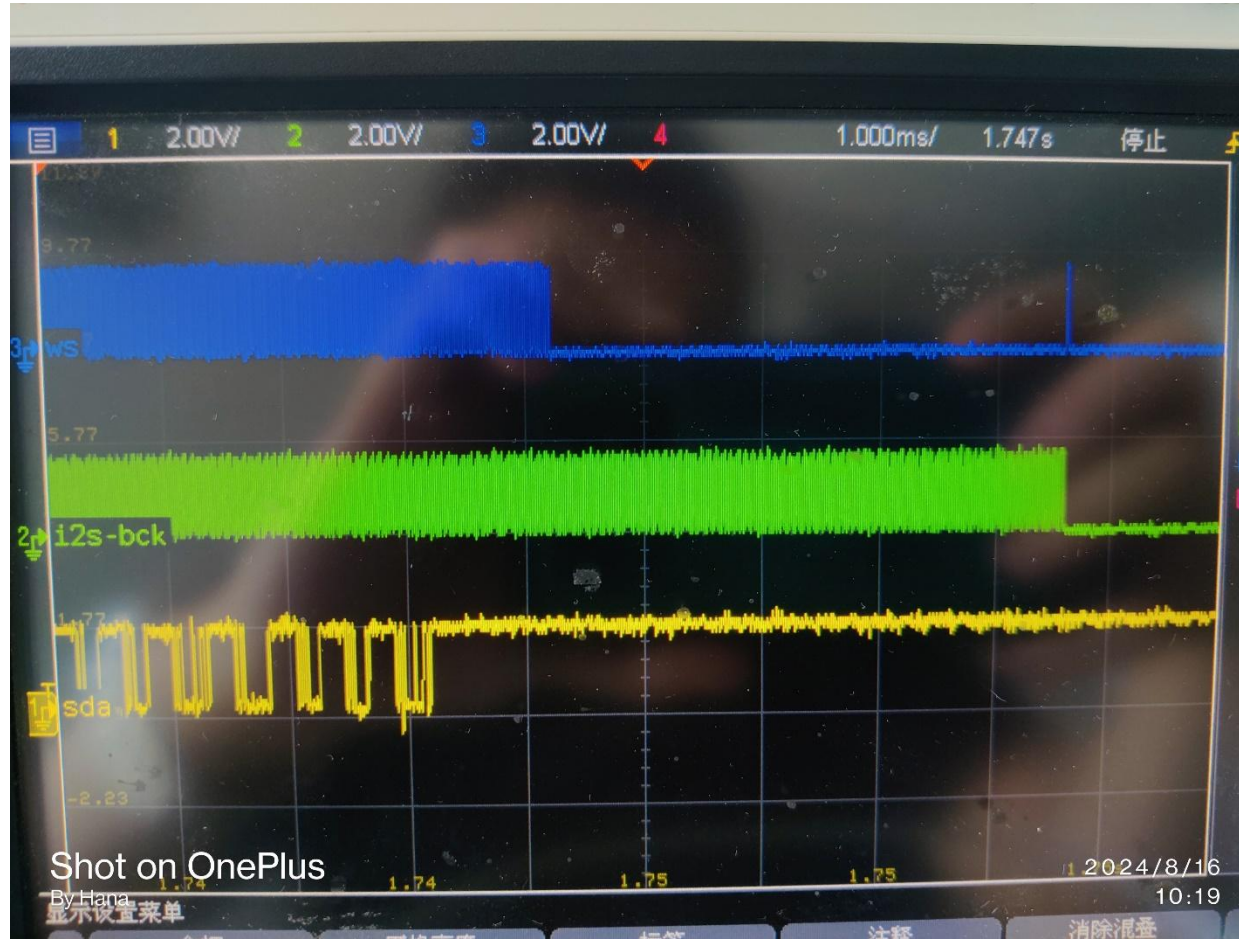
# Clock issues from customers VIII | wrong sequence II



# Clock issues from customers IX | wrong sequence III



# Clock issues from customers X | correct sequence



***THANKS!***