ODOX
Institute Of Technologies

# Smartphone based DSO signals v1.0

By Odox Institute of Technology

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CHARGING SECTION LX SIGNAL

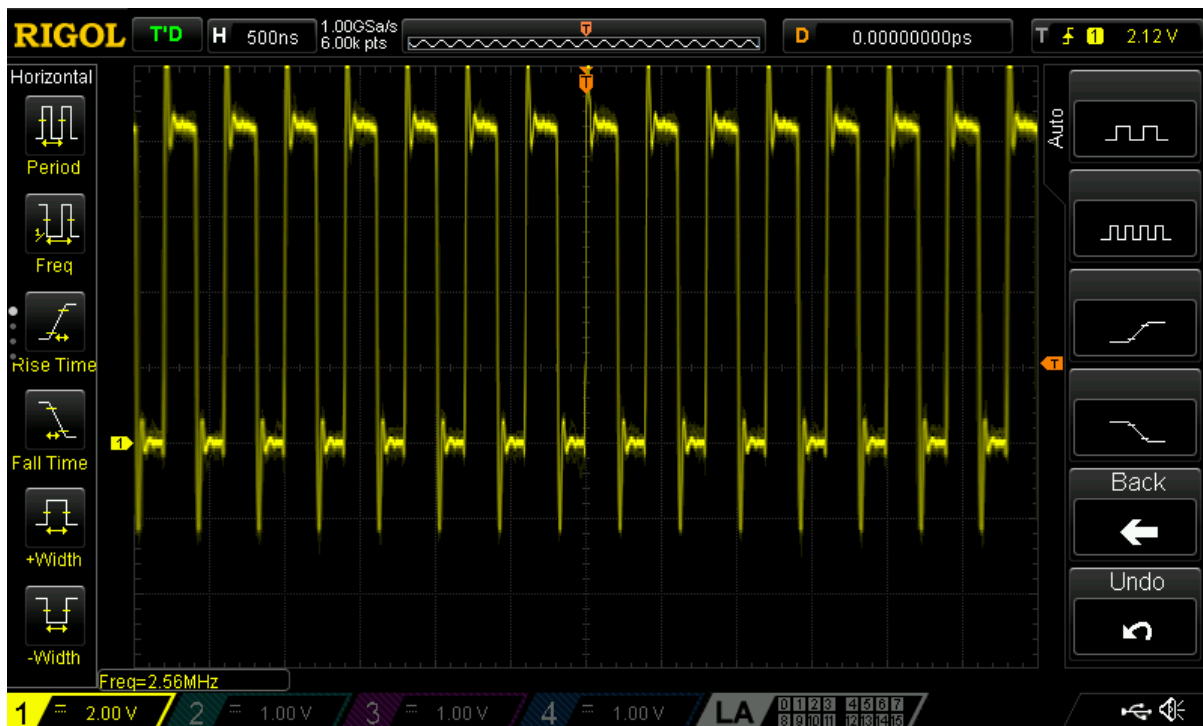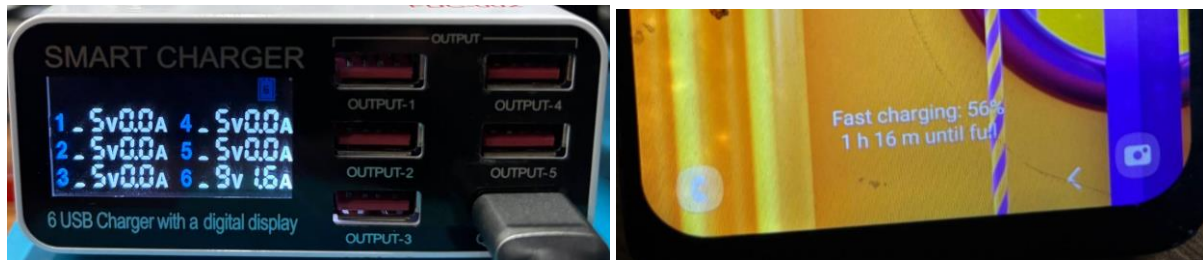**Normal charging**

Lx signal Frequency: 427 Khz

Lx signal amplitude: 5v
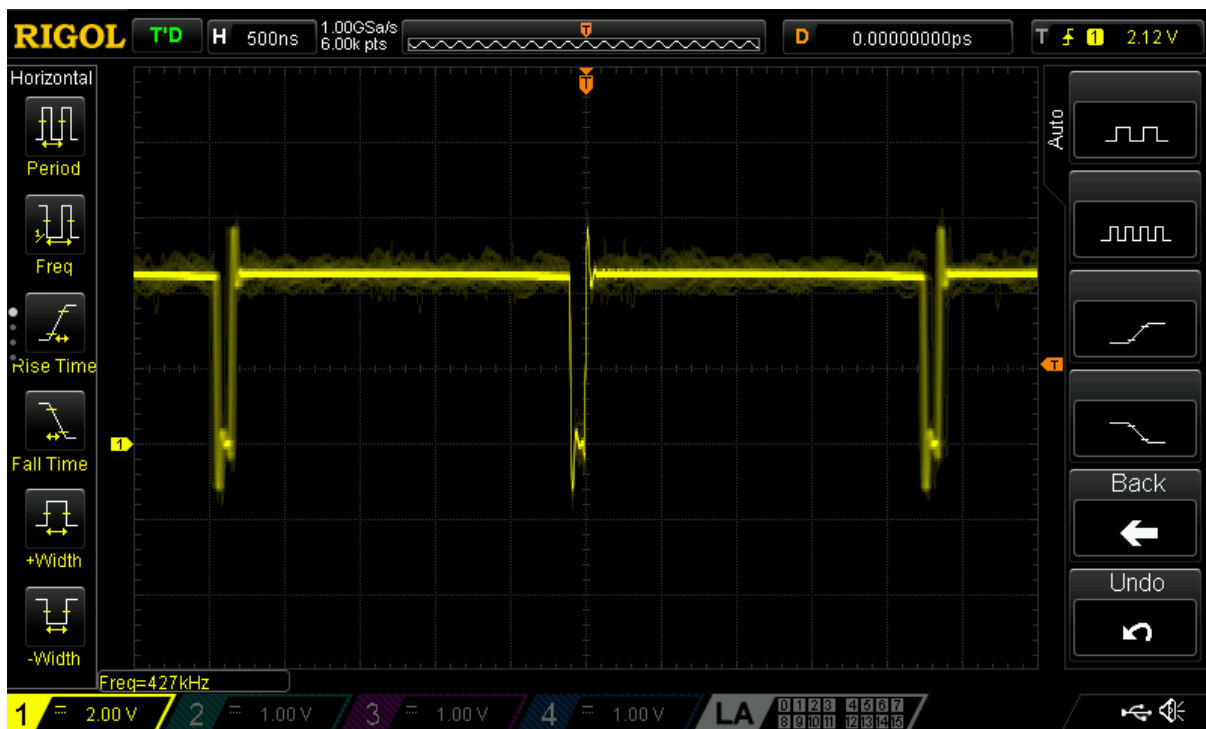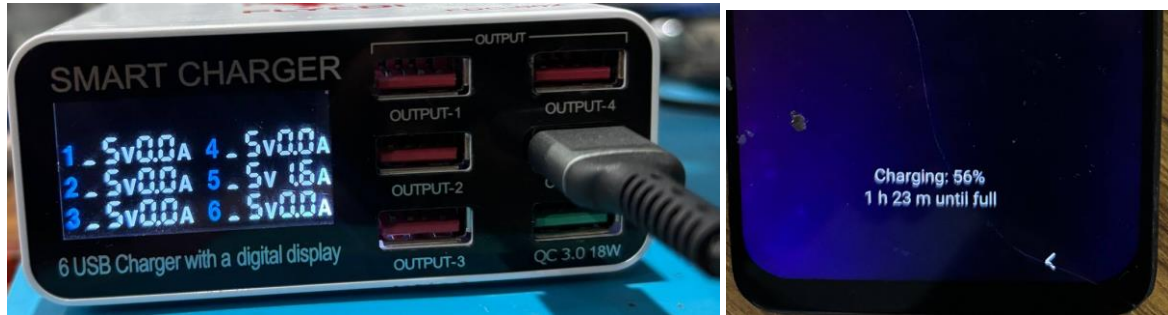
Fast charging

Lx signal frequency: 2.56MHz

Lx signal aplitude: 9v

A **fast charger gives higher voltage**,

➤ PMIC **switches faster**,

➤ Delivers **more energy per second**,

➤ Charges battery faster while keeping output at **4.2V**

Fast Charging Magic Comes From... Explanation

Higher VBUS (9V/12V)   More energy available

Buck switching at high frequency   Delivers energy quickly and smoothly

Smart control of duty cycle   Keeps output safe (4.2V), but faster charging

Efficient use of coil and capacitor Smoother, ripple-free energy delivery
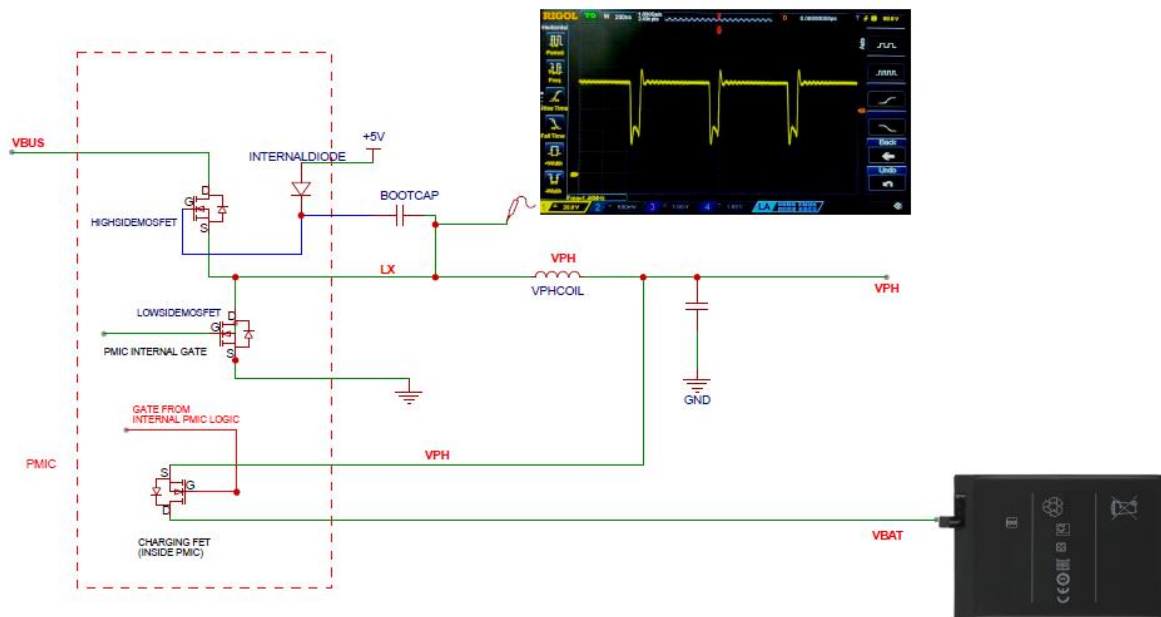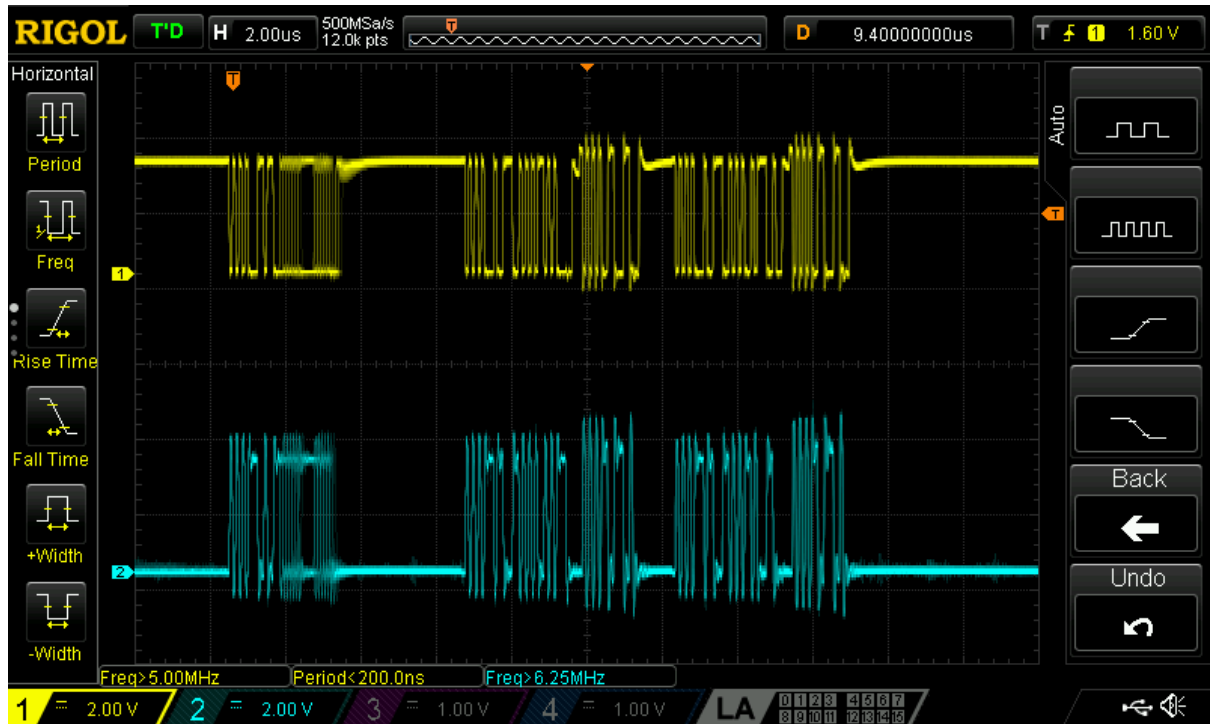

Vph current checking:

Current sensing resistor

$$Current = \frac{Voltage\ across\ resistor}{Resistance\ (Ohms)}$$

Smartphone Signals for Reference

DP DM DATA COMMUNICATION

Channel 1: DP

Channel 2: DM

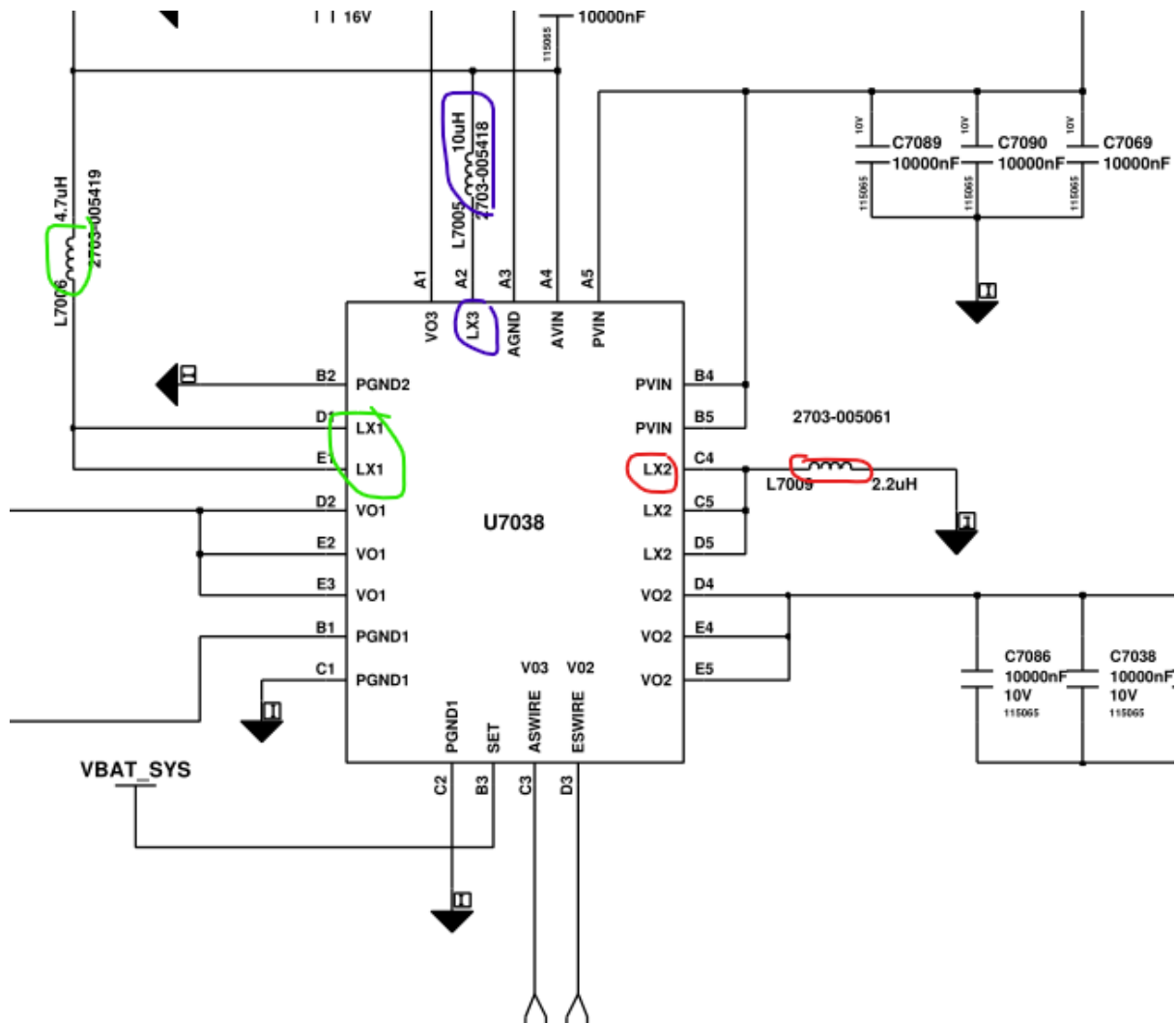Smartphone Signals for Reference

LED GRAPHICS VOLTAGES LX SIGNALS

Channel 1: Lx1 → vo2 → -4.4v

Channel 2: Lx2 → vo3 → 7.3v
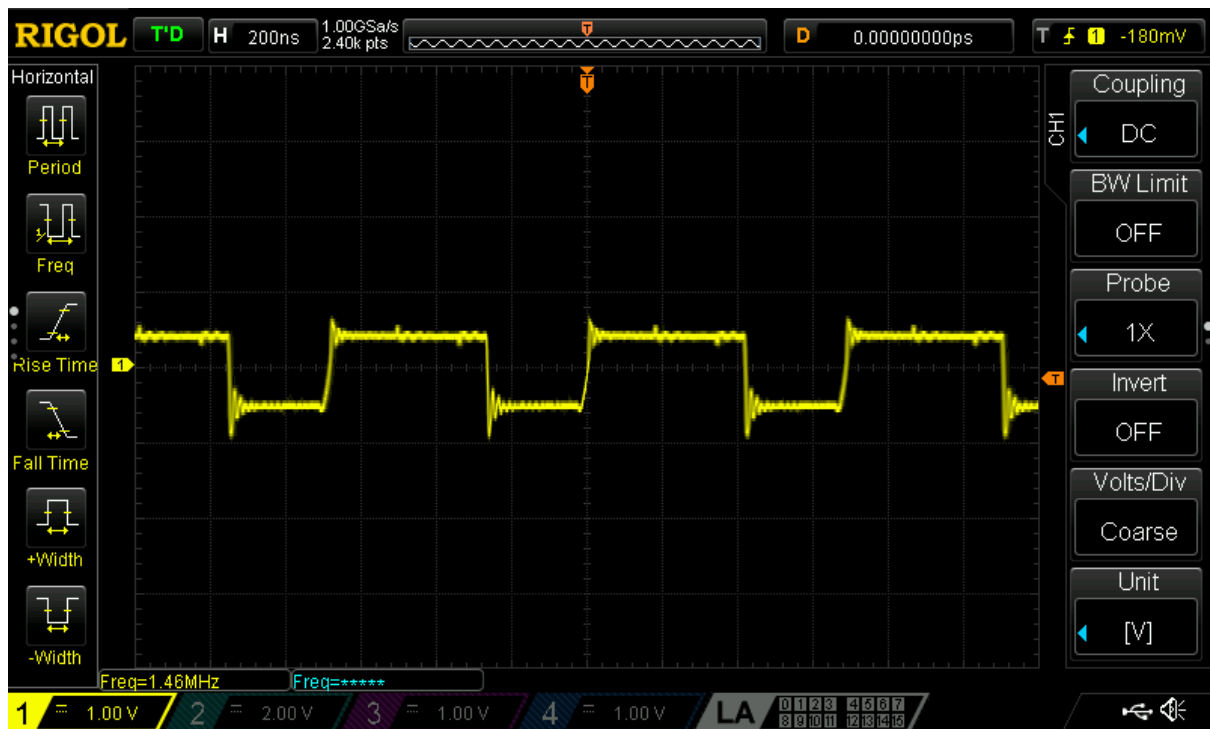
Channel 3: Lx3 → vo1 → 4.6v

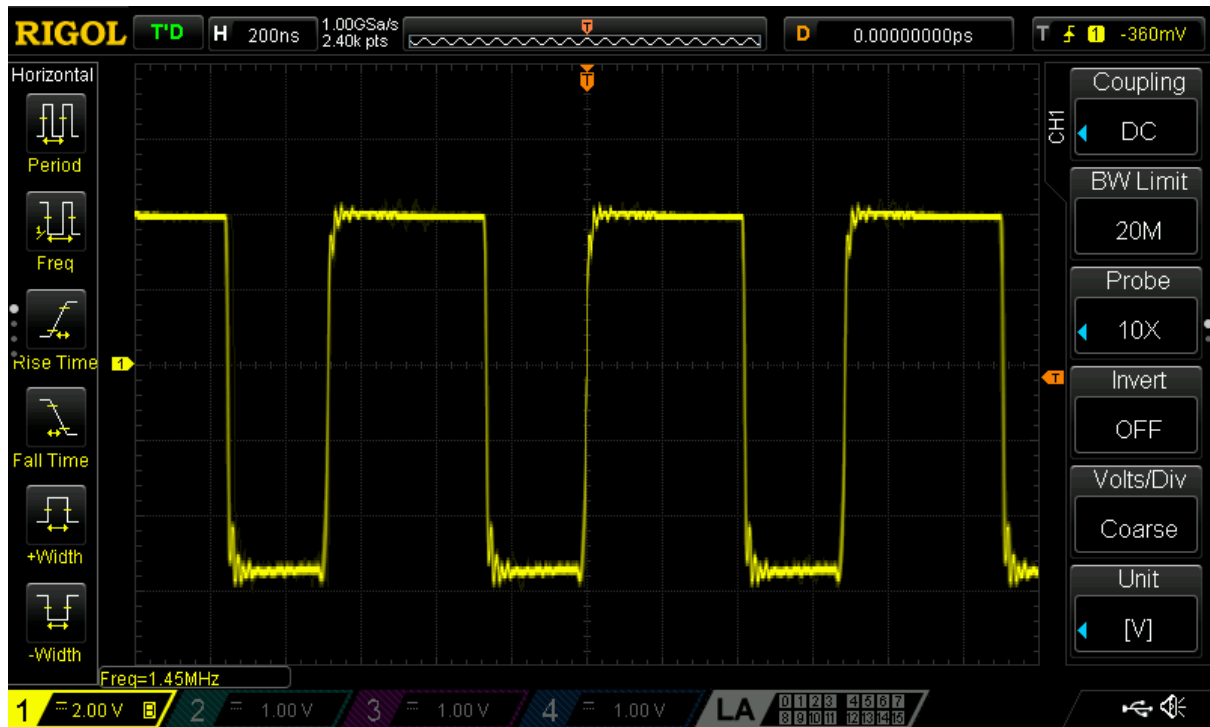Elvss lx frequency increases when brightness decreases and vice versa

Low brightness – frequency: 5Mhz
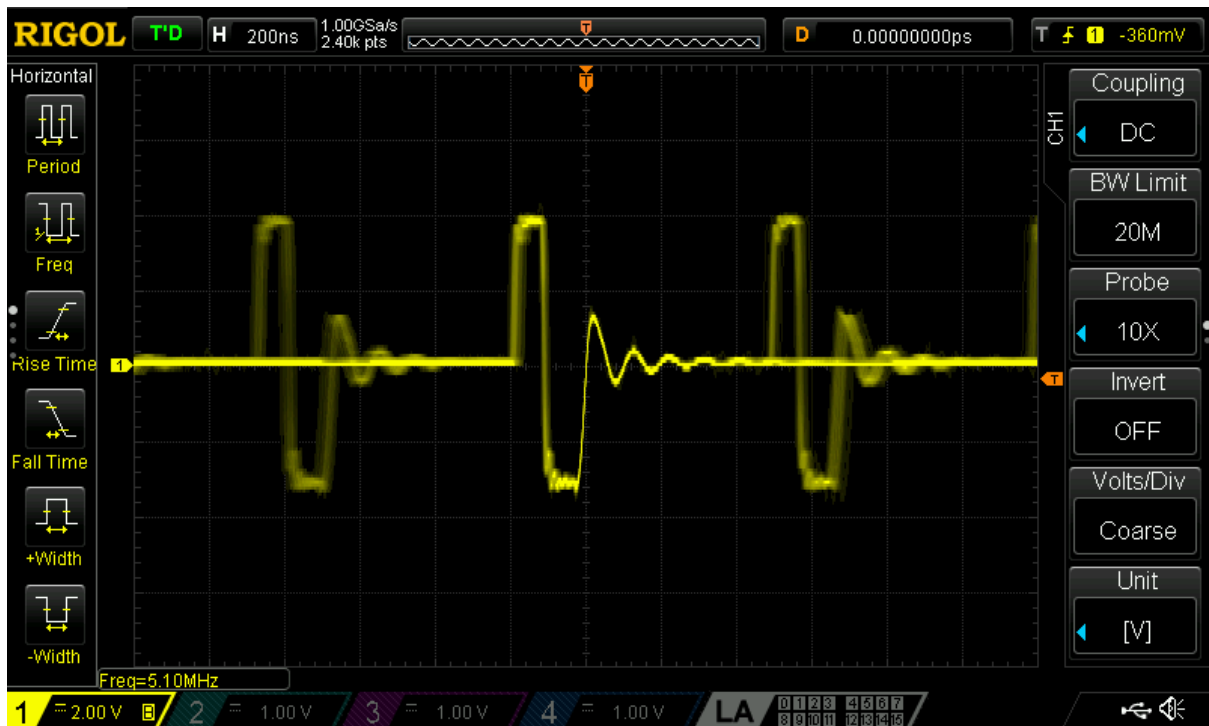
High brightness – frequency: 1.5MHz

Total 9.5v volts peak to peak signal –-> 0.5v upward and 0.5v downwards

High brightness ELVSS LX signal

Smartphone Signals for Reference

Low / minimum brightness ELVSS LX signal

Medium brightness ELVSS LX signal

Smartphone Signals for Reference

ELVDD on channel number 2

Voltage: 8v pp

2v downwards

6v upwards

ELAVDD on channel number 3

Smartphone Signals for Reference

DISPLAY & TOUCH DATA COMMINIUCATIONS

Reset signal

Reset signal has 1.8v when display ON

Reset signal has no voltage when display off

When display is absent no voltage

If we changed device tom sleep mode, reset signal goes 0v

Display DET
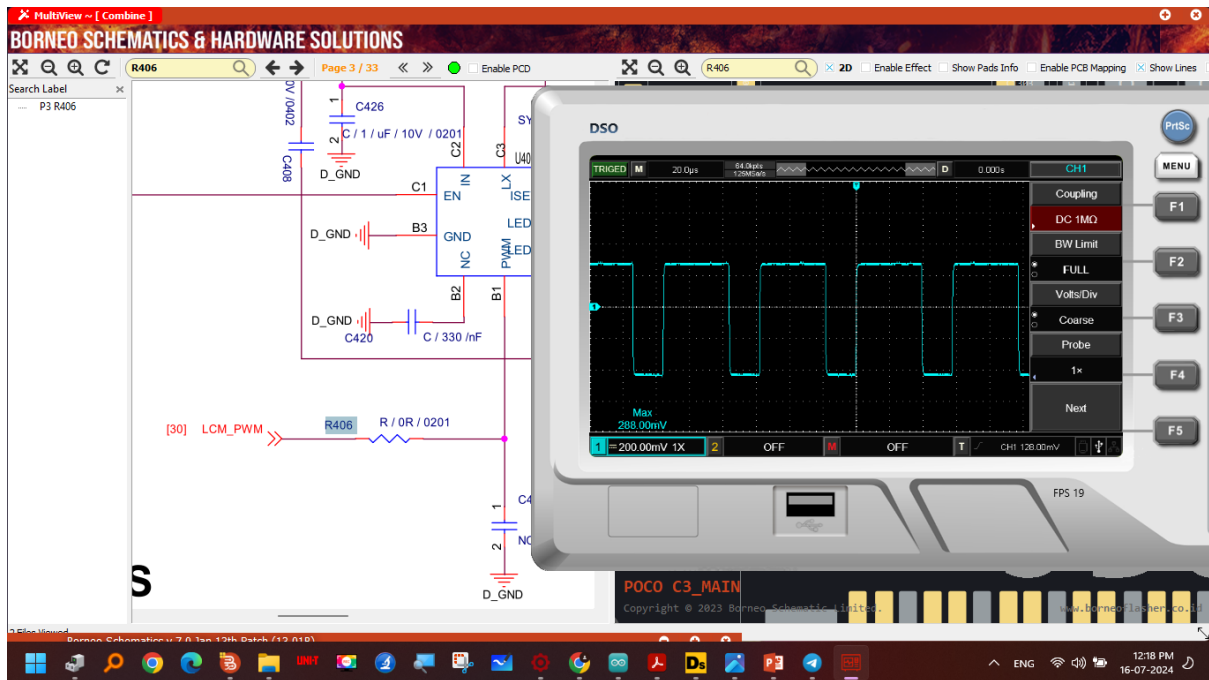
TSP INT

Normal time → 1.8v dc

Sleep mode → 0.5v dc

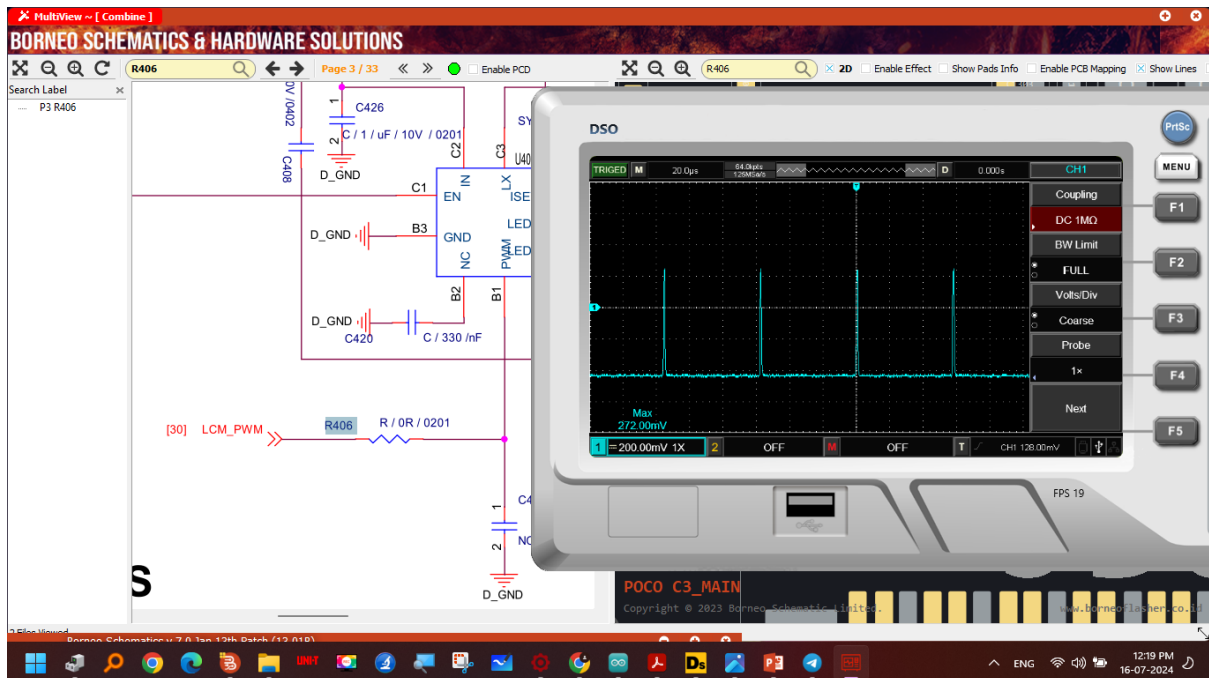Touch SCL SDA
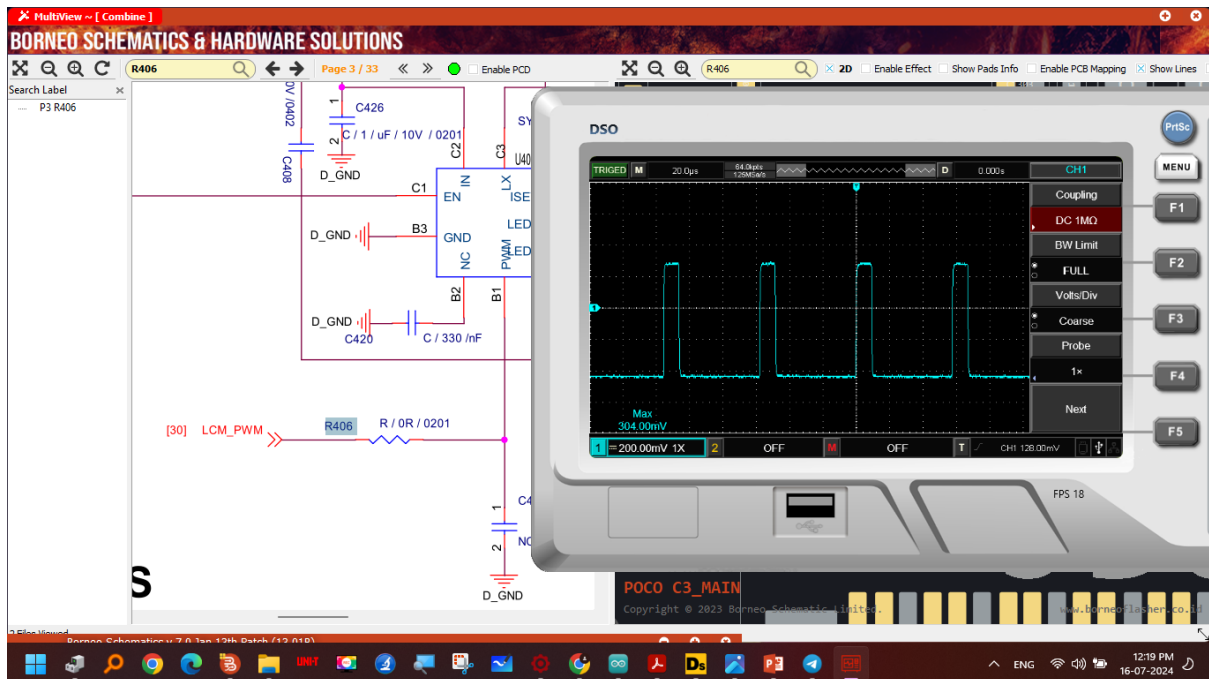
Decoded touch screen data
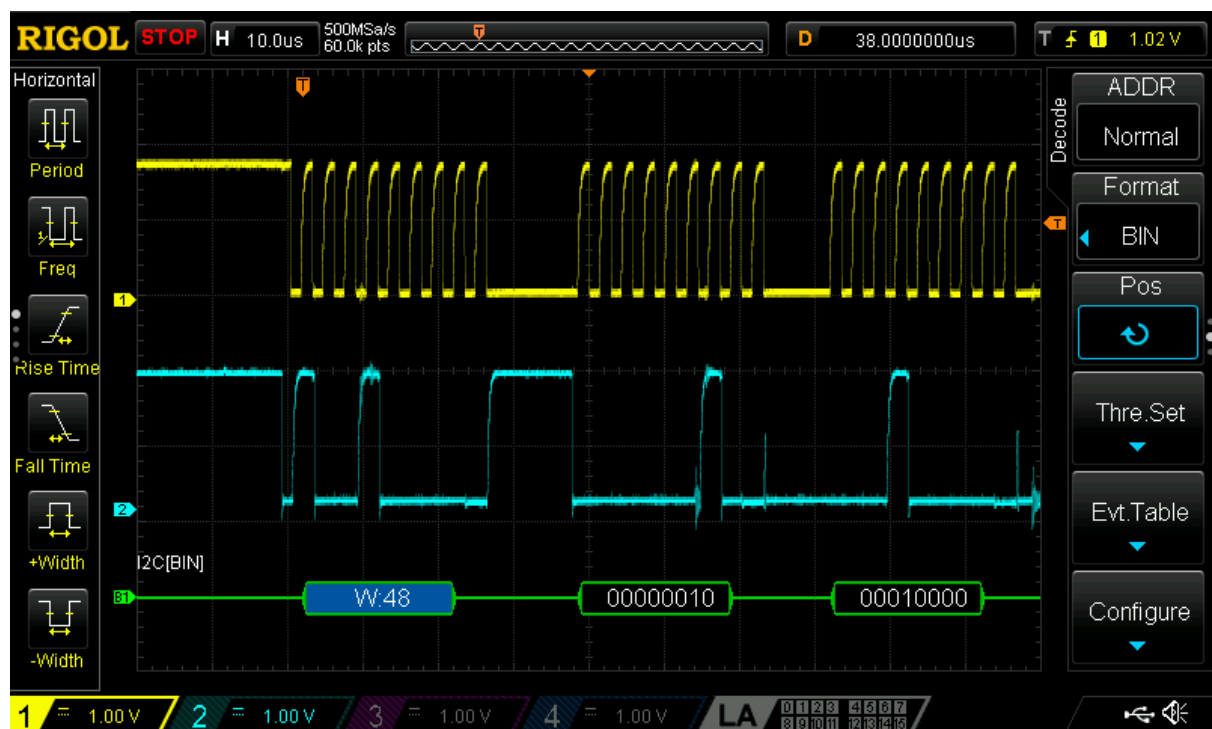
Display PWM signal
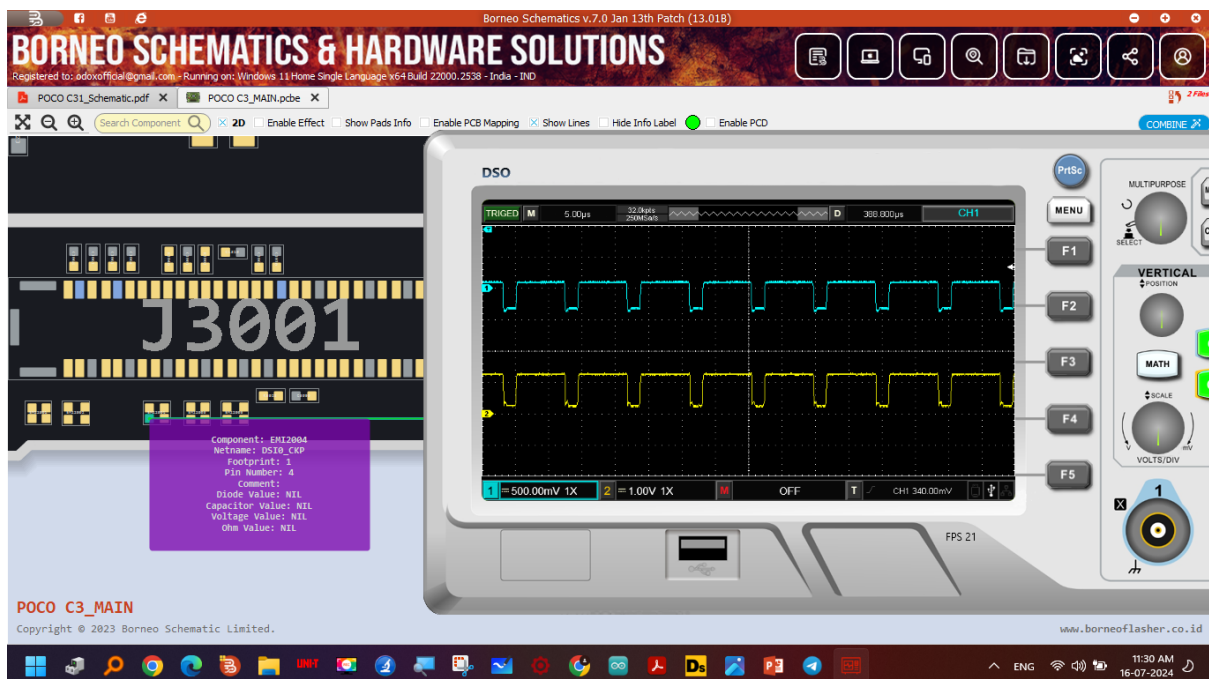
<u>Display PWM – full brightness</u>
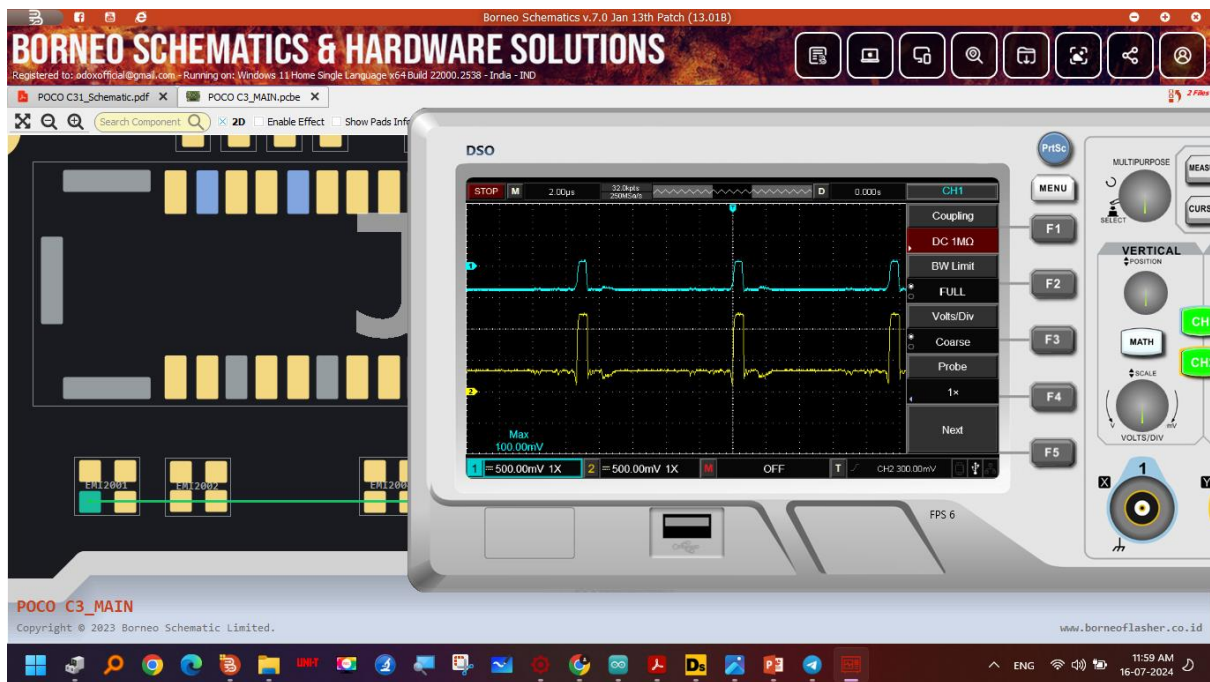

<u>Display PWM – minimum brightness</u>
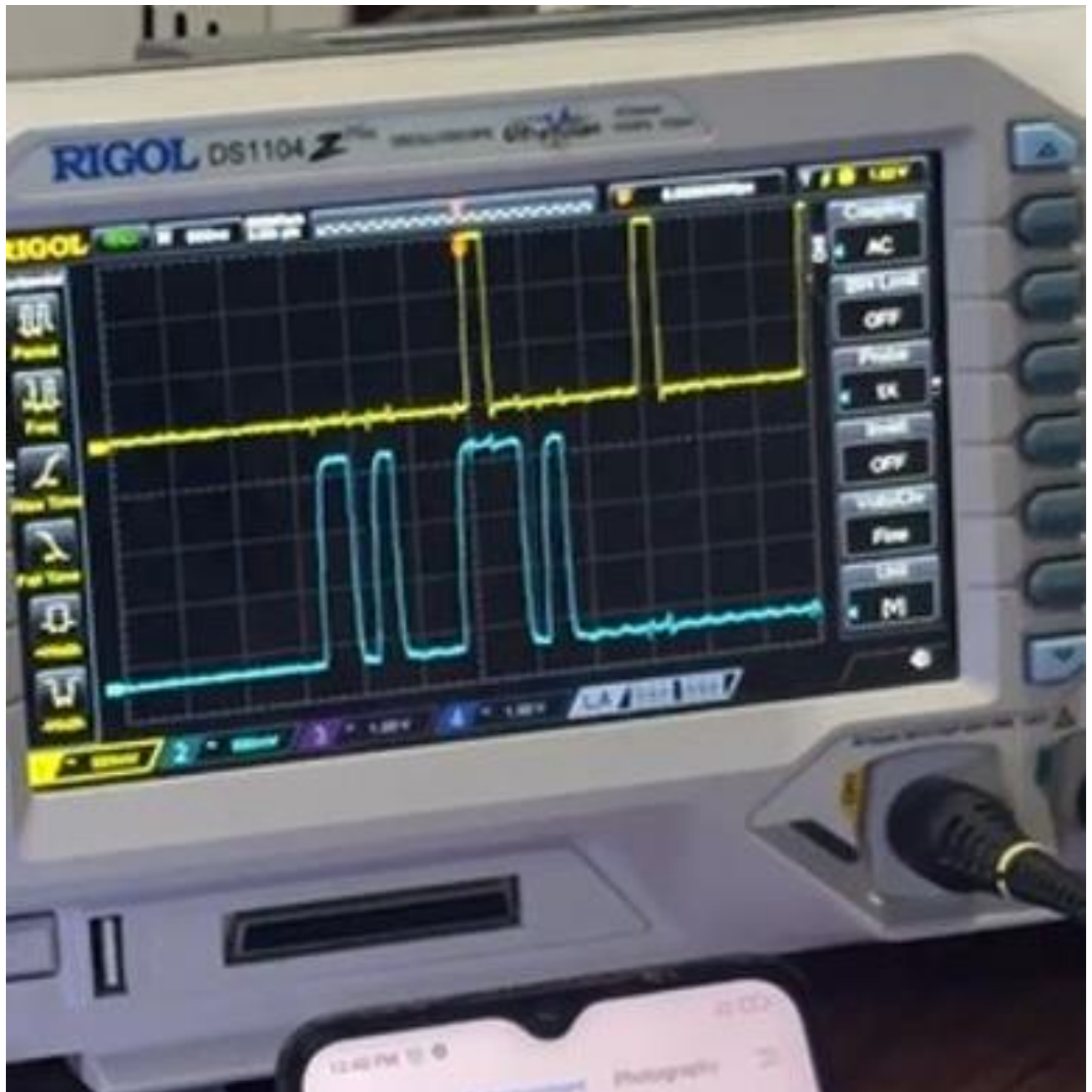
Display PWM – medium brightness

Display MIPI Clock P and Clock M

Smartphone Signals for Reference

Display MIPI data

TOUCH MOSI MISO SIGNALS

Smartphone Signals for Reference
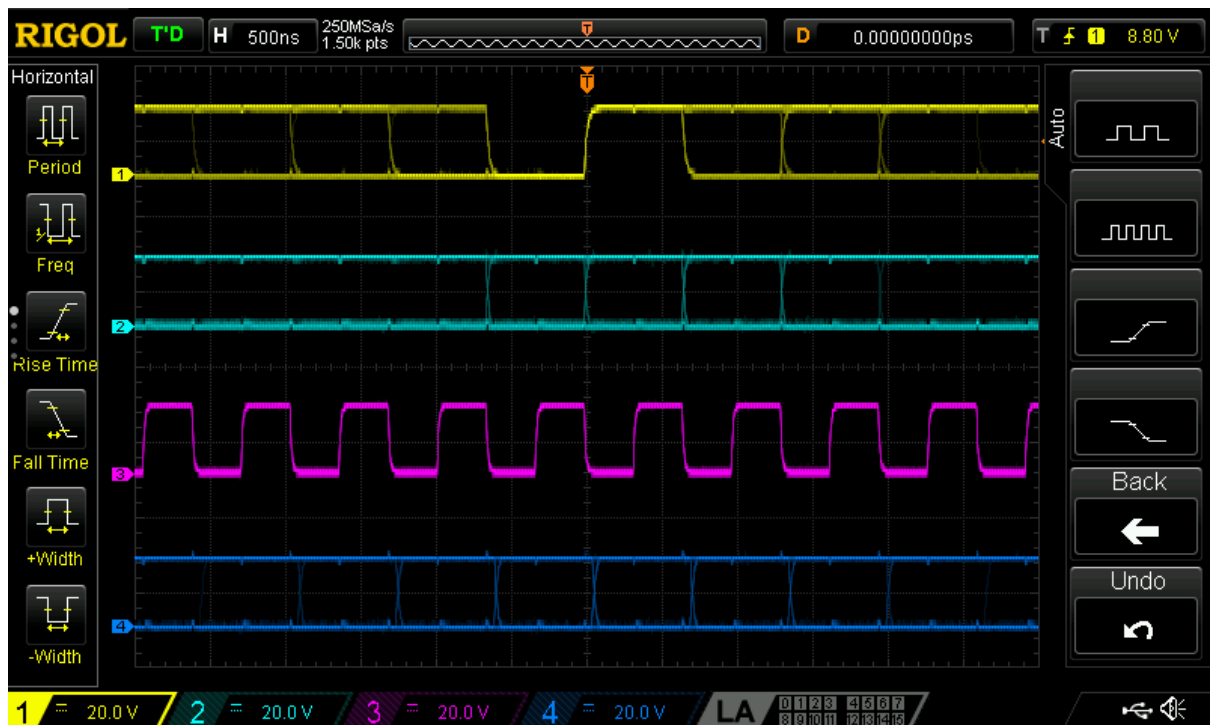
AUDIO AMPLIFIER I2S SIGNALS

I2s signal

Channel 1: data out

Channel 2: word select

Channel 3: clock

Channel 4: data in

SAMSUNG|SM-M307|Schematic

SAMSUNG|SM-M307|Layout

Smartphone Signals for Reference

Smartphone Signals for Reference
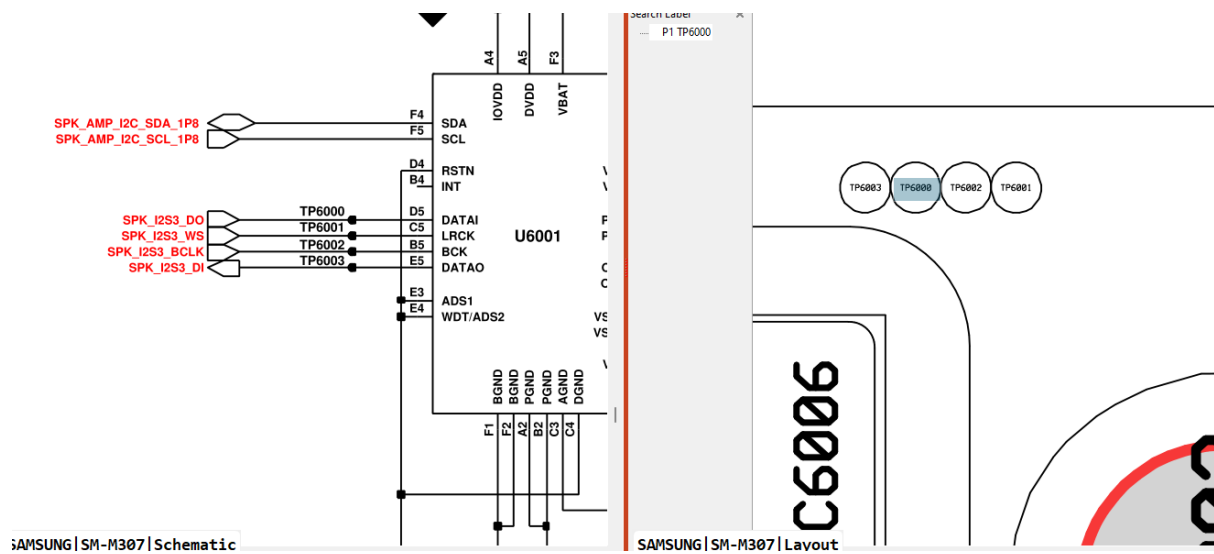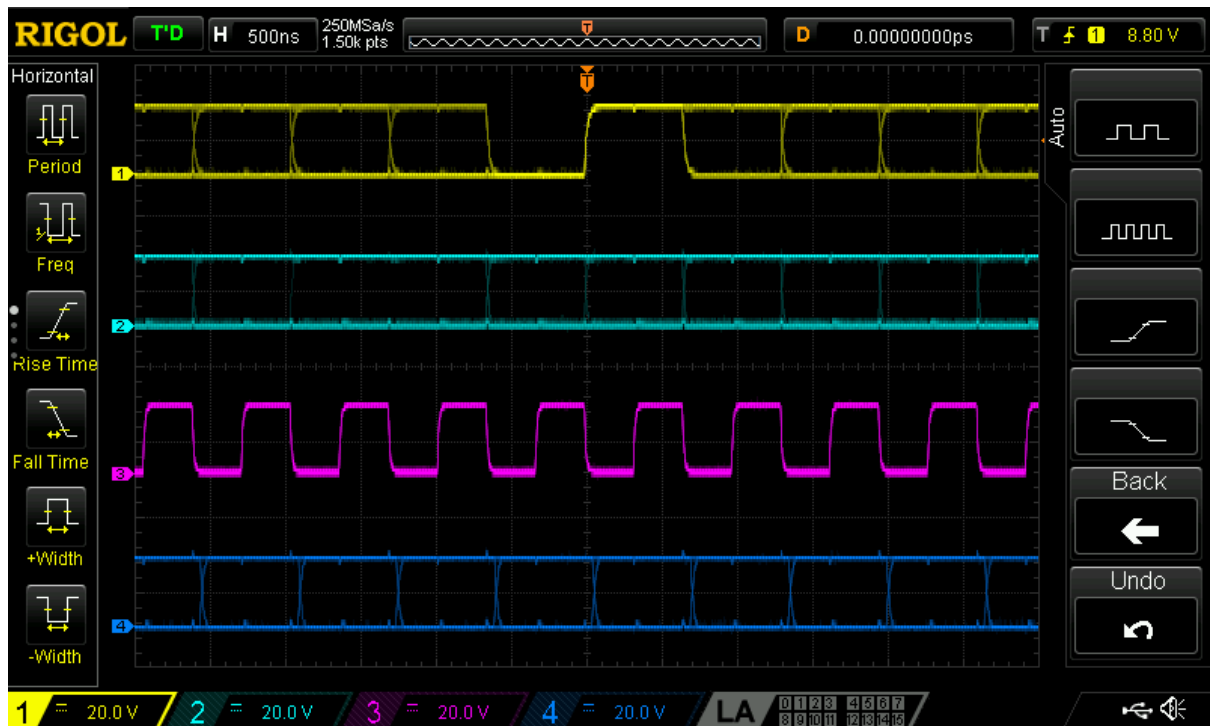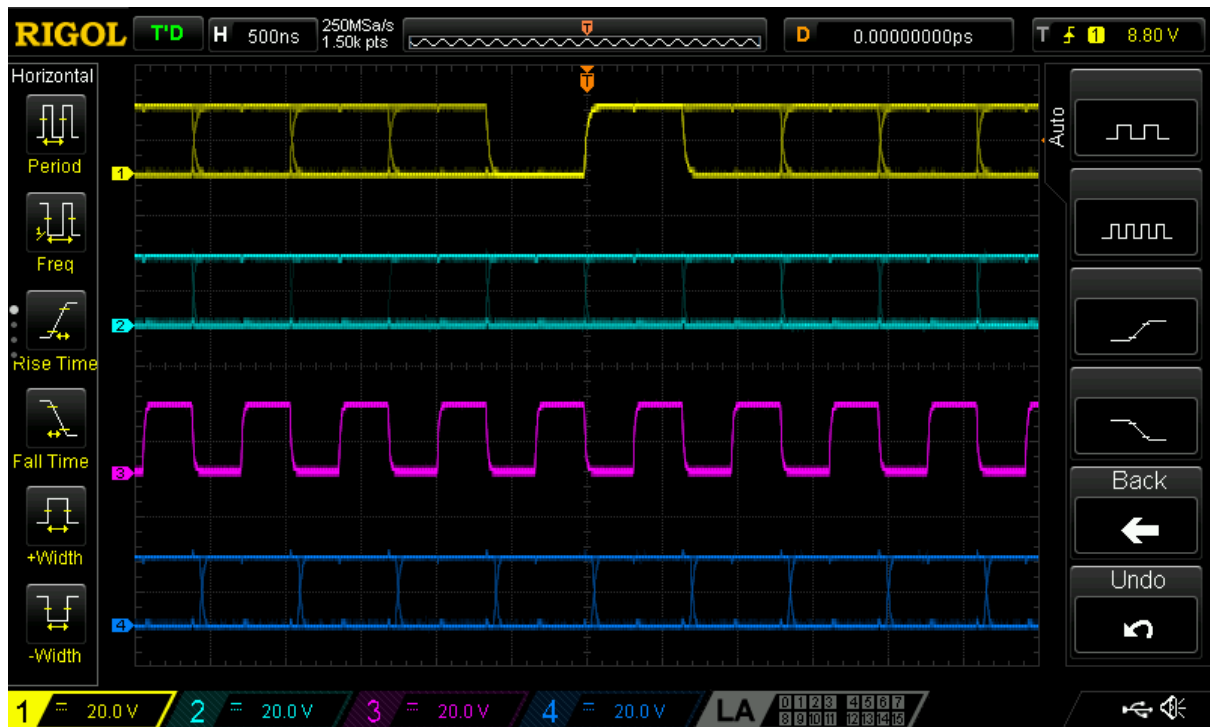
MIC OUTPUT SIGNAL

Take signal from mic positive output path

Here is the checking video:
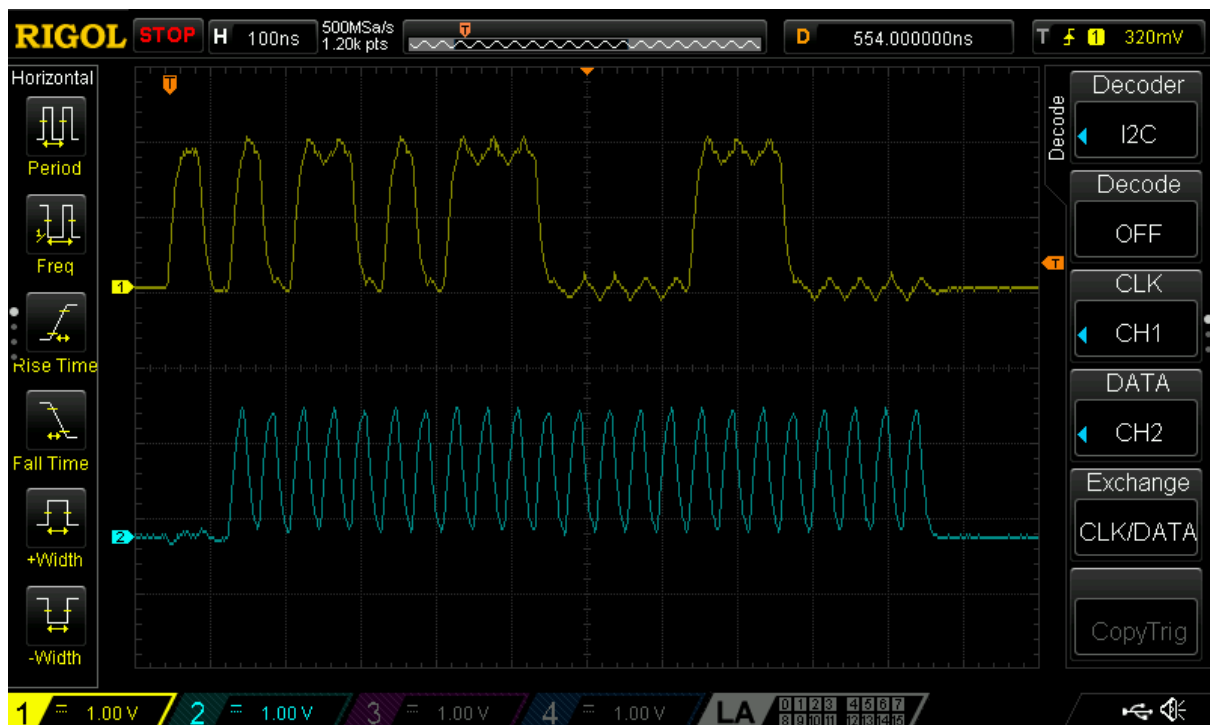
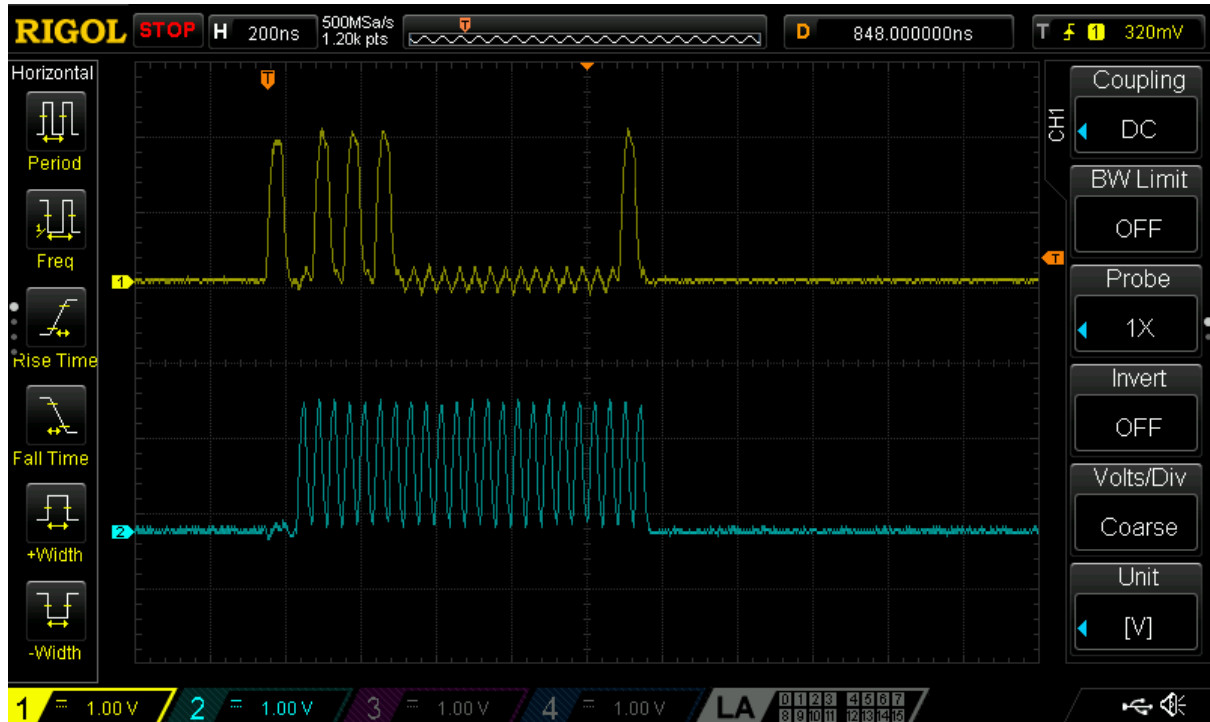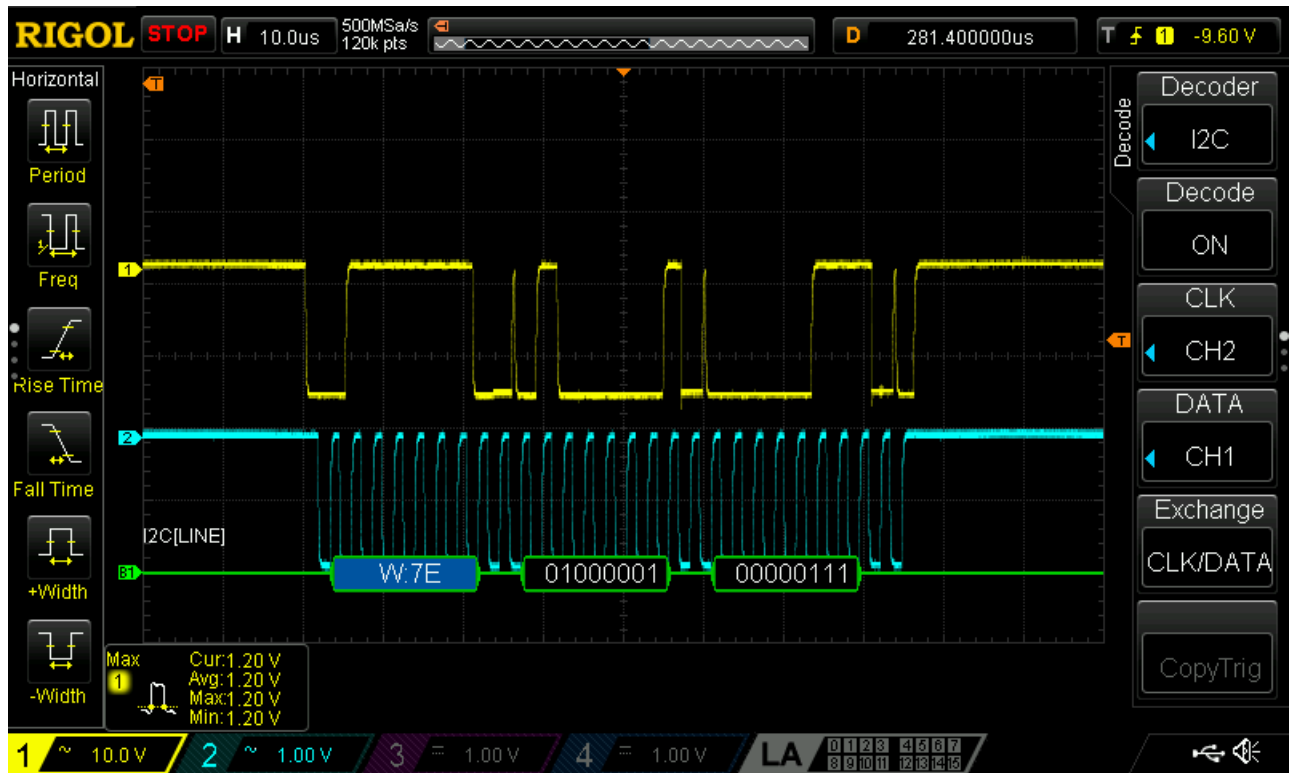https://youtube.com/shorts/m-BdaiqVpSU?si=7a9ltriFCB5ptlIt
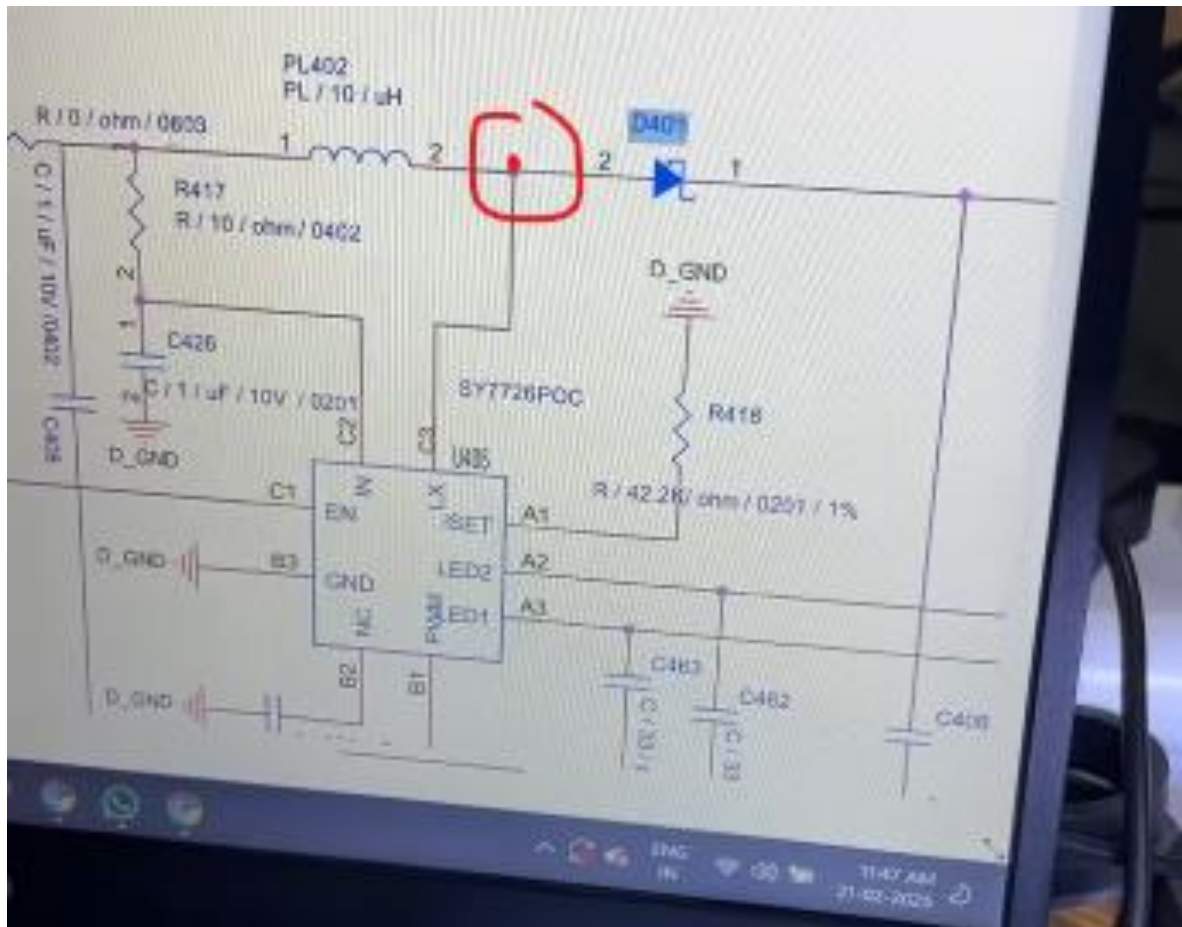

Smartphone Signals for Reference

RFFE CLK DAT

Channel number 1: data

Channel number 2: clock

Smartphone Signals for Reference

FRONT CAMERA I2C SIGNAL

Smartphone Signals for Reference
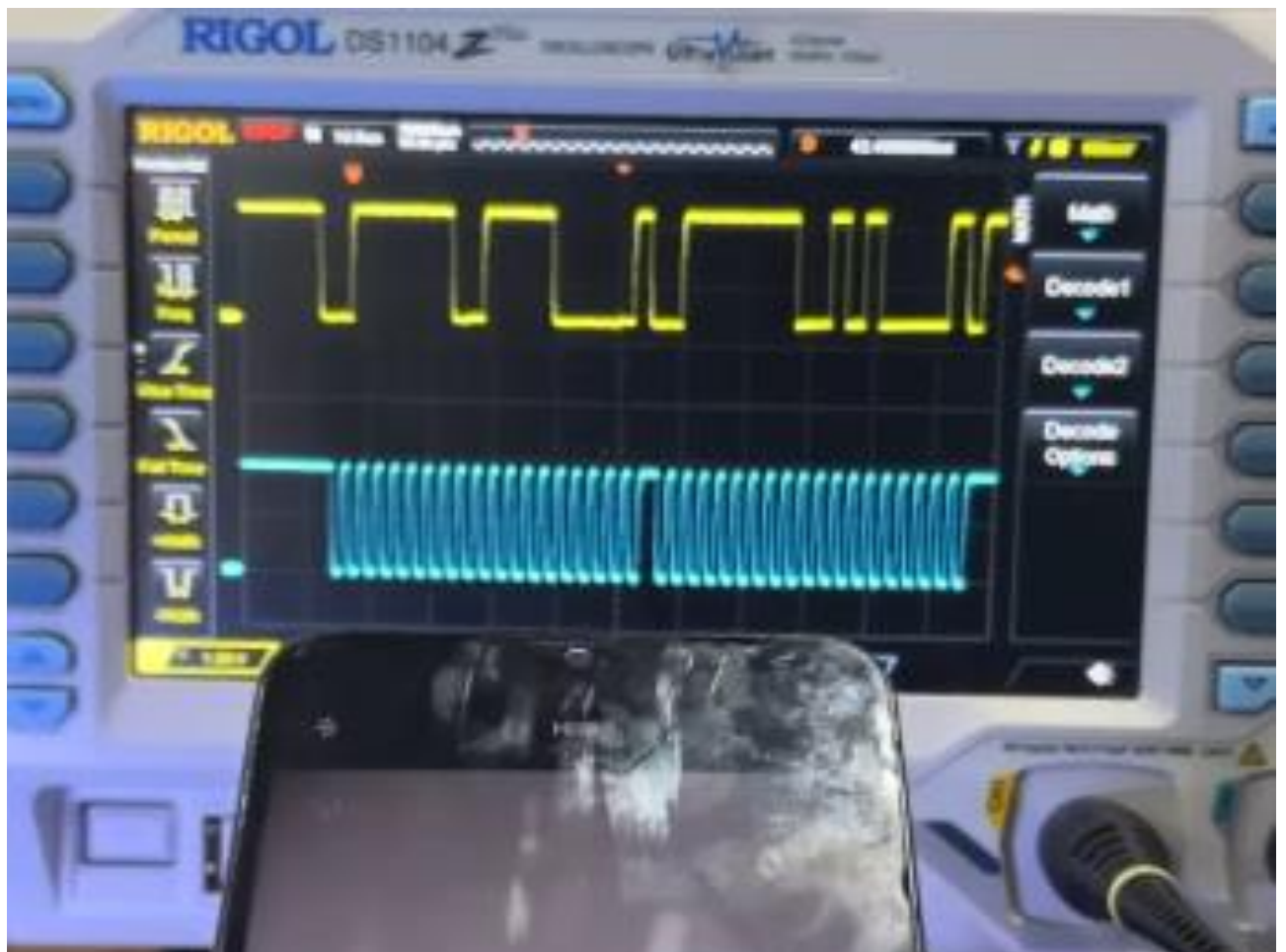
BACKLIGHT LX SIGNAL

Full brightness & Low brightness

Wi-Fi clock signal

Smartphone Signals for Reference