

Hardware Unit Test Report

Power consumption Test of Android TV version

Hardware version	FW version	Sample No.	eMMC Flash P/N
V125	BFX-UA300-userdebug 10 QT 19.524.21 19.524.24 19.531.13 19.531.17	S/N: TBD	DDR: 1. K4A8G165WC-BCTD 2. K4A4G165WF-BCTD eMMC: KLM8G1GETF-B041

1. Test Setup

Equipment:

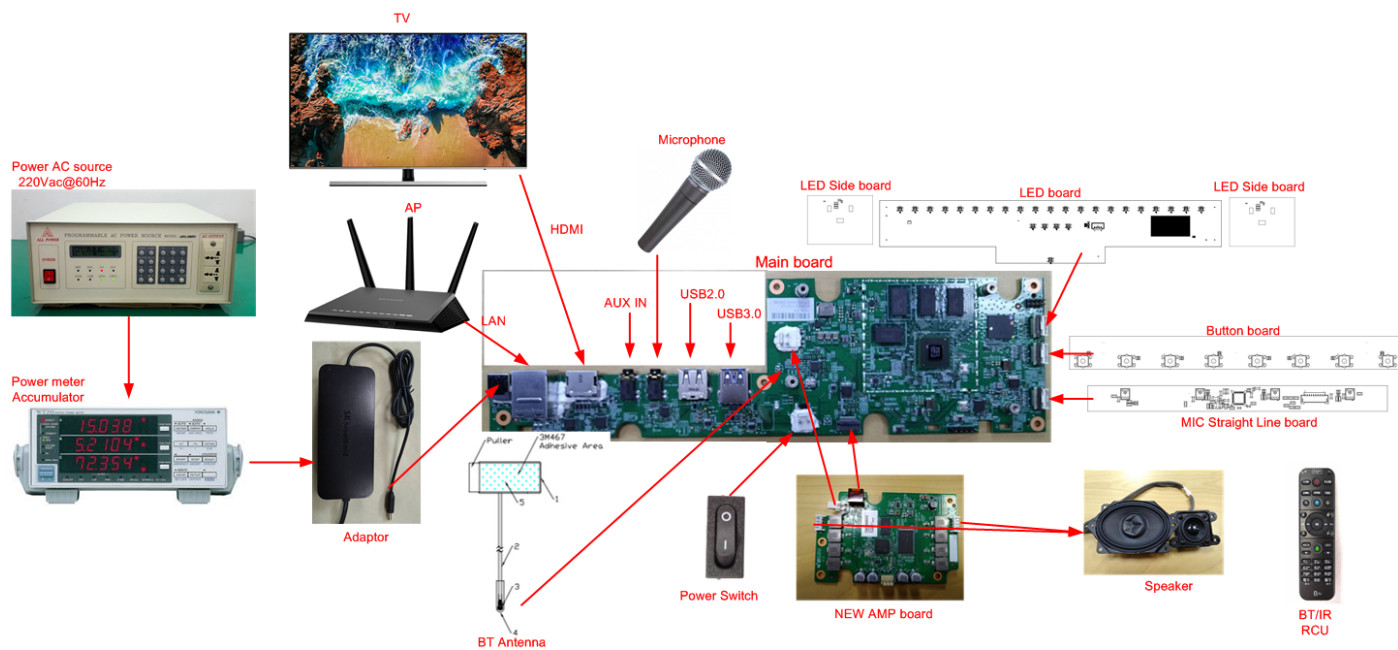
1. BFX-UA300 DVT board V125.
2. AC POWER: APG-1005N: 220Vac @60Hz
3. AC Adapter: LA-A271KS 24V/4A
4. 4K TV: ENVISION P2271WHL
5. Power meter with accumulator: Yokogawa WT210
6. Current probe: TCPA300
7. NETGEAR R7000 1Gbps

Test Environment:

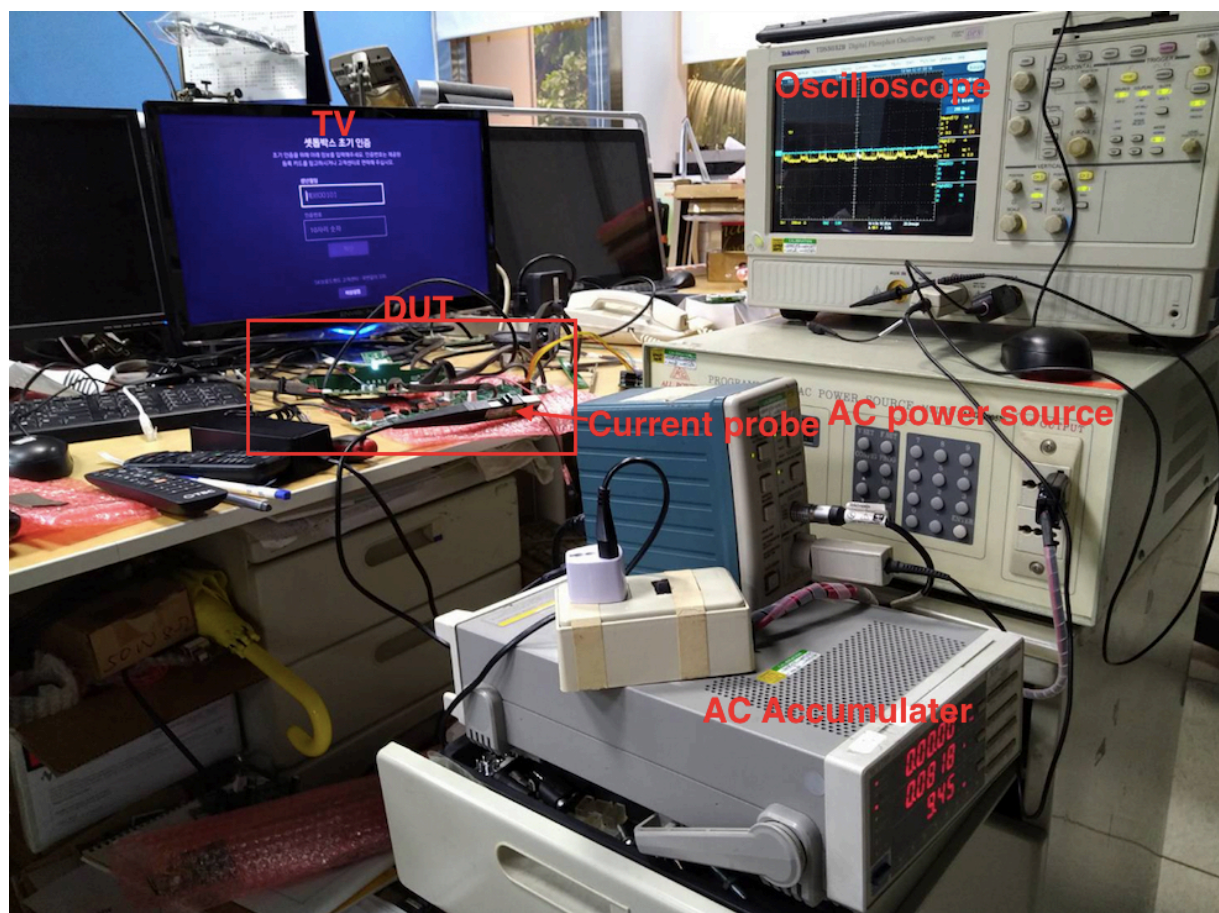
1. Test place: FXN CNSBG Building 1F office
2. Test DUT name: BFX-UA300 DVT V125 board
3. Test environment condition: temperature: 25 deg-C, humidity: 65
4. Test date: 2021/05/27
5. Test result: See section 3 for test results.
6. Test setup picture (block diagram and real test environment picture)

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Block Diagram:



Test setup picture:



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2. Test Items and Condition

- **Active standby mode**
- **Passive standby mode**
- **Operation mode**
- **Full load condition**

1. Active standby mode

1. DUT power on
2. Press RCU power on/off key to off the TV.

Due to the RCU key cannot control main board into active standby mode, so the command:

su

test_disp hdmipwr off

Turn on/off AMP IC command:

1.Standby Mode On(power stage of AMP IC has a current of 0mA):

su

i2cset -f -y 0 0x2a 0x5d 0x0 b

i2cset -f -y 0 0x2b 0x5d 0x0 b

i2cset -f -y 0 0x2c 0x5d 0x0 b

i2cset -f -y 0 0x2d 0x5d 0x0 b

2.Standby Mode Off:

su

i2cset -f -y 0 0x2a 0x5d 0x1 b

i2cset -f -y 0 0x2b 0x5d 0x1 b

i2cset -f -y 0 0x2c 0x5d 0x1 b

i2cset -f -y 0 0x2d 0x5d 0x1 b

Turn off Status LED command:

echo 0 > /sys/class/leds/lp5036\:led9_mod/brightness

3. Accumulating for 1 hour and record the power consumption result as Results 3.1~3.2.

2. Passive standby mode

1. DUT power on
2. Using command to make DUT to enter active standby mode.
3. Command:

Bluetooth off command:

su

service call bluetooth_manager 8

Bluetooth on command:

su

service call bluetooth_manager 6

LED off command:

su

echo 0 > /sys/class/leds/lp5036\:led9_mod/brightness

Passive standby mode command:

su

setprop persist.berlin.suspend.mode active_standby

echo mem > /sys/power/state

Turn on/off AMP IC command:

1.Standby Mode On(power stage of AMP IC has a current of 0mA):

su

i2cset -f -y 0 0x2a 0x5d 0x0 b

i2cset -f -y 0 0x2b 0x5d 0x0 b

i2cset -f -y 0 0x2c 0x5d 0x0 b

i2cset -f -y 0 0x2d 0x5d 0x0 b

2.Standby Mode Off:

su

i2cset -f -y 0 0x2a 0x5d 0x1 b

i2cset -f -y 0 0x2b 0x5d 0x1 b

i2cset -f -y 0 0x2c 0x5d 0x1 b

i2cset -f -y 0 0x2d 0x5d 0x1 b

Turn on/off HDMI Power IC command: simulate HDMI cable plugged-out

Below 2 command lines just to send once time.

echo 506 > /sys/class/gpio/export

echo out > /sys/class/gpio/gpio506/direction

Set gpio 0: GPIO26 low, HDMI Power IC disable:

echo 0 > /sys/class/gpio/gpio506/value

Set gpio 1: GPIO26 high, HDMI Power IC enable:

echo 1 > /sys/class/gpio/gpio506/value

4. Accumulating for 1 hour and record the power consumption result as Results 3.3~3.4.

3. Operation mode:

1. Play VOP video stream provided by ALT as major test condition.
2. Set output speaker volume at 70%(level 23).
3. Accumulating for 1 hour and record the power consumption result as Results 3.5.

4. Operation mode:

1. Play VOP video stream(BTV_00.ts) provided by ALT as major test condition.
2. Set output speaker volume at 100%(level 32).
3. Add E-loader to USB2.0 and USB3.0 for 500mA and 900mA.
4. Accumulating for 1 hour and record the power consumption result as Results 3.6.

3. Test Result

DVT build power consumption:

3.1 Active standby mode [Adaptor: LA-A271KS 24V/4A]

Test Results of power consumption: F/W version: 19.524.21 (LAN: 1000M bps)			
Item No.	AC port BFX-UA300 DVT Board V115	DC port BFX-UA300 DVT Board V115	Remark
Active standby mode*	220Vac/0.0689A@60Hz, 6.3004W	24.0Vdc/0.2055A, 4.932W	

Note:

*: Active standby mode includes power down function by command to simulate RCU power on/off key. The test is after 10 minutes when DUT enters active standby mode.

3.2 Active standby mode [Adaptor: LA-A271KS 24V/4A]

Test Results of power consumption: F/W version: 19.524.24 (LAN: 1000M bps)			
Item No.	AC port BFX-UA300 DVT Board V115	DC port BFX-UA300 DVT Board V115	Remark
Active standby mode*	220Vac/0.0678A@60Hz, 5.9108W	24.0Vdc/0.1856A, 4.454W	

Note:

*: Active standby mode includes power down function by command to simulate RCU power on/off key. Set GPIO26 to disable HDMI power IC for simulate plugged-out HDMI cable. The test is after 10 minutes when DUT enters active standby mode.

3.3 Passive standby mode [Adaptor: LA-A271KS 24V/4A]

Test Results of power consumption: F/W version: 19.524.21 (LAN: 1000M bps)			
Item No.	AC port BFX-UA300 DVT Board V115	DC port BFX-UA300 DVT Board V115	Remark
Passive standby mode*	220Vac/0.0493A@60Hz, 1.9731W	24.0Vdc/0.05477A, 1.3505W	**
Passive standby mode*	220Vac/0.0462A@60Hz, 1.4837W	24.0Vdc/0.03953A, 0.9487W	***
Passive standby mode*	220Vac/0.0477A@60Hz, 1.5074W	24.0Vdc/0.04054A, 0.9730W	****

Note:

*: Passive standby mode includes power down function of AMP board, MIC straight board and BT function. The test is after 10 minutes when DUT enters active standby mode.

: Before entering passive standby mode, **BT/LED/AMP IC need to set as shutdown or standby mode. The sequence is SHDN and PWM off through I2C. Reversely, if recover from passive standby mode, the sequence is press RCU power key, then 5V_EN will be high and initial AMP board through I2C.

The reference commands are list as Point 2.

***: Before entering passive standby mode, “**test_disp hdmipwr off**” was sent which is simulated RCU for entering active standby mode. This command function is set HDMI TMDS off on VS-550 SOC side.

****: Reserve Status LED “ON” for passive standby mode. If ALT will use status LED for indicating passive standby mode.

5V_EN on/off:

AMP_PWM_OFF pin is controlled on this image(19.524.21), we reworked pin1 of 5R73 flying cable to pin1 of R2.

Note1: The time test is from pressing button until to see the Home launcher of Google TV.

Boot-up time: TBD (press power button)

Wake-up time: TBD(press RCU power button)

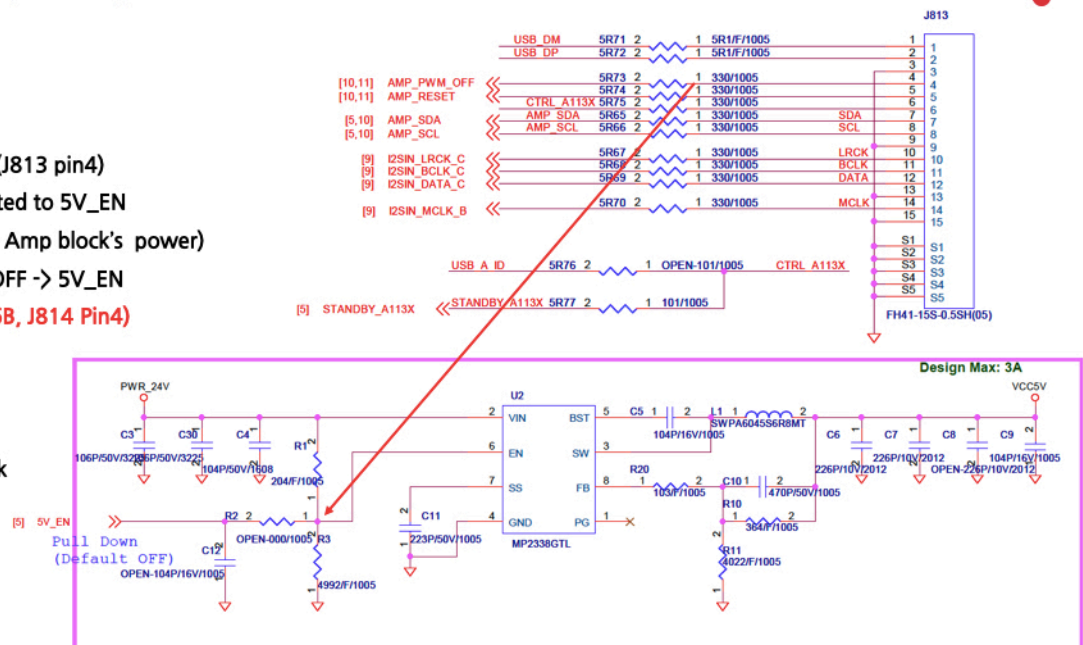
Note2: Rework a flying cable from pin1 of 5R73(GPIO: AMP_PWM_OFF) on connector(J813) to pin1 of R2 for GPIO: 5V_EN.

APPENDIX(Will apply Mass production)

- A113X OFF
- AMP IC OFF

- Using “AMP_PWM_OFF”(J813 pin4)
 - AMP_PWM_OFF connected to 5V_EN
(VS550 can control Audio Amp block's power)
 - J813 Pin4: AMP_PWM_OFF → 5V_EN
(SoC Board: PD_AD83586B, J814 Pin4)
 - Enable Audio Amp Block
 - > 5V_EN : High
 - > I2C Control(initialize)
 - Disable Audio Amp Block
 - > I2C Control(Off)
 - > 5V_EN : Low

ALT



Note3: 19.524.21 image issue:

This image can control AMP_PWM_OFF pin for 5V_EN, but for AMP IC still cannot initialize. SW team will build this issue to new image.

3.4 Passive standby mode [Adaptor: LA-A271KS 24V/4A]**Test Results of power consumption:****F/W version: 19.524.24 (LAN: 1000M bps)**

Item No.	AC port BFX-UA300 DVT Board V115	DC port BFX-UA300 DVT Board V115	Remark
Passive standby mode*	220Vac/0.0445A@60Hz, 1.1893W	24.0Vdc/0.03074A, 0.7378W	**
Passive standby mode*	220Vac/0.0445A@60Hz, 1.2500W	24.0Vdc/0.03242A, 0.7780W	***

*: Passive standby mode includes power down function of AMP board, MIC straight board and BT function. Status LED is keeping on in passive standby mode. The test is after 10 minutes when DUT enters active standby mode.

** : This image, “19.524.24”, has included “AMP_PWM_OFF” GPIO pin function. I2C commands of “Turn on/off AMP IC commands” are suggested by vendor that not need to send before entering and returning from passive standby mode. FXN SW team adds initial AMP sequence in image. But Active standby mode still needs to send these commands.

The entering passive standby command sequence is BT off, “test_disp hdmipwr off”(HDMI TMDS off), set GPIO26 Low, passive standby command. Please see the attached datasheet from retiming IC, see note4.

***: Not to send “test_disp hdmipwr off”, but send GPIO26 to set low for check the power consumption. When HDMI power IC is disable, HDMI retiming IC automatically enters standby, too.

Note4: Power consumption table of HDMI retiming IC.

**IT66318****Power Consumption**

Power	Parameter	Min.	Typ	Max	Unit
3Gbps ¹					
1.0V	1V current consumption		155		mA
3.3V _{AC}	3.3V current r consumption(AC coupled) ³		23		mA
3.3V _{DC}	3.3V current consumption(DC coupled) ⁴		73		mA
Total	Total power consumption(AC coupled) ³		230.9		mW
	Total power consumption(DC coupled) ⁴		395.9		
6Gbps ¹					
1.0V	1V current consumption		224		mA
3.3V _{AC}	3.3V current consumption(AC coupled) ³		26		mA
3.3V _{DC}	3.3V current consumption(DC coupled) ⁴		78		mA
Total	Total power consumption(AC coupled) ³		309.8		mW
	Total power consumption(DC coupled) ⁴		481.4		
Standby ²					
1.0V	1V current consumption		1.5		mA
3.3V	3.3V current consumption		2		mA
Total			8.5		mW

Note:

- Power is measured with TMDS signal and HDCP enabled on RX and TX outputs.
- Standby mode is entered automatically when no down-stream Sink is attached. (The power include internal MCU, LDO standby power)

3.5 Operation mode [Adaptor: LA-A271KS 24V/4A]

Test Results of power consumption: F/W version: 19.531.13 (LAN: 1000M bps)			
Item No.	AC port BFX-UA300 DVT Board V115	DC port BFX-UA300 DVT Board V115	Remark
Operation mode*	220Vac/0.0863A@60Hz, 10.685W	24.0Vdc/0.353A, 8.472W	

Note:

*: The output volume is 70% (level 23) power for speaker output.

Test Results of power consumption: F/W version: 19.531.17 (LAN: 1000M bps)			
Item No.	AC port BFX-UA300 DVT Board V115	DC port BFX-UA300 DVT Board V115	Remark
Operation mode*	220Vac/0.0868A@60Hz, 10.707W	24.0Vdc/0.355A, 8.52W	

*: The output volume is 70% (level 23) power for speaker output.

3.6 Full load condition [Adaptor: LA-A271KS 24V/4A]

Test Results of power consumption: F/W version: 19.531.13 (LAN: 1000M bps)			
Item No.	AC port BFX-UA300 DVT Board V115	DC port BFX-UA300 DVT Board V115	Remark
Full load condition*	220Vac/0.1189A@60Hz, 18.155W	24.0Vdc/0.6464A, 15.5064W	

Note:

*: The output volume is 100%(Level 32) power for speaker output. And add E-loader to USB2.0 and USB3.0 for 500mA and 900mA.

Test Results of power consumption: F/W version: 19.531.17 (LAN: 1000M bps)			
Item No.	AC port BFX-UA300 DVT Board V115	DC port BFX-UA300 DVT Board V115	Remark
Full load condition*	220Vac/0.1316A@60Hz, 20.703W	24.0Vdc/0.755A, 18.1200W	

Note:

*: The output volume is 100%(Level 32) power for speaker output. And add E-loader to USB2.0 and USB3.0 for 500mA and 900mA.