Report No: 22UP010008

UP-EDGE-APL03

System Level Product
P5
Compatibility Test Report

Summary	☒ Pass ☐ Fail ☐ Pass with Deviation (Comment: _____)

Test Results Category				
	Critical	**Major**	**Minor**	**Enhancement**
Defect Found	0	0	0	0
Defect Unsolved	0	0	0	0

Issue date	QE Supervisor	Test Engineer
2022-09-08	Louie Lee	Aslen Hsieh

Specification Validation

Main Specification

Item	Specification	Result			Note
		Pass	Fail	N/A	
PCBA size	56 mm × 85 mm	☒	☐	☐	
CPU	Intel ® Celeron™ N3350 Intel ® Pentium™ N4200 Intel ® Atom E3950	☒	☐	☐	
CPU.TDP	6W-12W	☒	☐	☐	
Memory	LPDDR4 up to 2400 MT/s , 2GB / 4GB / 8GB	☒	☐	☐	
STORAGE	1x eMMC ver 5.0 (16GB/32GB/64GB)	☒	☐	☐	
Graphics	HDMI 1.4b (3840x2160@30Hz) via HDMI & USB3 Combo Connector	☒	☐	☐	
	DP 1.2 (4096x2160p60Hz) via USB TYPE C Connector	☒	☐	☐	
USB	2 xUSB3.2 Gen1 (type A)	☒	☐	☐	
	1 xHDMI & USB3.2 Gen1 Combo Connector	☒	☐	☐	
	1x USB3.2 OTG via USB type C connector	☒	☐	☐	
Ethernet	1x Realtek 8111H	☒	☐	☐	
Audio	1x wafer for HDMI Audio x 1, HDA ALC888 for LINE Out/Mic In	☒	☐	☐	
Internal I/O	1x 2 pin wafer for Fan (12V)	☒	☐	☐	
	1x 2 pin wafer for RTC Battery	☒	☐	☐	
	1x 4 pin wafer for Power Button & Reset Button	☒	☐	☐	
	1x 6 pin wafer for Audio (Line out + MIC)	☒	☐	☐	
	1x 10 pin wafer (2 USB2.0 + 1 HSUART)	☒	☐	☐	
	1 x HAT 40 pin header (Pitch 2.54mm)	☒	☐	☐	
	1x 41 pin FPC connector for carrier board (M.2 2230/2242/2280/3052/3042)	☒	☐	☐	
	1x 6 pin header (Pitch 1.27mm) (SPI update)	☒	☐	☐	
LED	4 LEDs YRGB (next to LAN CONNECTOR)	☒	☐	☐	
Expansion Slot	1 x USB TYPE C Connector for DP&USB 3.2 Gen1 & OTG	☒	☐	☐	
	2 xUSB3.2 Gen1 (Dual-STACKED type A)	☒	☐	☐	
	1 x HDMI & USB3.2 Gen1 Combo Connector	☒	☐	☐	
	1x 6 pin header (Pitch 1.27mm) (SPI update)	☒	☐	☐	
	1 x HAT 40 pin header (Pitch 2.54mm) 28xGPIO, 1xSPI, 2x I2C, 1x ADC, 1x I2S, 2x PWM, 1x UART, 3V3, 5V, GND	☒	☐	☐	

Security	TPM2.0 (SLB9670)	☒	☐	☐	
RTC battery	YES	☒	☐	☐	
Power-on	power-on (AT & ATX)	☒	☐	☐	
Power	12V, 1x DC connector co-lay with pheonix connector	☒	☐	☐	
OS Support	Windows* 10 IOT Enterprise(64-bit) LTSC RS5	☒	☐	☐	
	Yocto project 3.1 Kernel 5.4	☒	☐	☐	
	Ubuntu 18.04.05 Kernel 5.4	☒	☐	☐	

Platform Information

Item	Device Information	
Product of department	UP	
PCB Model / Version	UP-APL03 Rev A0.5_0_0	
BIOS / Version	UP-APL03 R1.1 (UPAPBM11)(07/01/2022)	
Driver folder	Driver(SDK) Package - DP00000255, UP-APL03 Driver Package, A.3	
CPU Type	Intel ® Pentium ® CPU N4200 @ 1.10GHz	
Memory Type	Onboard memory LPDDR4 8GB	
Storage	Onboard eMMC 64GB (SanDisk DA4064)	
LCD Monitor	BenQ EL2870U	
Operating System	☒	English Ubuntu 18.04.6 kernel 5.4.0-1-generic #0
	☒	English Yocto_3.1 kernel Linux up-4000 5.4.87-intel-pk-standard #1
	☒	Windows IOT Core
	☒	Windows 10 Enterprise English Version 64Bit (V1903)
Power Supply	PS1065-120IB500 12V 5A	

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1. Hardware Compatibility

1.1. CPU Compatibility Test

CPU Information (Information and frequency should show correct value)	Result			Note
	Pass	Fail	N/A	
Intel ® Atom ™ Processor E3950 @ 1.60GHz	☒	☐	☐	
Intel ® Pentium ® CPU N4200 @ 1.10GHz	☒	☐	☐	
Intel ® Celeron ® CPU N3350 @ 1.10GHz	☒	☐	☐	

1.2. Memory Compatibility Test

Memory Information a. Information and frequency should show correct value b. System should boot up and into O.S normally	AAEON P/N	Result			Note
		Pass	Fail	N/A	
Onboard memory LPDDR4 2GB		☒	☐	☐	
Onboard memory LPDDR4 4GB		☒	☐	☐	
Onboard memory LPDDR4 8GB		☒	☐	☐	

1.3. Monitor Compatibility Test

Monitor Information a. Monitor should display under DOS and O.S environment b. Monitor should not appear ghost or ripples	Result			Note
	Pass	Fail	N/A	
HDMI (Test with 5M HDMI cable/ Bravo-u)				
BenQ BL2710	☒	☐	☐	
SAMSUNG SyncMaster BX2450	☒	☐	☐	
SAMSUNG U28D590D	☒	☐	☐	

2. Basic Function Test

2.1. Video Function Test

2.1.1. Single Output Function Test

Configuration	
CPU	Intel ® Atom ™ Processor E3950 @ 1.60GHz
Memory	Onboard memory LPDDR4 4GB
Storage	Onboard eMMC 64GB
HDMI	SAMSUNG U28D590D
Type C to DP	SAMSUNG U28D590D
Operating system	Windows 10 Enterprise English Version 64Bit (V1903)
Color Quality	☒16bit ☐24bit ☒32bit
Criteria	No ghost, ripples

Resolution	HDMI			Type C to DP			Note
	Pass	Fail	N/A	Pass	Fail	N/A	
800X600	☒	☐	☐	☒	☐	☐	
1024X768	☒	☐	☐	☒	☐	☐	
1280X768	☒	☐	☐	☒	☐	☐	
1280X1024	☒	☐	☐	☒	☐	☐	
1366X768	☒	☐	☐	☒	☐	☐	
1600X1200	☒	☐	☐	☒	☐	☐	
1920X1080	☒	☐	☐	☒	☐	☐	
1920X1200	☒	☐	☐	☒	☐	☐	
2048X1152	☒	☐	☐	☒	☐	☐	
2560X1440	☒	☐	☐	☒	☐	☐	
3840X2160	☒	☐	☐	☒	☐	☐	
EDID check	☒	☐	☐	☒	☐	☐	
Hot plug	☒	☐	☐	☒	☐	☐	
Rotation(0/90/180/270)	☒	☐	☐	☒	☐	☐	
Boot Display	☒	☐	☐	☒	☐	☐	

Note: Pay attention to Full Screen under POST screen and Text Mode

2.1.2. Multi-Display Output Test

Selection	Output	Result			Note
		Pass	Fail	N/A	
Dual Display Clone	HDMI + Type C to DP	☒	☐	☐	
Extended Desktop		☒	☐	☐	

2.1.3. Boot up Without Display Test

Process step:

1. Power on without inserting any HDMI/Type C to DP connector until system reaches Windows desktop
2. Plug HDMI/Type C to DP connector into test machine while system reaches Windows then check Graphics driver and display
3. Check HDMI/Type C to DP output Brightness is normal and it shows “Ghost Image” / ”Flicker” or not
4. Repeat step 1~3 for HDMI/Type C to DP testing

Test item		Result			Note
		Pass	Fail	N/A	
Display should working normal in Windows Desktop	HDMI	☒	☐	☐	
	Type C to DP	☒	☐	☐	

2.2. Audio Function Test

Function Test	Result			Note
	Pass	Fail	N/A	
L (Left) Channel	☒	☐	☐	
R (Right) Channel	☒	☐	☐	
Microphone	☒	☐	☐	
HDMI Audio	☒	☐	☐	
Type C to DP Audio	☒	☐	☐	

2.3. LAN Function Test

Configuration						
1000Mbps switch		D-Link DGS-1008D				
100Mbps LAN switch		Accton Desktop-3005				
10Mbps LAN HUB		SVEC FD916H				
OnBoard LAN1	Realtek PCIe GBE Family Controller				MAC Address	00-07-32-61-5A-5A
LAN Speed	Link / Speed LED	Active LED	LAN 1			Note
			Pass	Fail	N/A	
1G			☒	☐	☐	
100M			☒	☐	☐	
10M			☒	☐	☐	
Gigabit LAN Ping test <ping xxx.xxx.xx.xx –l 65500 –n 1000> (Ping loss≦1)			☒	☐	☐	
Wake On LAN (WOL should work properly when resume from S3/S4/S5)	S3		☒	☐	☐	
	S4		☒	☐	☐	
	S5		☒	☐	☐	
LAN model name correctness			☒	☐	☐	
LAN Boot (PXE) (Boot from LAN should work properly)			☒	☐	☐	UEFI
Internet Browser (DHCP Server) (Visit the website should work properly)			☒	☐	☐	
Access 1GB file from ftp (Access file should not stop or error)			☒	☐	☐	
Iperf (Windows) $iperf3 –c xx.xx.xx.xx –w 1M –i 1 – t 60 (Gigabit LAN bandwidth should > 900Mbps)			☒	☐	☐	

2.4. Expansion HAT (40pin)

Test item	Result			Note
	Pass	Fail	N/A	
28xGPIO	☒	☐	☐	Use BIOS to test high / low control for 28 ports GPIO

2.5. UART Test

Test item	Result			Note
	Pass	Fail	N/A	
UART Test	☒	☐	☐	

2.6. FAN / GPIO Control

Test item	Result			Note
	Pass	Fail	N/A	
FAN enable / disable control (Intel GPIO tool \ GPIO36 PWM2 \ Level 1 \ Tx enable \ Rx disable \ update)	☒	☐	☐	GPIORxDis→Disable / GPIOTxDis→Enable➔FAN On GPIORxDis→Enable / GPIOTxDis→ Disable➔FAN Off

2.7. USB Port Integration Test

Item	USB Port	USB 2.0 ports (under OS)			USB 3.2 GEN1 ports (under OS)			Note
		Pass	Fail	N/A	Pass	Fail	N/A	
USB3.1 HDD:	Transcend USB3.1 GEN1 (TS-CM80S)	☒	☐	☐	☒	☐	☐	
	CyberSLIM USB3.1 GEN2	☒	☐	☐	☒	☐	☐	
USB2.0 Flash:	ADATA PD4 512MB	☒	☐	☐	☒	☐	☐	
USB3.1 Flash:	SanDisk 64GB	☒	☐	☐	☒	☐	☐	
	Transcend USB3.1 64GB	☒	☐	☐	☒	☐	☐	
	Transcend 32GB	☒	☐	☐	☒	☐	☐	
USB DVD ROM:	LITE-ON eNAU808	☒	☐	☐	☒	☐	☐	
USB Keyboard:	KINYO KB-14U	☒	☐	☐	☒	☐	☐	
USB Mouse:	Microsoft 1113	☒	☐	☐	☒	☐	☐	
USB3.1 HUB:	Transcend TS-HUB2K	☒	☐	☐	☒	☐	☐	

Test item	Result			Note
	Pass	Fail	N/A	
Check USB Flash disk already exist when system S3 resume	☒	☐	☐	

2.8. TPM Function Test

Test item			Result			Note
			Pass	Fail	N/A	
TPM driver and version check in device manager			☒	☐	☐	TPM 2.0
TPM Administration under O.S	TPM Information check		☒	☐	☐	
	Clear TPM		☒	☐	☐	
BitLocker Test	Encryption test	Click BitLocker system check	☒	☐	☐	
		Encryption	☒	☐	☐	
	Recovery key test		☒	☐	☐	
	Decryption test<turn off BitLocker>		☒	☐	☐	

2.9. Jumper and Connector Function Test

Test item			Result			Note
			Pass	Fail	N/A	
Clear CMOS will clear CMOS date , time , setting , password			☒	☐	☐	
Power button	One touch for power on	Repeat 3 times	☒	☐	☐	

	One touch for power off in BIOS manual		☒	☐	☐	
	One touch for system shutdown in Windows environment (power manager need to set press PWB for shutdown)		☒	☐	☐	
	＞4sec for H/W shutdown in Windows environment (power manager need to set press PWB do nothing)		☒	☐	☐	
Reset button, system reset under Windows environment			☒	☐	☐	
Power LED behavior		S1(boot up): Power LED on	☒	☐	☐	
		S3: Power LED off	☒	☐	☐	
		S4: Power LED off	☒	☐	☐	
		S5: Power LED off	☒	☐	☐	

3. Expansion card and Application Test

3.1. PCI Express Bear Card Test

Test point: Make sure PCIe power, wake# and MLW are correct

Test item		Result			Note
		Pass	Fail	N/A	
M.2 (B key) bear card	Power LED	☒	☐	☐	
	Wake #	☒	☐	☐	
	Check USB Interface	☒	☐	☐	

3.2. Expansion Slot Compatibility Test

Test point: Make sure expansion slots are compatible with expansion cards

M.2 PCI-e Card			Result			Note
			Pass	Fail	N/A	
M.2 2230 E Key	Enli , QCNFA364A Wireless LAN Kit M.2 2230 802.11ac/a/b/g/n + BT4.0 , 2T2R , with 2 sets of cable & antenna		☒	☐	☐	
	SparkLan , WNFQ-258ACN(BT) Wireless LAN Kit M.2 2230 802.11ac/a/b/g/n + BT4.0 , 2T2R , with 2 sets of cable & antenna		☒	☐	☐	
	Intel AX210NGW Wireless 6E (Wi-Fi + BT) 802.11ax		☒	☐	☐	
M.2 2280 NVME M key	WD_BLACK SN850 / PCIe 4.0 GEN4 SSD 500G		☒	☐	☐	
	Transcend TSxxxGMTE652T2 GEN3x4	128GB	☒	☐	☐	M.2-S69
		256GB	☒	☐	☐	M.2-S70
		512GB	☒	☐	☐	M.2-S71
	Transcend TSxxxGMTE662T2 GEN3x4	512GB	☒	☐	☐	M.2-S72
		1TB	☒	☐	☐	M.2-S73
		2TB	☒	☐	☐	M.2-S74
	Innodisk M.2 P80 3TE6	128GB	☒	☐	☐	
		256GB	☒	☐	☐	
		512GB	☒	☐	☐	
		1TB	☒	☐	☐	
		2TB	☒	☐	☐	
	Phison M.2 2280 NVME SSD, 512GB GEN3x4 ESMP512GKB5C2-E12S (Bics5)	512GB	☒	☐	☐	
M.2 3052 B key	USB3.0 interface	QUECTEL RM500Q-GL M.2 3052 B-Key 5G Card	☒	☐	☐	1.Ping 168.95.1.1 for 1000 clcyes, loss < 2 times 2.Download 1GB file from website 3.speed test > 300Mbps
M.2 2280 B key	PCIe interface	Innodisk 3ME2 P42 DEM24-A28M61BCAQC-26 128GB	☒	☐	☐	
	PCIe interface	WD SN500 NVME SSD B+M 250GB	☒	☐	☐	Read：456MB/s Write：353MB/s

Expansion card：

(1) UPCR-M2CB Rev A0.1_0_0→PCIE x1 SSD M.2 Gen2
(2) UPCR-M2CB Rev A0.1_0_0→3052 (USB) / Wi-Fi only (M.2 2230)
(3) UPCR-M2CB Rev A0.1_0_0→M.2 2230 Wi-Fi+BT

4. Power Consumption Test

Configuration	
CPU	Intel ® Atom ™ Processor E3950 @ 1.60GHz
Memory	Onboard memory LPDDR4 4GB
Storage	Onboard eMMC 64GB
O.S	Windows 10 Enterprise English Version 64Bit (V1903)

4.1. Power Consumption

Test Environment							
DC source		GWINSTEK PSW 80-27					
Test Item		**Voltage**	**Current**		**P**		**Note**
Full Loading Mode: Measure the current value when system running Burnintest (CPU, RAM, Network, Disk, Sound, Video, GPU, 2D, 3D)	Peak	(+12V)	2.22	A	26.64	W	USB2.0 dummy load x 1 USB3.0 dummy load x 2 LAN x 1
	Steady-state		2.07		24.84		
CPU heavy loading (Steady-state) Measure the current value when system running Prime95		(+12V)	1.05	A	12.6	W	
Win. Idle mode: Measure the current value when system in windows mode and without running any program		(+12V)	0.22	A	2.64	W	CPU utilization must ≤ 3% while idle mode
S3 mode: Measure the current value when system in S3 mode of windows and without running any		(+12V)	0.04	A	0.48	W	
S5 mode: Measure the current value when system in S5 mode of windows and without running any		(+12V)	0.04	A	0.48	W	

4.2. PC Health Status

Test Point:

CPU DTS Temp deviation: ±15℃

H/W monitor	Result			BIOS		Actual		Note
	Pass	Fail	N/A					
CPU Temperature Actual and monitor must be ±15℃	☒	☐	☐	40	℃	43	℃	

4.3. DC-in power test

4.3.1. DC power Jack fast plug Test

Test Point:

Confirm System boot normal after DC power fast plug test

Test Item	Result			Note
	Pass	Fail	N/A	
DC power jack fast plug test with 10 times	☒	☐	☐	

4.4. CMOS Battery Test

Test Point: Calculated result should be > 5 years
Battery: CR2032
Capacity 225mAh

Check item	Measured Voltage		Measured Current		Calculate Result		Result			Note
							Pass	Fail	N/A	
Battery leakage 1. Voltage should be > 3V 2. Calculated result should be > 5 years	3.11	V	2.9	uA	8.8	years	☒	☐	☐	

Calculate result=225mAh/measured current/365days/24hours

5. Time Accuracy Test

5.1. System Clock & RTC Clock Test

Under Room Temperature: 26℃

Function \ Item	Time Interval	Criteria	Actual		Result			Note
					Pass	Fail	N/A	
RTC Clock in Power On Mode	24 hrs	+/-2 sec	+1	Sec	☒	☐	☐	
RTC Clock in Power Off Mode	24 hrs	+/-2 sec	+1	Sec	☒	☐	☐	

5.2. Booting Time Test

Installation	Criteria	Actual		Note
System Booting Time <Press the Power Button till display appears>	Booting time ≦12sec, Pass Booting time 13~20 sec, Enhancement Booting time > 20sec, Fail	8.22	Sec	

6. O.S. Compatibility Test

6.1. English Ubuntu 18.04.6 kernel 5.4.0-1-generic #0

6.1.1. Update Linux Kernel

Install O.S to eMMC

Installation	Result		
	Pass	Fail	N/A
English Ubuntu 18.04.6 kernel 5.4.0-1-generic #0	☒	☐	☐

Test Results

Function Test		Result		
		Pass	Fail	N/A
Image boot eMMC Test		☒	☐	☐
Check Update kernel Version	5.4.0	☒	☐	☐
Full HDMI	Displays 3840 x 2160	☒	☐	☐
Full Type C to DP		☒	☐	☐
Audio HDMI	Play sound test Change sound card output controls	☒	☐	☐
Audio Type C to DP		☒	☐	☐
Audio HDA	Detect audio codec / ALC888-VD Analog $ aplay -l	☒	☐	☐
	Play sound test <Play video from Youtube>	☒	☐	☐
	Change sound card output controls	☒	☐	☐
	Record on capture channel	☒	☐	☐
eMMC flash (32GB)	Detect eMMC	☒	☐	☐
	O.S install and boot from eMMC	☒	☐	☐
1 x GbE Realtek RTL8111H	Detect link state change (eth_interface: enp2s0)	☒	☐	☐
	DHCP over Ethernet (eth_interface: enp2s0)	☒	☐	☐
	ICMP (ping) over Ethernet (eth_interface: enp2s0)	☒	☐	☐
USB 3.0 OTG port	USB 3.0 OTG cable	☒	☐	☐
3 x USB 3.0 host ports	CN4 TOP	☒	☐	☐
	CN4 DOWN	☒	☐	☐
	CN5 Port	☒	☐	☐
	CN4 TOP - 3.0 USB bootable	☒	☐	☐
	CN4 DOWN - 3.0 USB bootable	☒	☐	☐
	CN5 - 3.0 USB bootable	☒	☐	☐
2 x USB 2.0 host ports	TOP - 10 pin header cable	☒	☐	☐
	DOWN - 10 pin header cable	☒	☐	☐
M10 UART + 40 pin HAT UART	10 pin header cable	☒	☐	☐
Power Button	Button shuts down system	☒	☐	☐
	Startup system from shutdown	☒	☐	☐
	Startup system from sleep (S3)	☒	☐	☐
CPLD LEDS	Toggle Red Led	☒	☐	☐
	Toggle Yellow Led	☒	☐	☐
	Toggle Green Led	☒	☐	☐

	Toggle Blue Led	☒	☐	☐
RTC	Read RTC date / time	☒	☐	☐
	RTC time advances when powered up	☒	☐	☐
	RTC time advances when powered down	☒	☐	☐
	Set RTC date-time	☒	☐	☐
	Wake-up from sleep (S3) on RTC alarm	☒	☐	☐
	Cancel wake alarm	☒	☐	☐
SOC Thermal/Fan control	Read Core temperature and thermal monitoring	☒	☐	☐
40 Pin HAT 28 GPIO	0-27 Inputs/Output Loopback	☒	☐	☐
40 Pin HAT I2C-0	Follow UP Squared wiki to access I2C pin	☒	☐	☐
40 Pin HAT I2C-1				
40 Pin HAT SPI CS0	you should see the spi devices under /dev	☒	☐	☐
40 Pin HAT SPI CS1		☒	☐	☐
Use USB to TTL serial console cable	same as M10 UART testing item	☒	☐	☐
40 Pin HAT PWM-0	Follow UP Squared wiki to access PWM pin	☒	☐	☐
40 Pin HAT PWM-1		☒	☐	☐
40 Pin HAT ADC	ADC_0	☒	☐	☐

6.2. English Yocto_3.1 kernel Linux up-4000 5.4.87-intel-pk-standard #1

Driver Information

Chipset Software	System default
Graphics Media	System default
Audio Driver	System default
LAN Driver	System default

Install O.S to eMMC

Installation	Result		
	Pass	Fail	N/A
Yocto_3.1 (Linux up-4000 5.4.87-intel-pk-standard #1 SMP PREEMPT Thu Jan 14 07:46:18 UTC 2021 X86_64 GNU/Linux)	☒	☐	☐

Test Results

Function Test		Result		
		Pass	Fail	N/A
Image boot eMMC Test		☒	☐	☐
Check kernel Version	5.4.87	☒	☐	☐
Full HDMI	3840 x 2160	☒	☐	☐
Full Type C to DP		☒	☐	☐
Audio HDMI	Play sound test file Change sound card output controls	☒	☐	☐
Audio Type C to DP		☒	☐	☐
Audio HDA	Detect audio codec	☒	☐	☐
	Play sound test file	☒	☐	☐
	Record on capture channel	☒	☐	☐
eMMC flash (32GB)	Detect eMMC	☒	☐	☐
1 x GbE Realtek RTL8111H	Detect link state change (eth_interface: enp2s0)	☒	☐	☐
	DHCP over Ethernet (eth_interface: enp2s0)	☒	☐	☐
	ICMP (ping) over Ethernet (eth_interface: enp2s0)	☒	☐	☐
USB 3.0 OTG port	USB 3.0 OTG cable	☒	☐	☐
3 x USB 3.0 host ports	CN4 TOP	☒	☐	☐
	CN4 DOWN	☒	☐	☐
	CN5 Port	☒	☐	☐
	CN4 TOP - 3.0 USB bootable	☒	☐	☐
	CN4 DOWN - 3.0 USB bootable	☒	☐	☐
	CN5 - 3.0 USB bootable	☒	☐	☐
2 x USB 2.0 host ports	TOP - 10 pin header cable	☒	☐	☐
	DOWN - 10 pin header cable	☒	☐	☐
M10 UART + 40 Pin HAT UART	10 pin header cable	☒	☐	☐
Power Button	Button shuts down system	☒	☐	☐
	Startup system from shutdown	☒	☐	☐
	Startup system from sleep (S3)	☒	☐	☐
CPLD LEDS	Toggle Red Led	☒	☐	☐
	Toggle Yellow Led	☒	☐	☐

	Toggle Green Led	☒	☐	☐
	Toggle Blue Led	☒	☐	☐
RTC	Read RTC date / time	☒	☐	☐
	RTC time advances when powered up	☒	☐	☐
	RTC time advances when powered down	☒	☐	☐
	Set RTC date-time	☒	☐	☐
	Wake-up from sleep (S3) on RTC alarm	☒	☐	☐
	Cancel wake alarm	☒	☐	☐
SOC Thermal/Fan control	Read Core temperature and thermal monitoring	☒	☐	☐
40 Pin HAT 28 GPIO	0-27 Input/Output Loopback	☒	☐	☐
40 Pin HAT I2C-0	Follow UP Squared wiki to access I2C pin	☒	☐	☐
40 Pin HAT I2C-1		☒	☐	☐
40 Pin HAT SPI CS0	You should see the spi devices under /dev	☒	☐	☐
40 Pin HAT SPI CS1		☒	☐	☐
40 Pin HAT PWM-0	Follow UP Squared wiki to access PWM pin	☒	☐	☐
40 Pin HAT PWM-1		☒	☐	☐
40 Pin HAT ADC	ADC_0	☒	☐	☐

6.3. Windows IOT Core

Install O.S to eMMC

Installation	Result		
	Pass	Fail	N/A
Windows IOT core 10.0.17763.253	☒	☐	☐

Installation refer to [win10_iot_core_install.pdf]

Test Results

Function Test		Result		
		Pass	Fail	N/A
Storage eMMC		☒	☐	☐
USB2.0 1/2 Ports		☒	☐	☐
USB3.0 1/2/3 Ports		☒	☐	☐
HDMI Function (include audio)		☒	☐	☐
Audio Function (Line Out / Mic)		☒	☐	☐
LAN1 Function	Command line ping 8.8.8.8 Web Browser	☒	☐	☐
USB keyboard / mouse		☒	☐	☐
ACPI	Shutdown icon	☒	☐	☐
	Restart icon	☒	☐	☐

<Notes: Default image is support LAN, USB, Basic display ; GPIO, I2C…function by request to make APP>

6.4. Windows 10 Enterprise English Version 64Bit (V1903)

64bit Driver Information	
Chipset Software	Intel ® Chipset Device Software 10.1.1 (2015-06-03)
Graphics Media	Intel ® HD Graphics 21.20.16.4565 (12/10/2016)
Audio Driver	Intel ® Display Audio 10.22.1.97 (12/1/2016)
	Realtek High Definition Audio 6.0.1.8036 (1/5/2017)
LAN Driver	Realtek PCIe GBE Family Controller 10.12.1007.2016 (10/7/2016)

Install O.S to eMMC

Installation	Result			Note
	Pass	Fail	N/A	
Windows 10 Enterprise English Version 64Bit (V1903)	☒	☐	☐	UEFI

Test Results

Test Item		Result			Note
		Pass	Fail	N/A	
Single Display					
HDMI - Full Screen		☒	☐	☐	
Type C to DP - Full Screen		☒	☐	☐	
Multi display		☒	☐	☐	
Basic Function Test					
Usable memory	64bit: 3.85GB	☒	☐	☐	
USB Mouse and Keyboard		☒	☐	☐	
Type C device		☒	☐	☐	
USB Removable Devices	USB 2.0	☒	☐	☐	
	USB 3.2 GEN1	☒	☐	☐	
	Safe to remove icon	☒	☐	☐	
TPM 2.0 detection		☒	☐	☐	
LAN Function Test					
LAN1 - DHCP, connect to internet		☒	☐	☐	
Audio Function Test					
Line Out Test		☒	☐	☐	
Microphone Test		☒	☐	☐	
HDMI Audio		☒	☐	☐	
Type C to DP Audio		☒	☐	☐	
Start Menu					
Log off User		☒	☐	☐	
Shut down (S5)		☒	☐	☐	
Sleep (S3)		☒	☐	☐	
Restart		☒	☐	☐	
Hibernate (S4)		☒	☐	☐	

6.4.1. Framework installation

Installation		Result		
		Pass	Fail	N/A
UpFrameworkSetup-220627	Device manager should not yellow band	☒	☐	☐

6.4.2. Demo apps installation

Installation AppPackages		Result		
		Pass	Fail	N/A
UpGpioTestTool_1.0.0.0_Test	Success: Your app was successfully installed. Press Enter to continue...:	☒	☐	☐
UpI2cTestTool_1.0.0.0_Test		☒	☐	☐

UpPwmTestTool_1.0.0.0_Test		☒	☐	☐
UpSpiTestTool_1.0.0.0_Test		☒	☐	☐
UpAdcTestTool_1.0.0.0_Test		☒	☐	☐
UpLedTestTool_1.0.0.0_Test		☒	☐	☐

6.4.3. GPIO Test

Function Test			Result		
			Pass	Fail	N/A
28 GPIO	Pin 3	Check each GPIO output high/low is control normal	☒	☐	☐
	Pin 5		☒	☐	☐
	Pin 7		☒	☐	☐
	Pin 8		☒	☐	☐
	Pin 10		☒	☐	☐
	Pin 11		☒	☐	☐
	Pin 12		☒	☐	☐
	Pin 13		☒	☐	☐
	Pin 15		☒	☐	☐
	Pin 16		☒	☐	☐
	Pin 18		☒	☐	☐
	Pin 19		☒	☐	☐
	Pin 21		☒	☐	☐
	Pin 22		☒	☐	☐
	Pin 23		☒	☐	☐
	Pin 24		☒	☐	☐
	Pin 26		☒	☐	☐
	Pin 27		☒	☐	☐
	Pin 28		☒	☐	☐
	Pin 29		☒	☐	☐
	Pin 31		☒	☐	☐
	Pin 32		☒	☐	☐
	Pin 33		☒	☐	☐
	Pin 35		☒	☐	☐
	Pin 36		☒	☐	☐
	Pin 37		☒	☐	☐
	Pin 38		☒	☐	☐
	Pin 40		☒	☐	☐

6.4.4. LED Test

Function Test			Result		
			Pass	Fail	N/A
Yellow	on	> yellow on	☒	☐	☐
	off	> yellow off	☒	☐	☐
Green	on	> green on	☒	☐	☐
	off	> green off	☒	☐	☐
Red	on	> red on	☒	☐	☐
	off	> red off	☒	☐	☐

Blue	on	> blue on	☒	☐	☐
	off	> blue off	☒	☐	☐

6.4.5. PWM Test

Function Test			Result		
			Pass	Fail	N/A
PWM	PWM0 <Pin32>	Run UpPWMTestTool in Windows program app > set 0 > get =>get duty value > duty 1.0 / 0.5 / 0.3 => duty set 1.0 / 0.5 / 0.3 > get =>duty cycle return 1.0 / 0.5 / 0.3 You will see the luminance of LED will be changed	☒	☐	☐
	PWM1 <Pin33>	Run UpPWMTestTool in Windows program app > set 1 > get =>get duty value > duty 1.0 / 0.5 / 0.3 => duty set 1.0 / 0.5 / 0.3 > get =>duty cycle return 1.0 / 0.5 / 0.3 You will see the luminance of LED will be changed	☒	☐	☐

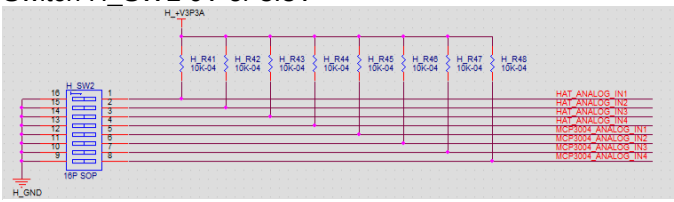
6.4.6. ADC Test

Function Test		Result		
		Pass	Fail	N/A
40 Pin HAT ADC	ADC_0 (Pin 7 connect to 3.3V) >read 0 Return volume 255	☒	☐	☐

6.4.7. I2C Test

Function Test			Result		
			Pass	Fail	N/A
40 Pin HAT	I2C-0	Use I2C card connect to HAT 40 Pin I2C0_SDA (#3) , I2C0_SCL (#5) , 5V and GND Run UpI2cTestTool >i2cdetect 0 [Return] 27 a7	☒	☐	☐
	I2C-1	Use I2C card connect to HAT 40 Pin I2C1_SDA (#27) , I2C1_SCL (#28) , 5V and GND Run UpI2cTestTool >i2cdetect 1 [Return] 27 a7	☒	☐	☐

6.4.8. SPI Test

Function Test			Result		
			Pass	Fail	N/A
40 Pin HAT	SPI	Use UP HAT test card connect to HAT 40 Pin SPI device is ADC124S101 Switch H_SW2 0V or 3.3V  Run UpSpiTestTool >read 64 [Return] 0 byte: F 1 byte: FD 2 byte: F . . 63 byte: FF <if not connect SPI device, read 64 will get value are 0> <if H_SW2 8pin switch to 3.3V, read 64 will get different value, example FF <if H_SW2 8pin switch to 0V, read 64 will get different value, example 0	☒	☐	☐

7. BIOS Function Test

Configuration	
CPU	Intel ® Atom ™ Processor E3950 @ 1.60GHz
Memory	Onboard memory LPDDR4 4GB
Storage	Onboard eMMC 64GB
O.S	Windows 10 Enterprise English Version 64Bit (V1903)

Test Point
Confirm BIOS control items are working correctly

7.1. Advanced Test

Test Item (Following item should work properly)			Result			Note
			Pass	Fail	N/A	
ACPI Settings						
Enable ACPI Auto Conf			☒	☐	☐	Enabled/Disabled
Enable Hibernation			☒	☐	☐	Enabled/Disabled
ACPI Sleep State	Suspend Disabled		☒	☐	☐	
	S3 (Suspend to RAM)		☒	☐	☐	
CPU Configuration						
Active Processor Core			☒	☐	☐	Enabled/Disabled
Core 0			☒	☐	☐	Enabled
Core 1			☒	☐	☐	Enabled/Disabled
Core 2			☒	☐	☐	Enabled/Disabled
Core 3			☒	☐	☐	Enabled/Disabled
Intel Virtualization Technology			☒	☐	☐	Enabled/Disabled
CPU Power Management						
EIST			☒	☐	☐	Enabled/Disabled
Turbo Mode			☒	☐	☐	Enabled/Disabled
Network Stack Configuration						
Network Stack			☒	☐	☐	Enabled/Disabled
USB Configuration						
XHCI Hand-off			☒	☐	☐	Enabled/Disabled
USB Mass Storage Driver Support			☒	☐	☐	Enabled/Disabled
Hardware Monitor			☒	☐	☐	
Serial Port Console Redirection						
Console Redirection			☒	☐	☐	Enabled/Disabled
Console Redirection Settings	Bits per second	9600	☒	☐	☐	
		115200	☒	☐	☐	
Trusted Computing						
Security Device Support			☒	☐	☐	Enabled/Disabled
Pending operation	None		☒	☐	☐	
	TPM Clear		☒	☐	☐	
Power Management						
Restore AC Power Loss	Always On		☒	☐	☐	
	Always Off		☒	☐	☐	
	Last State		☒	☐	☐	
Wake Events						
RTC wake system from S5	Disabled		☒	☐	☐	
	Fixed Time		☒	☐	☐	
	Dynamic Time		☒	☐	☐	
HAT Configurations						
HAT40 28 pin GPIO			☒	☐	☐	
LED Yellow			☒	☐	☐	ON/OFF
LED Green			☒	☐	☐	ON/OFF
LED Red			☒	☐	☐	ON/OFF

LED Blue	☒	☐	☐	ON/OFF
ADC	☒	☐	☐	Enabled/Disabled
After BIOS menu modified, check if system reset time is too long (example > 20sec)	☒	☐	☐	

7.2. Chipset Test

Test Item (Following item should work properly)			Result			Note
			Pass	Fail	N/A	
North Bridge	Memory Information		☒	☐	☐	
South Bridge	HD-Audio Configuration	HD-Audio Support	☒	☐	☐	Enabled/Disabled
SCC Configuration						
SCC eMMC Support			☒	☐	☐	Enabled/Disabled
eMMC Max Speed	HS400		☒	☐	☐	Read：313MB/s Write：263MB/s
	HS200		☒	☐	☐	Read：176MB/s Write：159MB/s
	DDR50		☒	☐	☐	Read：86MB/s Write：77MB/s
USB Configuration						
USB VBUS	On		☒	☐	☐	
	Off		☒	☐	☐	
XDCI Support			☒	☐	☐	Disable/PCI Mode

7.3. Boot Test

Test Item (Following item should work properly)		Result			Note
		Pass	Fail	N/A	
Quiet Boot		☒	☐	☐	
UEFI PXE		☒	☐	☐	
Boot From eMMC		☒	☐	☐	
Boot From USB HDD		☒	☐	☐	
Boot From USB DVD ROM		☒	☐	☐	
Boot from LAN		☒	☐	☐	UEFI
Disable		☒	☐	☐	
O.S Selection	Windows	☒	☐	☐	
	Intel Linux	☒	☐	☐	

7.4. Clear CMOS and Load Default Test

Test Item (Following item should work properly)		Result			Note
		Pass	Fail	N/A	
Clear CMOS by remove battery (under G3 status)		☒	☐	☐	Clear date, time, setting, password
Load default	Date, time, password should be kept	☒	☐	☐	
	BIOS setting should be restored to default	☒	☐	☐	
	Boot option priorities should restore from disable to default	☒	☐	☐	

7.5. Administrator / User Password Test

Test Item (Following item should work properly)		Result			Note
		Pass	Fail	N/A	
Administrator Password	Password Case Sensitive	☒	☐	☐	
User Password		☒	☐	☐	

7.6. Secure Boot Test

Test Item (Following item should work properly)		Result			Note
		Pass	Fail	N/A	
Secure boot disable	Boot into Windows and UEFI shell should work normal	☒	☐	☐	
Secure boot enable	System can't boot into UEFI shell	☒	☐	☐	
	Boot into Windows should work normal	☒	☐	☐	

7.7. Negative Test

7.7.1. USB Keyboard Negative Test

Methods	Result			Note
	Pass	Fail	N/A	
1. Boot into BIOS setup manual 2. Press NumLock or ScrLk and press arrow key 3. Confirm arrow key function are normally	☒	☐	☐	

7.7.2. Suspend S3 Negative Test

Methods		Result			Note
		Pass	Fail	N/A	
1. Resume from S3 2. Confirm USB ports, HDMI / Type C to DP audio can work properly	USB ports	☒	☐	☐	
	HDMI audio	☒	☐	☐	
	Type C to DP audio	☒	☐	☐	

7.7.3. UEFI Mode Negative Test

Methods	Result			Note
	Pass	Fail	N/A	
1. Install Windows with UEFI mode 2. Clear CMOS 3. Confirm BIOS\Boot device was not loss "Windows boot manager" and should boot into Windows properly	☒	☐	☐	

8. Performance Test

Configuration	
CPU	Intel ® Atom ™ Processor E3950 @ 1.60GHz
Memory	Onboard memory LPDDR4 4GB
Storage	Onboard eMMC 64GB
O.S	Windows 10 Enterprise English Version 64Bit (V1903)

8.1. System Performance Test

Test Result: (Display set 1920x1080 test)

Testing Software	Criteria	Result		
		Pass	Fail	N/A
PCMark 10	1. No error or hang during test 2. To compare with reference score and the deviation should < -20%	☒	☐	☐
	Score	**Note**		
PCMARK10 Score	1419			
Essentials	4084			
Productivity	1747			
Digital Content Creation	1088			

Testing Software	Criteria	Result		
		Pass	Fail	N/A
3DMark-v2-5-5029 Sky Diver	1. No error or hang during test 2. To compare with reference score and the deviation should < -20%	☒	☐	☐
	Score	**Note**		
Score	1967			
Graphics score	1879			
Graphics test 1	8.59FPS			
Graphics test 2	8.58FPS			
Physics score	2691			
8 threads	45.99FPS			
24 threads	27.70FPS			
48 threads	0.00FPS			
96 threads	0.00FPS			
Combined score	1875			
Combined test	7.72FPS			

Testing Software	Criteria	Result		
		Pass	Fail	N/A
3DMark-v2-5-5029 Fire Strike	1. No error or hang during test 2. To compare with reference score and the deviation < -20%	☒	☐	☐
	Score	**Note**		
Score	522			
Graphics score	560			
Graphics test 1	2.62FPS			
Graphics test 2	2.28FPS			
Physics score	2660			
Physics test	8.45FPS			
Combined score	193			
Combined test	0.90FPS			

Testing Software	Criteria	Result		
		Pass	Fail	N/A
Performance Test 8.0	1. No error or hang during test 2. To compare with reference score and the deviation should < -20%	☒	☐	☐
	Score	**Note**		
PassMark Rating	1062			
CPU Mark	2228			
2D Graphics Mark	187.6			
3D Graphics Mark	498.5			
Memory Mark	882			
Disk Mark	1307			

8.2. Performance of Storage Interface Test

USB 3.2 GEN1 / USB Type C GEN1 / USB 2.0 Performance				
USB3.0 SSD	Plextor EX1 plus type C SSD 128GB			
USB3.0 drive	Transcend USB3.0 128GB			
Item	Comment / (unit)	Software	Transfer Rate (MB/s)	Note
USB 3.2 GEN1 ports	Maximum Read	ATTO Disk Benchmark	459MB/s	Read: >450MB/s
	Maximum Write	ATTO Disk Benchmark	398MB/s	
	Maximum Read	ATTO Disk Benchmark	460MB/s	
	Maximum Write	ATTO Disk Benchmark	399MB/s	
	Maximum Read	ATTO Disk Benchmark	460MB/s	
	Maximum Write	ATTO Disk Benchmark	403MB/s	
USB Type C GEN1 ports	Maximum Read	ATTO Disk Benchmark	461MB/s	
	Maximum Write	ATTO Disk Benchmark	458MB/s	
USB2.0 ports	Maximum Read	ATTO Disk Benchmark	34MB/s	Read: >20MB/s
	Maximum Write	ATTO Disk Benchmark	25MB/s	
	Maximum Read	ATTO Disk Benchmark	34MB/s	
	Maximum Write	ATTO Disk Benchmark	25MB/s	

9. Stability test

Configuration	
CPU	Intel ® Atom ™ Processor E3950 @ 1.60GHz
Memory	Onboard memory LPDDR4 4GB
Storage	Onboard eMMC 64GB
O.S	Windows 10 Enterprise English Version 64Bit (V1903)
Environment	Under room temperature

9.1. Run In Test

O.S: Windows 10 Enterprise English Version 64Bit (V1903)

Test Item			Result			Note
			Pass	Fail	N/A	
Burn In Test V9.0 (1012 above) Duty: 100 Time: over 12 hours <System should not error or hang during testing>	CPU		☒	☐	☐	
	RAM		☒	☐	☐	
	GPGPU		☒	☐	☐	
	Video		☒	☐	☐	
	2D		☒	☐	☐	
	3D		☒	☐	☐	DirectX: 9
	Disk		☒	☐	☐	
	Sound		☒	☐	☐	
	Network <Advanced>		☒	☐	☐	
	USB	2.0	☒	☐	☐	x1
		3.0	☒	☐	☐	x2

9.2. Reboot Test

O.S: Windows 10 Enterprise English Version 64Bit (V1903)
Test Tool: Passmark rebooter.exe

Test item	Result			Note
	Pass	Fail	N/A	
Reboot test for 500 cycles <a. System should not error or hang during testing> <b. Device manager should not loss any devices or yellow bang>	☒	☐	☐	

9.3. Power button on/off Test

O.S: UEFI shell
Condition:
1. On/off fixture set power on - 1 sec ; power off - 40 sec

Test item	Result			Note
	Pass	Fail	N/A	
Power button on/off over 500 cycles <On/off should complete 500 cycles without any error or hang>	☒	☐	☐	

9.4. System stability after S3 / S4 / S5 cycles

O.S: Windows 10 Enterprise English Version 64Bit (V1903)

Test item	Criteria	Result			Note
		Pass	Fail	N/A	
System stability after S3 cycles <Perform S3 cycles 3 times>	1. SUT boots to OS successfully 2. No yellow bang observed if all the drivers are installed	☒	☐	☐	

	3. SUT does S3-resume cycles successfully without any issues				
System stability after S4 cycles <Perform S4 cycles 3 times>	1. SUT boots to OS successfully 2. No yellow bang observed if all the drivers are installed 3. SUT does S4-resume cycles successfully without any issues	☒	☐	☐	
System stability after S5 cycles <Perform S5 cycles 3 times>	1. SUT boots to OS successfully 2. No yellow bang observed if all the drivers are installed 3. SUT does S5-resume cycles successfully without any issues	☒	☐	☐	

9.5. PCI Device Scan Test

O.S: UEFI shell
Program: ScanPCIDevice.efi
Test Point: Make sure system will not loss any device after system warm boot

Test item	Criteria	Result			Note
		Pass	Fail	N/A	
200-times PCI Device scan Test	Devices should not loss	☒	☐	☐	

9.6. G3 cold boot test

9.6.1. Max and Min voltage test

O.S: UEFI shell
Condition:
1. BIOS select “power on” mode
2. On/off fixture set power on - 40 sec ; power off - 20 sec
3. Max voltage: Spec supported voltage input +5%, example 12V+5%=12.6V
4. Min voltage: Spec supported voltage input -5%, example 12V-5%=11.4V

Test item	Voltage	Criteria	Result			Note
			Pass	Fail	N/A	
Max voltage input / 1000 times power on/off	12.6	a. loss rate: 0 /1000 times b. RTC date and time should not loss	☒	☐	☐	
Min voltage input / 1000 times power on/off	11.4		☒	☐	☐	

9.6.2. AC power restored in short time test

O.S: UEFI shell
Condition:
1. BIOS select “power on” mode
2. On/off fixture set power on - 40 sec ; power off - 5 sec

Test item	Criteria	Result			Note
		Pass	Fail	N/A	
AC power restored in short time / 20 times power on/off	loss rate: 0 /20 times	☒	☐	☐	

9.7. Heavy loading test with Max/Min voltage

O.S: Windows 10 Enterprise English Version 64Bit (V1903)
AP: Intel TAT

Test item	Voltage	Criteria	Result			Note
			Pass	Fail	N/A	
Max voltage input / 2 hours heavy loading	12.6	System no power down, hang or BSOD	☒	☐	☐	
Min voltage input / 2 hours heavy loading	11.4		☒	☐	☐	