

Report NO: 23IP010003

MAX-Q670A

Board Level Product P5 Compatibility Test Report

Summary	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> 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

2023-05-25

Deputy Manager

Louie Lee

Test Engineer

Aslen Hsieh

Specification Validation

Main Specification

Item	Specification	Result			Note
		Pass	Fail	N/A	
Form Factor	Micro-ATX Form Factor, 9.6"x9.6" (244mmx244mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Processor	Intel® 12th Generation(Alder Lake-S) Core™ i9/i7/i5/i3 E series Processor, Intel® 13th Generation(Raptor Lake-S) Core™ i9/i7/i5/i3 E series Processor, LGA 1700 CPU socket, 8+8 Cores vPro 32EU, max. 125W TDPs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
System Memory	Dual-Channel,non-ECC, DDR5 4000 MHz (2DPC) 4 x DIMM, Max. 128GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Chipset	Intel® Q670E Chipset	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Super I/O	NCT6126D(SIO)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Network	1 x Intel® I219LM (GBE,supports Intel® AMT 12.0) - two layers conn 1 x Intel® I210AT - two layers conn 2 x Intel® Intel i225LM (Optional · Default: NO) -- on top of USB ports (BOM change: keep two-layer USB ports only, no 2.5G LAN on top)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Storage	8 x SATA 6Gb/s,support RAID 0/1/5/10 1 x M.2 2242/80 M key (PCIe 4 lanes Gen4.0) (CPU) support RAID 0/1/5/10 1 x M.2 2242/80 M key (PCIe 4 lanes Gen4.0) (PCH) support RAID 0/1/5/10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
TPM	TPM 2.0 onboard (Infineon SLB9672)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Audio	1 x speaker header (Line-out) 1 x AAFP	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Expansion Slots	1 x PCIe [x16] (16 lanes Gen5.0) (CPU), 8 lanes when dual use PCIe [x16]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1 x PCIe [x4] (open Slot) (2 lanes Gen3.0)(PCH)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1 x PCIe [x16] (open Slot) (8 lanes Gen5.0)(CPU)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1 x PCIe [x4] (open Slot) (4 lanes Gen4.0)(PCH)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1 x M.2 3042/3052/2242 B-key (PCIe 3.0 x1/USB3.2 Gen1) + Micro SIM Slot	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1 x M.2 2230 E-key (PCIe 3.0 x1/USB 2.0)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC Health Monitoring	Temperature Monitor on CPU/Chassis	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Voltage Monitor on Vcore/5V/3.3V/12V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	Fan Monitor on CPU/Chassis	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WatchDog Timer	1~255 step by software program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Smart Fan Control	CPU Fan x 1 / Chassis Fan x 2 (the 3rd Chassis Fan is DC Fan)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wake On LAN / PXE	Yes (WOL / PXE)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Power State	S3, S4, S5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Graphics	Intel® Graphics Media Accelerator	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Graphics Multi Display	Four independent displays onboard	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Resolution	VGA	Up to 1920 x 1200 @60Hz (via IT6516B)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	LVDS	Up to 1920 x 1080 @ 60 Hz, Dual Channel 18/24 bit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	eDP	Up to 3840 x 2160 @ 30 Hz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	HDMI	Up to 4096 x 2160 @ 60 / 30 Hz, with digital audio (HDMI2.0)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DP	Up to 4096 x 2160 @ 24 Hz / 3840 x 2160 @ 60 Hz, with Digital Audio (4k)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rear I/O	USB	1 x USB 3.2 Gen2x2 Type C connector (20 Gbps/bootable, can be deactivated per BIOS function ; USB Power switchable feature) (Optional ; default:No)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		4 x USB 3.2 Gen 2 Type A connector (10Gbps/bootable, can be deactivated per BIOS function ; USB Power switchable feature) (under LAN Port)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Serial Port	1 x DB-9 COM (supports RS-232/422/485, 5V/12V/RI)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Display	1 x HDMI 2.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		1 x VGA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		1 x DP (V1.4a)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	LAN	4 x RJ45 ports (default:2)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Audio	3 x Audio Jack: Line-in, Mic-in, Line-out	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Internal I/O Connectors	Storage	8 x SATA 6Gb/s,support RAID 0/1/5/10 1 x M.2 2242/80 M key (PCIe 4 lanes Gen4.0) (CPU) support RAID 0/1/5/10 1 x M.2 2242/80 M key (PCIe 4 lanes Gen4.0) (PCH) support RAID 0/1/5/10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		8 x SATA 6Gb/s,support RAID 0/1/5/10 1 x M.2 2242/80 M key (PCIe 4 lanes Gen4.0) (CPU) support RAID 0/1/5/10 1 x M.2 2242/80 M key (PCIe 4 lanes Gen4.0) (PCH) support RAID 0/1/5/10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Audio	1 x speaker header (Line-out) 1 x AAFP	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Serial Port	5 x RS-232 headers 1 x DB-9 COM (supports RS-232/422/485, 5V/12V/RI optional)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	DIO	1 x 8-bit Digital I/O interface (In/Out programmable)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	FAN	1 x CPU Fan connector(s) (4-pin ; PWM mode)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		3 x Chassis Fan connector(s) (4-pin ; PWM mode X2, DC mode x1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Power	1 x 24-pin EATX Power header	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		1 x 8-pin EATX 12V Power connector	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Display	1x LVDS (colay eDP, default LVDS)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	others	1 x Chassis Intrusion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		1 x AT/ATX mode select jumper	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		1 x Front panel header	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		1 x Clear CMOS jumper	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		1 x Buzzer on board	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		1 x 3-pin ME lock header	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		2 x LED Header for Ethernet (Option: 4x LED Header when 4x RJ45)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Power Compliance	1 x 24-pin ATX connector	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	1 x 8-pin ATX 12V Power connector	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

O.S. Support

Item	Specification	Result			Note
		Pass	Fail	N/A	
Microsoft Windows	Windows10 English 64bit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Windows11 English 64bit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Platform Information

Item	Device Information	Note
System Model/Version	MAX-Q670A	
CPU Board	MAX-Q670A R1.01	
BIOS / Version	MAX-Q670A R3.3 (MA67AM33) (03/31/2023)	
Driver	SAP0000000767 (MAX-Q670A Driver SAP 20230206)	
CPU Type	Intel® Core™ i9-13900E Processor 1.80 GHz 65W	
	Intel® i7-13700T Processor 1.40 GHz 35W	
	Intel® Core™ i9-12900E Processor 30M Cache, up to 5.00 GHz 65W	
Memory Type	Innodisk DDR5 4800 32GB M5U0-BGS2K5VP-26 x 4pcs (SEC K4RAH08 6VBBCQK)	
SATA SSD	Phison SSBP256GKB5G0-S17TI BiCS5 256GB	
VGA	LG E2260	
HDMI / DP Monitor	BenQ EL2870U	
eDP	AUO G101UAN01.0 / 10.1" / 1920*1200	
LVDS	AUO M215HW03 V1 / 21" / 1920*1080 / 48bit	
PCI-e card	Intel GIGABIT CT DESKTOP ADAPTER	PCI-e x 1
	Vecow UE-1008 USB3.0 8 ports card	PCI-e x 4
	High Poing RocketRAID 2720SGL PCI-e 2.0 RAID HOST adapter	PCI-e x 8
	Nvidia RTX A4000 PCIe GEN4 x16 GDDR6 16GB Graphics card	PCI-e x 16
Operating System	<input checked="" type="checkbox"/> Windows 10 Enterprise English 64bit (v21H2)	
	<input checked="" type="checkbox"/> Windows 11 Enterprise English Version 64Bit (v21H2)	
ATX Power Supply :	be quiet! BQT E7-Golden-550W POWER	

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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	
Alder Lake				
Intel® Core™ i9-12900E Processor 30M Cache, up to 5.00 GHz 65W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® Core™ i7-12700 Processor 25M Cache, up to 4.90 GHz 65W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® Core™ i7-12700E Processor 25M Cache, up to 4.80 GHz 65W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® Core™ i5-12400 Processor (18M Cache, up to 4.40 GHz) 65W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® Pentium® Gold G7400E Processor 6M Cache, 3.60 GHz 65W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® Core™ i9-12900TE Processor 30M Cache, up to 4.80 GHz 35W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® Core™ i7-12700TE Processor 25M Cache, up to 4.60 GHz 35W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® Core™ i3-12100TE Processor 12M Cache, up to 4.00 GHz 35W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® Celeron® Processor G6900TE 4M Cache, 2.40 GHz 35W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Raptor Lake				
Intel® Core™ i9-13900E Processor 1.80 GHz 65W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® i7-13700T Processor 1.40 GHz 35W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® i5-13400E Processor 2.40 GHz 65W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® i5-13500E Processor 2.40 GHz 65W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel® i3-13100TE Processor 2.40 GHz 35W	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

1.2. Memory Compatibility Test

Memory Information (a. Information and frequency should show correct value. b. System should boot up and into OS normally.)	AAEON P/N	Result			Note
		Pass	Fail	N/A	
DDR5 SO-DIMM					
Innodisk DDR5 4800 8GB M5S0-8GSYZCVP-26 (SEC K4RAH165VB-BCQK)	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Innodisk DDR5 4800 16GB M5S0-AGS2NCVP-26 (SEC K4RAH086VB-BCQK)	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Innodisk DDR5 4800 32GB M5S0-BGS2OCVP-26 (SEC K4RAH086VB-BCQK)	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Transcend DDR5 4800 8GB TS1GSA64V8G (SEC K4RAH165VB BCQK)	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Transcend DDR5 4800 16GB TS2GSA64V8E (SEC K4RAH086VB BCQK)	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Transcend DDR5 4800 32GB TS4GSA64V8E (SEC K4RAH086VB BCQK)	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Apacer DDR5 4800 8GB (SEC K4RAH16 5VBBCQK)	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Apacer DDR5 4800 16GB (SEC K4RAH08 6VBBCQK)	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Apacer DDR5 4800 32GB (SEC K4RAH08 6VBBCQK)	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DDR5 Long-DIMM Memory Configurations	Memory Frequency	Result			Note
		Pass	Fail	N/A	
Innodisk DDR5 4800 32GB M5U0-BGS2K5VP-26 (SEC K4RAH08 6VBBCQK) x 4pcs					
DIMM_A1 or DIMM_B1	3600 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIMM_A2 or DIMM_B2	4400 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIMM_A1 + DIMM_A2	3600 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIMM_B1 + DIMM_B2	3600 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIMM_A1 + DIMM_B1	3600 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIMM_A2 + DIMM_B2	4400 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIMM_A1 + DIMM_B2	3600 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIMM_A2 + DIMM_B1	3600 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIMM_A1+DIMM_A2+DIMM_B1	3600 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIMM_A1+DIMM_A2+DIMM_B2	3600 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIMM_A1+DIMM_A2+DIMM_B1+ DIMM_B2	3600 MHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

1.3. SATA Compatibility Test

1.3.1 Onboard SATA(AHCI) Test

SATA Device Information (Information and size should show correct value with AHCI mode)	Size	Result			AAEON P/N	
		Pass	Fail	N/A		
Main Board project test with 80~100cm SATA cable , typical #1709070800						
SATAIII	500GB		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SATAIII	Toshiba 3.5" SATAIII DT01ACA100 1TB/32MB 7200rpm	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SATAIII	WD 3.5" SATAIII WD20EZRZ 2TB 5400rpm	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SATAIII	Seagate 3.5" SATAIII ST3000DM001 3TB 7200rpm	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SATAIII	WD WD40EZRZ 4TB 5400rpm	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SSD	SAMSUNG SSD 860EVO 500GB	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SSD	Transcend SSD 470 TSxxxGSSD470K-AEN	128GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TS128GSSD470K-AEN 128GB (Bics5)
		256GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TS256GSSD470K-AEN 256GB (Bics5)
		512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TS512GSSD470K-AEN 512GB (Bics5)
SSD	Phison SSBP128GKB5G0-S17TI	128GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	Phison SSBP256GKB5G0-S17TI BiCS5 256GB	256GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Phison SSBP512GKB5G0-S17TI BiCS5 512GB	512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Phison SSBP001TKB5G0-S17TI BiCS5 1TB	1TB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SSD	Innodisk 3TG6-P BiCS5	128GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		256GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		1TB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		2TB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

1.3.2 Onboard SATA (RAID) Test

SATA RAID Test (RAID function should work properly)		Result			Note
		Pass	Fail	N/A	
RAID-0 (HDDx2) Striping/Span Test	1 WD 3.5" SATAIII WD20EZR 2TB 7200rpm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2 WD 3.5" SATAIII WD20EZR 2TB 7200rpm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RAID-1 (HDDx2) Mirror Test	1 WD 3.5" SATAIII WD20EZR 2TB 7200rpm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2 WD 3.5" SATAIII WD20EZR 2TB 7200rpm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RAID-5 (HDDx3) Striping/Span Test Rotation Parity	1 Transcend SSD 470 TSxxxGSSD470K-AEN / 256GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2 Phison SSBP256GKB5G0-S17TI BiCS5 / 256GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	3 Innodisk 3TG6-P BiCS5 / 256GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RAID-10 (HDDx4) Striping/Span Test Mirroring	1 Transcend SSD 470 TSxxxGSSD470K-AEN / 256GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2 Phison SSBP256GKB5G0-S17TI BiCS5 / 256GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	3 Innodisk 3TG6-P BiCS5 / 512 GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	4. Transcend SSD 470 TSxxxGSSD470K-AEN / 512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

1.3. Onboard NVME (RAID) Test

SATA RAID Test (RAID function should work properly)		Result			Note
		Pass	Fail	N/A	
RAID-0 (HDDx2) Striping/Span Test	Transcend TSxxxMTE710T NVME GEN4x4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Innodisk M.2 P80 4TG2-P (BiCS5) GEN4 x4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RAID-1 (HDDx2) Mirror Test	Transcend TSxxxMTE710T NVME GEN4x4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Innodisk M.2 P80 4TG2-P (BiCS5) GEN4 x4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RAID-5 (HDDx3)	Transcend TSxxxMTE710T NVME GEN4x4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Striping/Span Test Rotation Parity	Innodisk M.2 P80 4TG2-P (BiCS5) GEN4 x4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Plextor PCIe SSD M6e 512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RAID-10 (HDDx4) Striping/Span Test Mirroring	Transcend TSxxxMTE710T NVME GEN4x4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Innodisk M.2 P80 4TG2-P (BiCS5) GEN4 x4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Plextor PCIe SSD M6e / 512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	SilverStone ECM20 M.2 PCI-E / 512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

1.4. Power Supply Compatibility Test

Power Supply Information a. System boot to OS should work properly. b. System OS shutdown function should work properly.	Result			Note
	Pass	Fail	N/A	
SeaSonic SSR-450RM 450W 80plus Gold	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Must for 24pin ATX
FSP AS550 550W 80plus Gold	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler Master RS-750-AMAA-G1 750W 80plus Gold	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
be quiet! BQT E7-Golden-550W POWER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

1.5. Monitor Compatibility Test

Monitor Information a. Monitor should display under DOS and OS environment. b. Monitor should not appear ghost or ripples.	Result			Note
	Pass	Fail	N/A	
VGA				
Asus PA238Q / 1920*1080 / 23" monitor	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LG E2260 / 1920*1080 / 23" monitor	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
*Philips 221I8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
*ASUS VE228	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
HDMI (Test with 5M HDMI cable/ Bravo-u)				
*ASUS VE228	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
*Philips 221I8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Asus PA238Q	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LG 24UD58-B 4K 60Hz LED (HDMI2.0)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MSI optix MAG281URF 4K 120Hz (DP1.4)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Display port				
LG 24UD58-B 4K 60Hz LED	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MSI optix MAG281URF 4K 120Hz (DP1.4)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
BenQ EL2870U	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Samsung U28D590	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2. Basic Function Test

2.1. Video Function Test

2.1.1. Single Output Function Test

Configuration													
CPU	Intel® Core™ i7-13700T Processor 1.40MHZ (30M Cache, up to 4.90 GHz) Intel® Core™ i9-12900E Processor 30M Cache, up to 5.00 GHz 65W												
Memory	Innodisk DDR5 4800 32GB M5U0-BGS2K5VP-26 (SEC K4RAH08 6VBBCQK) x 4pcs												
SATA SSD	Phison SSBP256GKB5G0-S17TI BiCS5 256GB												
VGA	LG E2260												
HDMI	Asus PA238Q												
Display port	BenQ EL2870U												
LVDS	AUO M215HW03 V1 / 21"/ 1920*1080 / 48bit												
eDP	AUO G101UAN01.0 / 10.1"/ 1920*1200												
Operating system	Windows10 Enterprise 64bit v21H2												
Color Quality	<input checked="" type="checkbox"/> 16bit <input type="checkbox"/> 24bit <input checked="" type="checkbox"/> 32bit												
Criteria	NO ghost, ripples												
Resolution	VGA			HDMI			DP			eDP / LVDS			Note
	Pass	Fail	N/A	Pass	Fail	N/A	Pass	Fail	N/A	Pass	Fail	N/A	
800X600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1024X768	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1280X768	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1280X1024	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1366X768	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1680X1050	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1920X1080	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	LVDS
1920X1200	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	eDP
2048X1152	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2560X1440	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3840 x 2160 30Hz	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3840 x 2160 60Hz	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3840 x 2160 120Hz	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3840 x 2160 144Hz	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
EDID check	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hot plug	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Rotation(0/90/ 180/270)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Boot Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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	VGA + DP + HDMI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Extended Desktop		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Dual Display Clone	LVDS+DP +HDMI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Extended Desktop		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Extended Desktop	eDP+DP +HDMI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Triple Display Clone		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Extended Desktop		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2.1.3. Boot up Without Display Test

Process step:

1. BIOS disable LVDS.
2. Power on without inserting any VGA/DVI/HDMI/DP connector until system reaches Windows desktop
3. Plug VGA connector into test machine while system reaches Windows then check Graphics driver and display.
4. Check VGA output Brightness is normal and it shows "Ghost Image" / "Flicker" or not
5. Repeat step2~4 for DVI / HDMI / DP testing.

Test item		Result			Note
		Pass	Fail	N/A	
Display should working normal in Windows Desktop	VGA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DVI	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	HDMI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Display port	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2.1.4. LCD Panel Test

ECD standard connector

LVDS Panel Model (LVDS display should full screen and no flicker)	Result			Note		
	Pass	Fail	N/A			
18bit	640x480	AUO G065VN01 640*480 18bit	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	800x600	AUO G084SN05 V.8	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	1024x768	AUO LED backlight G121XN01-V0 1024*768 18bit	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	1280x800	HannStar HSD1 01PWW1 R0-A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
24bit	1366x768	AUO G185XW01 V0 / 18" / 1366x768 / 24bit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	IPC-BU cable
48bit	1920x1080	AUO M215HW03 V1 / 21" / 1920*1080 / 48bit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	IPC-BU cable

eDP connector

eDP Panel Model (eDP display should full screen and no flicker)	Result			Note	
	Pass	Fail	N/A		
3840x2160	AUO B1732AN01.0 / 17.3" / 3840 * 2160	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
1920x1200	AUO G101UAN01.0 / 10.1" / 1920*1200	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	IPC-BU cable

2.2. Audio Function Test

Function Test	Result			Note
	Pass	Fail	N/A	
L (Left) Channel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
R (Right) Channel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Line In	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MICROPHONE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
AMP (Left and Right)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

H/W support AMP + Line out + AAFP	1. AMP and line out should output at same time. 2. AMP and line out should mute when headphone jack was plug in.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
HDMI Audio		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DP Audio		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2.3. LAN Function Test

Configuration										
2500Mbps switch		ZYLXEL XGS1010-12								
1000Mbps switch		D-Link DGS-1008D								
100Mbps LAN switch		Accton Desktop-3005								
10Mbps LAN HUB		SVEC FD916H								
OnBoard LAN1		Intel® i210, 10/100/1000Base				MAC Address		00-07-32-AC-71-5B		
OnBoard LAN2		Intel® i219-LM, 10/100/2500Base				MAC Address		00-07-32-AC-71-59		
OnBoard LAN3		Intel® i225-LM, 2.5G,10/100/2500Base				MAC Address		00-07-32-AC-71-5A		
OnBoard LAN4		Intel® i225-LM, 2.5G,10/100/2500Base				MAC Address		00-07-32-AC-71-5C		
LAN Speed	Link / Speed LED	Active LED	LAN 1 / LAN2			LAN 3 / LAN 4			Note	
			Pass	Fail	N/A	Pass	Fail	N/A		
1G	1G			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	100M			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	10M			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2.5G	2.5G			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1G			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	100/10M			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Gigabit LAN Ping test <ping xxx.xxx.xx.xx -l 65500 -n 1000> (Ping loss ≤ 1)				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wake On LAN (WOL should work properly when resume from S3/S4/S5)		S3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		S4		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		S5		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LAN model name correctness				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LAN Boot (PXE) (Boot from LAN should work properly)				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Internet Browser (DHCP Server) (Visit the website should work properly)				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Access 1GB file from ftp. (Access file should not stop or error.)				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Iperf (Windows) \$sudo iperf3 -c xx.xx.xx.xx -w 1M -i 1 -t 60 (Gigabit LAN bandwidth should >				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

900Mbps) (2.5Gbps LAN bandwidth should >2.25Gbps)						
---	--	--	--	--	--	--

2.4. COM Ports Test

Test Item	Result			Note
	Pass	Fail	N/A	
Serial Modem Dial Out	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Serial Modem Ring In	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test by Modem
Serial Modem +12V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test by Multimeter
Serial Modem +5V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test by Multimeter
Transmission Test <115200bps / 15M>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2.5. RS-422 / RS-485 Test

Test Item	Result			Note	
	Pass	Fail	N/A		
RS-422 for COM1	Bi-directional transmission test <115200bps / 1.2KM>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Boot from G3 mode should functional normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RS-485 for COM1	Use ICP CON I-7044D D/IO Module (Support Auto flow control)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Half Direction transmission test <115200bps / 1.2KM>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Boot from G3 mode should functional normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2.6. Digital I/O Test

Test item	Result			Note
	Pass	Fail	N/A	
DIO VCC +5V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DIO1 ~ DIO8

2.7. USB Port Integration Test

Item	USB Port	USB2.0 ports (under OS)			USB3.2 ports (under OS)			Note
		Pass	Fail	N/A	Pass	Fail	N/A	
USB3.2 SSD:	Plextor EX1 plus type C SSD 128GB (R/W:517.46/404.96)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	ADATA EC700G USB3.2 GEN2 x1 (Kingston A1000 480G) , R/W:1032/805 MB/s	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	VANTEC NST-220C3-SG (M.2 2280 Intel 760 256GB PCIe GEN3 x4 inside) R/W:2092/1007 MB/s	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USB2.0 Flash:	TDK Media 32GB USB2.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USB3.2 Flash	ADATA UC350 USB3.2 32GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Transcend USB3.2 64GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Sandisk 64GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USB DVD ROM:	BUFFALO BDXL-PC6U2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USB keyboard:	Logitech K240	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USB mouse:	Logitech M212	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USB3.2 HUB:	Transcend TS-HUB2k	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Test item	Result			Note				
	Pass	Fail	N/A					
Check USB Flash disk already exist when system S3 resume					<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2.8. TPM Function Test

Test item	Result			Note				
	Pass	Fail	N/A					
TPM driver and version check in device manager					<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
TPM Administration under OS	TPM Information check				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Clear TPM				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
BitLocker Test	Encryption test	Click BitLocker system check			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		Encryption			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Recovery key test				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Decryption test<turn off BitLocker>				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2.9. Jumper and Connector Function Test

Test item	Result			Note		
	Pass	Fail	N/A			
LVDS voltage jumper support 3.3V / 5V selection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Inverter voltage jumper support 5V / 12V selection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Brightness control jumper	PWM mode support 0~100% modulation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	DC mode support 0~100% modulation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
COM_VSET jumper support 12V / 5V / RI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Clear CMOS will clear CMOS date , time , setting , password.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Buzzer and 4 pin Speaker test	System boot: one short beep.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	No memory found: One long beep, two short beep, pause a period of time, and loop.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Power button	One touch for power on.	Repeat 3 times	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	One touch for power off in BIOS manual.		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	One touch for system shutdown in Windows environment. (power manager need to set "press PWB for shutdown.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	> 4sec for H/W shutdown in Windows environment. (power manager need to set "press PWB do nothing.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Reset button, system reset under Windows environment.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Power LED behavior	S1(boot up): Power LED on	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	S3: Power LED off	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	S4: Power LED off	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	S5: Power LED off	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
HDD LED, active when SATA/CF/CFast/mSATA/M.2 access	SATA: Active	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	M.2(PCI-e): Inactive	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
CPU FAN	full speed can meet FAN specification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
CHA FAN	full speed can meet FAN specification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
AAFP, line out / microphone work properly.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
AMP_CON, AMP left / right channel work properly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AMP should mute when audio jack plug-in.		

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		
PCIe x16 bear card	12V, 3.3V, STB 3.3V Power LED	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Wake #	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Max Link Width test result GEN3 / x16	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bear card limit
PCIe x4 bear card	12V, 3.3V, STB 3.3V Power LED	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Wake #	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Max Link Width test result GEN3 / x4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bear card limit
M.2 (B key) bear card	3.3V,1.5, Reset Power LED	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Wake #	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Max Link Width test result GENx / x1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not support

3.2. Expansion Slot Compatibility Test

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

PCI-Express x1 card (Test on PCIe x16 / x8 / x4 / x1 slots)	Result			Note
	Pass	Fail	N/A	
DigiFusion SATAIII 6G card PES311A / AHCI mode	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel GIGABIT CT DESKTOP ADAPTER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DigiFusion PCIe GIGA LAN (Realtek RTL8111F)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sunix BASE-T Network PCIe 2.5G LAN Card	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2.5G Ethernet
Uptech UTB242 USB3.0 4 port (TI TUSB7340)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Moxa multi serial card	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PCI-Express x4 card (Test on PCIe x16 / x8 / x4 slots)	Result			Note
Pass	Fail	N/A		
High Poing RocketRAID 640L PCI-e2.0 RAID card	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vecow UE-1008 USB3.0 8 ports card	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Intel GIGABIT ET2 Quad Port Svr Adptr	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Plextor PCIe SSD M6e 128GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PCI-Express x8 card (Test on PCIe x16 & x8 slots)	Result			Note
Pass	Fail	N/A		
ASUS AMD Radeon R7250-1GD5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
High Poing RocketRAID 2720SGL PCI-e 2.0 RAID HOST	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PCI-Express x16 card (Test on PCIe x16 slot)	Result			Note
Pass	Fail	N/A		
ZOTAC GAMING GEFORCE RTX3070 TWIN EDGE 8GB 256BIT GDDR6 PCI-Express x16 Graphics Card	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
ASUS GT1030-SL-2G-BRK (NVIDIA Chipset) PCI-Express x16 VGA Card	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Nvidia RTX A4000 PCIe GEN4 x16 GDDR6 16GB Graphics card	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

M.2 2230 E key (a. WIFI should connect internet normal. (b. BT should connect BT device normal.)		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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Intel AX210NGW Wireless 6E (WIFI + BT) 802.11ax	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
M.2 2280 PCIe (a. Information and size should show correct value (b. R/W should work properly)		Result			Note	
		Pass	Fail	N/A		
M.2 2280 NVME M key	WD_BLACK SN850/ PCIe 4.0 GEN4 SSD 500G	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Transcend TSxxxGMTE652T2 GEN3x4	128GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M.2-S69
		256GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M.2-S70
		512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M.2-S71
	Transcend TSxxxGMTE662T2 GEN3x4	512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M.2-S72
		1TB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M.2-S73
		2TB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M.2-S74
	Phison M.2 2280 NVME SSD, 512GB GEN3x4 ESMP512GKBC2-E12S (Bics5)	512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Transcend TSxxxMTE710T NVME GEN4x4	256GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		1TB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Innodisk M.2 P80 4TG2-P (BiCS5) GEN4 x4	512GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		1TB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		2TB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Apacer B92.945JBU	480GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Apacer B92.945LGU	960GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

M.2 3052 / 2242 B Key (a. 4G/5G connection should work normal. (b. Storage Information and size should show correct value		Result			Note	
		Pass	Fail	N/A		
M.2 3052 B key	USB2.0 interface	QUECTEL EM06-E M.2 3042 B-Key 4G Card	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	USB3.0 interface	QUECTEL RM500Q-GL M.2 3052 B-Key 5G Card	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.Ping 168.95.1.1 for 1000 clcyes, loss<2 times. 2.Download 1GB file from website. 3.speed test > 300Mbps
M.2 2242 B Key	PCIe interface	Transcend TS128GMTE452T2-G1 128GB (B+M Key)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AP-SS9C3128G002

3.3. Expansion Card Integration Test

Test Item	Result			Note
	Pass	Fail	N/A	
1. Connect devices to all of expansion slots. 2. No error during OS and driver installation 3. All of expansion cards should work normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

3.4. Display port Converter Compatibility Test

Test Item			Result			Note
			Pass	Fail	N/A	
DP to HDMI converter: LPC-1504	Boot display	Full screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	OS display	Full screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max resolution:
DP to DVI converter: LPC-1503	Boot display	Full screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	OS display	Full screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max resolution:

4. Power Consumption Test

Configuration	
CPU	Intel® Core™ i9-12900E Processor 30M Cache, up to 5.00 GHz 65W Intel® Core™ i7-13700T Processor 1.40MHZ (30M Cache, up to 4.90 GHz)
Memory	Innodisk DDR5 4800 32GB M5U0-BGS2K5VP-26 x 4pcs (SEC K4RAH08 6VBBCQK)
Storage	Phison SSBP256GKB5G0-S17TI BiCS5 256GB
O.S	Windows 10 Enterprise English 64bit (v21H2)

4.1. Power Consumption

Test Equipment (i9-12900E 65W)						
Equipment		DC/AC TRMS mA CLAMP METER				
Manufacturer		PROVA 11				
Model name		Model 11				
Test condition						
Power supply		be quiet! BQT E7-Golden-550W POWER				
Keyboard / mouse (TYPE-C)		USB keyboard x1 ; USB mouse x1				
Test Item		Voltage	Current	P		Note
Full Loading Mode: Measure the current value when system running Burnintest test.(CPU, RAM, Network, Disk, Sound, Video, GPU, 2D, 3D, COM ports)	Peak	(+12V)	13.09	A	210.12	W
		(+5V)	9.77			
		(+3.3V)	0.89			
		(-12V)	0			
		(5VSB)	0.25			
	Steady-state	(+12V)	4.81	A	105.92	W
		(+5V)	9.13			
		(+3.3V)	0.41			
		(-12V)	0			
		(5VSB)	0.24			
CPU heavy loading: (Steady-state) Measure the current value when system running Prime95(Balance current)	(+12V)	4.92	A	84.08	W	
	(+5V)	4.34				
	(+3.3V)	0.71				
	(-12V)	0				
	(5VSB)	0.20				
Win. Idle mode: Measure the current value when system in windows mode and without running any program	(+12V)	1.23	A	27.86	W	
	(+5V)	2.13				
	(+3.3V)	0.47				
	(-12V)	0				
	(5VSB)	0.18				
S3 mode: Measure the current value when system in S3 mode of windows and without running any	(+12V)	0.19	A	1.45	W	
	(+5V)	0				
	(+3.3V)	0				
	(-12V)	0				
	(5VSB)	0.29				
S5 mode: Measure the current value when system in S5 mode of windows and without running any	(+12V)	0.18	A	0.9	W	
	(+5V)	0				
	(+3.3V)	0				
	(-12V)	0				
	(5VSB)	0.18				

Test Equipment (i7-13700T 45W)							
Equipment		DC/AC TRMS mA CLAMP METER					
Manufacturer		PROVA 11					
Model name		Model 11					
Test condition							
Power supply		be quiet! BQT E7-Golden-550W POWER					
Keyboard / mouse (TYPE-C)		USB keyboard x1 ; USB mouse x1					
Test Item		Voltage	Current	P		Note	
Full Loading Mode: Measure the current value when system running Burnintest test.(CPU, RAM, Network, Disk, Sound, Video, GPU, 2D, 3D, COM ports)	Peak	(+12V)	10.61	A	185.16	W	USB2.0 dummy load x 2 USB3.0 dummy load x 7 LAN x 4 COM loopback x 6
		(+5V)	10.53				
		(+3.3V)	1.30				
		(-12V)	0				
		(5VSB)	0.18				
	Steady-state	(+12V)	3.15	A	93.69	W	
		(+5V)	10.20				
		(+3.3V)	1.21				
		(-12V)	0				
		(5VSB)	0.18				
CPU heavy loading: (Steady-state) Measure the current value when system running Prime95(Balance current)	(+12V)	3.40	A	72.05	W		
	(+5V)	4.43					
	(+3.3V)	0.86					
	(-12V)	0					
	(5VSB)	0.80					
Win. Idle mode: Measure the current value when system in windows mode and without running any program	(+12V)	1.28	A	43.19	W	CPU utilization must ≤ 3% while idle mode	
	(+5V)	2.24					
	(+3.3V)	0.83					
	(-12V)	0					
	(5VSB)	0.23					
S3 mode: Measure the current value when system in S3 mode of windows and without running any	(+12V)	0.14	A	3.44	W		
	(+5V)	0					
	(+3.3V)	0					
	(-12V)	0					
	(5VSB)	0.32					
S5 mode: Measure the current value when system in S5 mode of windows and without running any	(+12V)	0.19	A	3.18	W		
	(+5V)	0.19					
	(+3.3V)	0.18					
	(-12V)	0					
	(5VSB)	0.18					

4.2. PC Health Status

Test Point:

Voltage deviation: ±5%.

Fan speed deviation: ±10%

CPU DTS Temp deviation: ±15°C

System Temp deviation: ±5°C

H/W monitor	Result			BIOS	Actual	Note
	Pass	Fail	N/A			
(+) 12V Actual and monitor must be ±5%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12.23 V	12.24 V	
(+) 5V Actual and monitor must be ±5%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5.04 V	5.03 V	
(+) 3.3V Actual and monitor must be ±5%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.30 V	3.27 V	

VCORE Actual and monitor must be ±5%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.95	V	0.77	V	
System Fan1 Speed Actual and monitor must be ±10%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1997	rpm	1991	rpm	
System Fan2 Speed Actual and monitor must be ±10%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1953	rpm	1956	rpm	
CPU Fan Speed Actual and monitor must be ±10%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2600	rpm	2581	rpm	
System Temp Actual and monitor must be ±5°C	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27	°C	29	°C	
CPU Temp Actual and monitor must be ±15°C	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	28	°C	30	°C	

4.3. 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.	3.08	V	4.2	uA	6.1	years	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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

5. Time Accuracy Test

5.1. System Clock & RTC Clock Test

Under Room Temperature:

Function	Item	Time Interval	Criteria	Actual		Result			Note
						Pass	Fail	N/A	
RTC Clock in Power On Mode		24 hrs	+/-2 sec	0	Sec	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RTC Clock in Power Off Mode		24 hrs	+/-2 sec	-1	Sec	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

5.2. Booting Time Test

Installation	Criteria	Actual		Note
System Booting Time < Press the Power Button till "Beep" Sound or display appears >	Booting time \leq 12sec, Pass Booting time 13~20 sec, Enhancement Booting time > 20sec, Fail	7.8	Sec	

5.3. Watchdog Timer Test

Use Function as below: Hi-Safe-v3_20221111_3_15_2_44

Time-Out Interval	Criteria	Actual		Result			Note
				Pass	Fail	N/A	
10 sec	+/- 10%	11.42	Sec	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
60 sec	+/- 10%	62.42	Sec	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
255 sec	+/- 10%	260.27	Sec	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

6. O.S. Compatibility Test

6.1. Windows 10 Enterprise English Version 64Bit v21H2

64bit Driver Information	
Chipset Software	Intel ® Chipset Device Software 3.1.7.143 (06/22/2022)
Graphics Media	Intel ® UHD Graphics 770 / 31.0.101.3959 (12/03/2022)
Audio Driver	Realtek High Definition Audio Device 6.0.9066.1 (11/17/2020) HD Audio Driver for Display Audio 31.0.101.3959 (12/3/2022)
LAN Driver	Intel ® Ethernet Connection I219-LM 12.19.2.45 (1/30/2022) Intel ® Ethernet Connection I255-LM 1.1.3.28 (3/5/2022) Intel ® I210 Gigabit Network connection 12.18.13.0 (8/29/2022)
ME Driver	Intel ® Management Engine 2219.3.0.0 (05/02/2022)

Install OS to SATA SSD & NVME:

Installation	Result			Note
	Pass	Fail	N/A	
English Windows10 Enterprise 64bit UEFI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Test Results:

Test Item	Result			Note
	Pass	Fail	N/A	
Single Display				
VGA -- Full Screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DP -- Full Screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
HDMI -- Full Screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
eDP -- Full Screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LVDS -- Full Screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Multi display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Basic Function Test				
Usable memory	32bit: GB	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	64bit: 128GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
USB Mouse and Keyboard	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
COM Port Mouse detect	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USB 2.0 Removable Devices	USB2.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	USB3.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safe to remove icon	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
TPM 2.0 detection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LAN Function Test				
LAN1 --- DHCP, connect to internet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LAN2 --- DHCP, connect to internet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LAN3 --- DHCP, connect to internet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LAN4 --- DHCP, connect to internet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Audio Function Test				
Line Out Test	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Line In Test	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Microphone Test	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Start Menu				
Log off User	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Shut down (S5)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sleep (S3)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Restart	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hibernate (S4)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

6.2. Windows 11 Enterprise English Version 64Bit v21H2

64bit Driver Information	
Chipset Software	Intel ® Chipset Device Software 3.1.7.143 (06/22/2022)
Graphics Media	Intel ® UHD Graphics 770 / 31.0.101.3959 (12/03/2022)
Audio Driver	Realtek High Definition Audio Device 6.0.9066.1 (11/17/2020) HD Audio Driver for Display Audio 31.0.101.3302 (7/29/2022)
LAN Driver	Intel ® Ethernet Connection I219-LM 12.19.2.45 (1/30/2022) Intel ® Ethernet Connection I255-LM 2.1.1.7 (2/2/2022) Intel ® I210 Gigabit Network connection 13.0.14.0 (2/24/2022)
ME Driver	Intel ® Management Engine 2219.3.0.0 (05/02/2022)

Install OS to SATA SSD :

Installation	Result			Note
	Pass	Fail	N/A	
English Windows11 Enterprise 64bit UEFI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Test Results:

Test Item	Result			Note
	Pass	Fail	N/A	
Single Display				
VGA -- Full Screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1920 x1080
DP -- Full Screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3840 x 2160
HDMI -- Full Screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3840 x 2160
eDP -- Full Screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1920 x1200
LVDS -- Full Screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1920 x1080
Multi display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Basic Function Test				
Usable memory	32bit: GB	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	64bit: 128GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
USB Mouse and Keyboard	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
COM Port Mouse detect	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USB 2.0	USB2.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Removable Devices	USB3.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Safe to remove icon	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TPM 2.0 detection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LAN Function Test				
LAN1 --- DHCP, connect to internet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LAN2 --- DHCP, connect to internet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LAN3 --- DHCP, connect to internet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LAN4 --- DHCP, connect to internet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Audio Function Test				
Line Out Test	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Line In Test	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Microphone Test	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Start Menu				
Log off User	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Shut down (S5)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sleep (S3)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Restart	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hibernate (S4)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

7. BIOS Function Test

Configuration	
CPU	Intel® Core™ i9-13900E Processor 1.80 GHz 65W
Memory	Innodisk DDR5 4800 32GB M5U0-BGS2K5VP-26 x 4pcs (SEC K4RAH08 6VBBCQK)
Storage	Phison SSBP256GKB5G0-S17TI BiCS5 256GB
OS	Windows 10 Enterprise English 64bit (v21H2)

7.1. Advanced Test

Test Item (Following item should work properly)		Result			Note
		Pass	Fail	N/A	
CPU configuration	Information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Hyper-threading	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Enabled /Disabled
	Virtualization Technology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Enabled /Disabled
Trusted Computing	TPM SUPPORT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Clear TPM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PTT Configuration	TPM Device Selection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	dTPM / PTT
SATA Configuration	SATA Controller	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Enable VMD controller	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	SATA6G 0 ~ 7port	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Hot plug	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USB Configuration	USB Mass Storage Driver Support	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hardware Monitor	Temperature	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Fan Speed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Voltage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SIO Configuration	Serial port 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Enabled /Disabled
	RS232	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	RS422	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	RS485	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Serial port 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Serial port 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Serial port 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Serial port 5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PCH-FW Configuration	ME version 16.1.25.1865	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ME version can't be 0.0.0.0
NVME Configuration		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Power Mode	ATX Type	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Restore AC Power Loss	Last State	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Always On	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Always Off	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RI Wake Event		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RTC Wake System from S5	Disabled	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Fixed Time	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Dynamic Time	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Digital IO port Configuration	DIO port 1~8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MEBx	Intel AMT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Enabled /Disabled
	Un-configure ME	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
After BIOS menu modified, check if system reset time is too long.		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(example > 20sec)

7.2. Chipset Test

Test Item (Following item should work properly)		Result			Note	
		Pass	Fail	N/A		
System Agent (SA) Configuration	Memory Configuration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	CH7513	Disabled	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		eDP	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		LVDS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PCH-IO Configuration	HD Audio	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Enabled /Disabled	

7.3. Boot Test

Test Item (Following item should work properly)		Result			Note
		Pass	Fail	N/A	
Quiet Boot		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Network Stack		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Boot From Hard Disk		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Boot From CDROM		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Boot From USB HDD		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Boot From USB Floppy		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Boot From USB CD-ROM		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Disable		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

7.4. Clear CMOS and Load Default Test

Test Item (Following item should work properly)		Result			Note
		Pass	Fail	N/A	
Clear CMOS by jumper (under G3 status)		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Clear date, time, setting, password, secure boot
Clear CMOS by remove battery (under G3 status)		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Clear date, time, setting, password, secure boot
Load default	Date, time, password should be kept	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	BIOS setting should be restored to default.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Boot option priorities should restore from disable to default.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

7.5. Supervisor / User Password Test

Test Item (Following item should work properly)		Result			Note
		Pass	Fail	N/A	
Administrator Password	Password Case Sensitive	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	If admin password only, system should not entry BIOS menu by press "Enter key".	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
User Password	Password Case Sensitive	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Secure boot enable	System can't boot into UEFI shell	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Boot into Windows should work normal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

7.7. Hi-safe Test

Test Item (Following item should work properly)		Result			Note
		Pass	Fail	N/A	
Hi-Safe-v3_20221111_3_15_2_44		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MA67A
System Information	CPU Information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Model Name	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Display Information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	RAM Information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
H/W Monitor	Info	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Fan Speed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Temperature	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Voltage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DIO	DIO1~4 High	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DIO1~4 Low	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DIO5~8 High	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DIO5~8 Low	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WatchDog	10sec	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Actual 11.24 sec
	1min	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Actual 62.42sec
	255sec	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Actual 260sec
	Auto Reload	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SmartFan	CPU Fan manual	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	CPU Fan Auto	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SMBus	Device Address	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0xA0
	Read Byte	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Read Word	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Result / Read	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Backlight controller	LVDS Mode Brightness 0~100	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	eDP mode Brightness 0~100	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

7.8. Hi-Manager Test

Test Item (Following item should work properly)		Result			Note
		Pass	Fail	N/A	
Version(20130819)		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Power control	Power on	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Power off	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Reset	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Power on from G3 state	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Group Management		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Event log		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Alarm Clock	Set Alarm Time	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Recurring Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Remote Recovery		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Remote Reboot/ Reboot from CD ROM/Reboot from ISO (Reboot to BIOS no support)
KVM		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test with i9-12900TE
Schedule		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

7.9. Negative Test

7.9.1 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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

7.9.2 Suspend S3 Negative Test

Methods		Result			Note
		Pass	Fail	N/A	
1. Resume from S3. 2. Confirm com ports(RS232/422/485), DIO, Smart Fan, LVDS backlight control, USB ports, HDMI/DP audio can work properly.	RS232/422/485	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DIO	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	SmartFan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	LVDS Backlight control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	USB ports	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DP/HDMI audio	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

7.9.3 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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

8. Performance Test

Configuration	
CPU	Intel® Core™ i9-13900E Processor 1.80 GHz 65W
Memory	Innodisk DDR5 4800 32GB M5U0-BGS2K5VP-26 x 4pcs (SEC K4RAH08 6VBBCQK)
Storage	Phison SSBP256GKB5G0-S17TI BiCS5 256GB
OS	Windows 10 Enterprise English 64bit (v21H2)

8.1. System Performance Test

Test Result: (Display set 1920*1080 test)

Testing Software	Criteria	Result		
		Pass	Fail	N/A
PCMark 10 v2-1-2574	1. No error or hang during test. 2. To compare with reference score and the deviation should < -20%.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Score	Note		
PCMARK10 Score	6579			
Essentials	12272			
Productivity	10164			
Digital Content Creation	6196			

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%.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Score	Note		
Score	9140			
Graphics score	8085			
Graphics test 1	34.60FPS			
Graphics test 2	39.57FPS			
Physics score	27863			
8 threads	274.14FPS			
24 threads	235.94FPS			
48 threads	160.06FPS			
96 threads	93.63FPS			
Combined score	8887			
Combined test	36.58FPS			

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%.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Score	Note		
Score	2460			
Graphics score	2530			
Graphics test 1	11.67FPS			
Graphics test 2	10.41FPS			
Physics score	27532			
Physics test	87.40FPS			
Combined score	956			

Combined test	4.45FPS	
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Testing Software	Criteria	Result		
		Pass	Fail	N/A
Performance Test 10.2	1. No error or hang during test. 2. To compare with reference score and the deviation should < -20%.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Score	Note		
PassMark Rating	3757.9			
CPU Mark	35834.9			
2D Graphics Mark	347.4			
3D Graphics Mark	1857.9			
Memory Mark	3003.4			
Disk Mark	34781.2			

8.2. Performance of Storage Interface Test

SATA Performance				
SATA SSD	Phison SSBP256GKB5G0-S17TI BiCS5 256GB			
Item	Comment / (unit)	Software	Score	Note
SATAIII ports	Maximum Read	ATTO Disk Benchmark	561MB/s	SATAIII up 300M/B
	Maximum Write	ATTO Disk Benchmark	249MB/s	

USB2.0 / USB3.2 / USB4 Performance				
USB3.0 SSD	Plextor EX1 plus type C SSD 128GB (R/W:517.46/404.96)			
USB3.2 GEN2 x1 SSD	ADATA EC700G USB3.2 GEN2 x1 (Kingston A1000 480G) , R/W:1032/805 MB/s			
Type C USB 3.2 GEN2 x2 SSD	VANTEC NexStar SX NST-220C3-SG (M.2 2280 Intel 760 256GB PCIe GEN3 x4 inside) R/W:2092/1007 MB/s			
Item	Comment / (unit)	Software	Transfer Rate (MB/s)	Note
USB_11_12 USB2.0 ports	Maximum Read	ATTO Disk Benchmark	43MB/s	>20MB/s
	Maximum Write	ATTO Disk Benchmark	41MB/s	
USB3_1_2 ports USB3.2(Gen2) Type A	Maximum Read	ATTO Disk Benchmark	1073MB/s	>850MB/s
	Maximum Write	ATTO Disk Benchmark	986MB/s	
USB3_3_4 ports USB3.2(Gen2) Type A	Maximum Read	ATTO Disk Benchmark	1076MB/s	>850MB/s
	Maximum Write	ATTO Disk Benchmark	991MB/s	
USB7 USB3.2 Gen1 Type A	Maximum Read	ATTO Disk Benchmark	465MB/s	>450MB/s
	Maximum Write	ATTO Disk Benchmark	452MB/s	
USB3(Gen1) _56 ports	Maximum Read	ATTO Disk Benchmark	465MB/s	>450MB/s
	Maximum Write	ATTO Disk Benchmark	460MB/s	
USB 3.2 GEN2 x2 Type C	Maximum Read	ATTO Disk Benchmark	2034MB/s	>1800MB/s
	Maximum Write	ATTO Disk Benchmark	1262MB/s	

M.2 2280 performance				
M.2 (PCI-e interface) GEN4/4x	WD_BLACK SN850/ PCIe 4.0 GEN4 SSD 500G			
Item	Comment / (unit)	Software	Transfer Rate (MB/s)	Note
M.2 (PCI-e interface) GEN4/4x	Maximum Read	Crystal Diskmark	6956MB/s	GEN4/4x: 6650MB/s
	Maximum Write	Crystal Diskmark	4334MB/s	

9. Stability test

Configuration	
CPU	Intel® Core™ i7-13700T Processor 30M Cache, up to 4.90 GHz
Memory	Innodisk DDR5 4800 32GB M5U0-BGS2K5VP-26 x 4pcs (SEC K4RAH08 6VBBCQK)
Storage	Phison SSBP256GKB5G0-S17TI BiCS5 256GB
OS	Windows 10 Enterprise English 64bit (v21H2)
Environment	Under room temperature.

9.1. Run In Test

OS: Windows 10 Enterprise English 64bit

Test Item	Result			Note	
	Pass	Fail	N/A		
Burn In Test V10.2(1004 above) Duty: 100 Time: over 12 hours <System should not error or hang during testing.>	CPU	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	RAM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	COM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Speed Set "Cycle to 115200."
	GPU	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Video	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2D	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	3D	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DirectX: 9
	Disk	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Sound	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Network <Advanced>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	USB	2.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.0		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

9.2. Reboot Test

OS: Windows 10 Enterprise English 64bit

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 >	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Win+R -> systempropertiesadvanced.exe -> startup and recovery setting -> automatically restart

9.3. Power button on/off Test

OS: DOS or UEFI shell

Condition:

1. On/off fixture set power on -1sec; power off -40sec.

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.>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

9.4. System stability after S3 / S4 / S5 cycles

OS: Windows 10 Enterprise English 64bit

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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

9.5. PCI Device Scan Test

OS: 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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

9.6. G3 cold boot test.

9.6.1 Max and Min voltage test

OS: DOS or UEFI shell

Condition:

2. BIOS select "power on" mode.
3. On/off fixture set power on -40sec; power off -20sec.
1. Max voltage: SPEC supported voltage input +5%, example 12V+5%=12.6V
2. Min voltage: SPEC supported voltage input -5%, example 12V-5%=11.4V
3. If width voltage input, follow SPEC to test voltage, example 9~36, or 12~24

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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Min voltage input / 1000 times power on/off	11.4		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

9.6.2 AC power restored in short time test

OS: DOS or UEFI shell

Condition:

1. H/W [auto power button] need to set enable.
2. On/off fixture set power on -40sec; power off -5sec.

Test item	Criteria	Result			Note
		Pass	Fail	N/A	
AC power restored in short time / 20	loss rate: 0 /20 times.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

times power on/off					
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9.7. Heavy loading test with Max/Min voltage.

OS: Windows10 Enterprise 64bit
AP: Intel TAT or Prime95 (Use TAT as first priority)

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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Min voltage input / 2 hours heavy loading	11.4		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	