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## TEST REPORT

Project No.: TM-2503000131P Applicant: 7Starlake Co., Ltd.

Address: 2F., No.190, Sec 2, Zhongxing Rd., Xindian Dist.,

New Taipei City, 23146, Taiwan.

Manufacturer: 7Starlake Co., Ltd.

Address: 2F., No.190, Sec 2, Zhongxing Rd., Xindian Dist.,

New Taipei City, 23146, Taiwan.

**Equipment Under Test (EUT):** 

Name: IP65 1CH 3G-SDI GPU Computer

**Brand Name: 7Starlake** Model No.: AV600-RH-AB Added Model(s): N/A

#### Standards:

EN 55032: 2015 + A11: 2020 + A1: 2020, Class A CISPR 32: 2015 + A1: 2019	BS EN 55032: 2015 + A11: 2020 + A1: 2020
EN IEC 61000-3-2: 2019 + A1: 2021	BS EN IEC 61000-3-2: 2019 + A1: 2021
EN 61000-3-3: 2013 + A1: 2019 + A2: 2021 + AC: 2022	BS EN 61000-3-3: 2013 + A1: 2019 + A2: 2021
EN 55035: 2017 + A11: 2020	BS EN 55035: 2017 + A11: 2020
IEC 61000-4-2: 2008	IEC 61000-4-6: 2023
IEC 61000-4-3: 2020 (Ed. 4.0)	IEC 61000-4-8: 2009
IEC 61000-4-4: 2012	IEC 61000-4-11: 2020 + COR1: 2020 + COR2: 2022 (Ed. 3.0)
IEC 61000-4-5: 2014 + A1: 2017	

Date of Sample Receipt: March 10, 2025

**Date of Test** : April 14, 2025 & April 15, 2025

**Date of Issue** : April 23, 2025

### Remarks:

This test report can be used for CE and UKCA marking application which is based on equivalent requirements between UK and EU. It is appropriate using designated standards to provide presumption of conformity with GB law.

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#### Disclaimer

Variants information between/among model numbers / trademarks is provided by the applicant, test results of this test report are applicable to the sample EUT received of main test model name

Approved By

Date

Stanley Cheng (Supervisor of engineering dept.)

Starley Cheng





Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留 90 天。本報告未經本公司書面許可,不可部份複製

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Revision History				
Revision	evision Report Number Description Issue Date			
00	TMXD2503000778DE	Original.	April 23, 2025	

Note:



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# 1. General Description

### 1.1 General Description of EUT

Name of EUT	IP65 1CH 3G-SDI GPU Computer
Brand Name	7Starlake
Model No.(s)	AV600-RH-AB
Added Model(s)	N/A
Variant Description	N/A

### 1.2 Details of EUT

EUT Power Rating	18-36VDC from DC Power Supply
Highest internal frequency	5000MHz

### **Accessories Cable List**

Cable Type	Core	Length	Category	Shielding/Non-shielding
DC Power Cable	N/A	2.0m	N/A	Non-shielding
USB Cable (M12) X2	N/A	2.0m	N/A	Shielding
HDMI Cable (M12)	1	1.8m	N/A	Shielding
2x COM+1x LAN with D38999 Connector Cable (M12)	N/A	2.0m	N/A	Shielding
SDI Cable	N/A	20m	N/A	Shielding

### 1.3 Description of Support Units

### **EUT Devices:**

No.	Equipment	Model No.	Brand Name
1	MB	SK516	Perfectron
2	CPU (2.50GHz)	i7-13800HRE	Intel
3	Memory (16GB / DDR5)	SO-DIMM	Samsung
4	Storage (512GB / SSD)	2.5" SATA3	Silicon Power
5	Power	SK711	Perfectron



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**Peripherals Devices:** 

No.	PRODUCT	MANUFACTURER	MODEL NO.	SERIAL NO.
1	USB Mouse	Logitech	M-U0026	N/A
2	USB Keyboard	Logitech	YU0036	2332SC30ZQN8
3	Rugged smart Display	Perfectron	SKY15	N/A
4	Server PC	DELL	Precision 3640 Tower	FQNLFF3
5	Mini-Converter	AJA	HI5-4K-PLUS	N/A
6	Monitor	ASUS	PA248QVY	R2LMQS085331
7	DC Power Supply	CHROMA	62024-80-60	62024PA02859
8	Ground Wired	N/A	N/A	N/A
9-10	COM Loopback	N/A	N/A	N/A

**Support Equipment Used in Tested Cable** 

No.	Cable Type	Core	Length	Shielding/Non-shielding
1-2	USB	N/A	3.8m	Shielding
3	HDMI	1	1.8m	Shielding
4	RJ45 (CAT6A)	N/A	22.0m X2	Shielding
5	SDI	N/A	20m	Shielding
6	HDMI	N/A	1.8m	Shielding
7	DC Power	N/A	3.8m	Non-shielding
8	Ground	N/A	1.5m	Non-shielding
9-10	COM	N/A	2.0m	Shielding

### 1.4 I/O Port Description

	I/O Port Types	Q'TY
1.	HDMI Port (M12)	1
2.	USB Port (M12)	2
3.	LAN Port (M12)	1
4.	SDI Out Port	1



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### 1.5 Decision of Test Mode

The test configuration/ modes are as the following:

### **Conduction Modes (Power port):**

1	HDMI 1024*768@60Hz	28VDC
2	HDMI 1024*768@60Hz	36VDC

### **Conduction Modes (Wired network ports):**

1	10Mbps
2	100Mbps
3	1Gbps
4	2.5Gbps
5	SDI

### **Radiation Modes:**

1	HDMI 1024*768@60Hz	18VDC
	HDMI 1024*768@60Hz	36\/DC
	HDMI 1024*768@60Hz / 1-6GHz	36VDC

### 1.6 The Final Test Mode of the EUT

After the preliminary scan, the following test mode was found to produce the highest emission level.

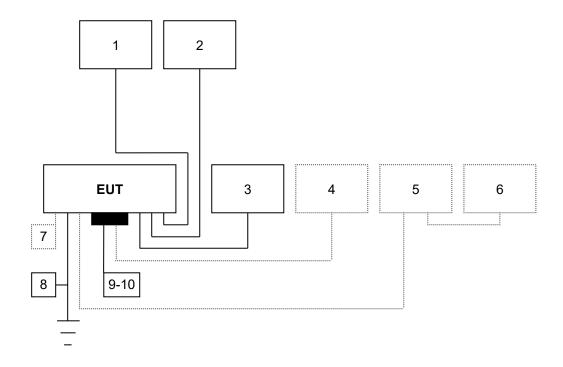
Final Test Mode			
Conducted Emission	Mode 2		
ISN	Mode 1		
Radiated Emission Below 1GHz	Mode 2		
Radiated Emission Above 1GHz	Mode 2		
Harmonics & Flicker	N/A		
Immunity	Mode 2		

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.



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### 1.7 Configuration of Tested System



### 1.8 Operation Procedure

- 1. Windows 10 boots system.
- 2. Run BurnInTest.exe to activate all peripherals to test EUT.
- 3. Run colorbarmove.mp4 to activate all peripherals for test EUT.
- 4. Run LanTest.exe to ping 192.168.1.1 -t (EUT), ping 192.168.1.99 -t (Server PC).



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### 1.9 Summary of Results

Emission				
Standard	Test Type	Result		
EN 55032: 2015 + A11: 2020 + A1: 2020	Conducted Emission	PASS		
CISPR 32: 2015 + A1: 2019 BS EN 55032: 2015 + A11: 2020 + A1: 2020	ISN	PASS		
	Radiated Emission	PASS		
EN IEC 61000-3-2: 2019 + A1: 2021 BS EN IEC 61000-3-2: 2019 + A1: 2021	Harmonic current emissions	N/A		
EN 61000-3-3: 2013 + A1: 2019 + A2: 2021 + AC: 2022 BS EN 61000-3-3: 2013 + A1: 2019 + A2: 2021	Voltage changes, voltage fluctuations & flicker	N/A		

Immunity					
Standard	Test Type	Result	Performance Criteria		
IEC 61000-4-2: 2008	ESD	PASS	В		
IEC 61000-4-3: 2020 (Ed. 4.0)	RS	PASS	Α		
IEC 61000-4-4: 2012	EFT	PASS	В		
IEC 61000-4-5: 2014 + A1: 2017	Surge	PASS	В		
IEC 61000-4-6: 2023	CS	PASS	Α		
IEC 61000-4-8: 2009	PFMF	N/A	А		
IEC 61000-4-11: 2020 + COR1: 2020 + COR2: 2022 (Ed. 3.0)	DIP	N/A	C/C/B		

### 1.10 Reporting Statements of Conformity

The conformity statement in this report is based solely on the test results, measurement uncertainty is excluded.

### 1.11 Deviation

No deviation from the mentioned test methods and applicable standards.



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## 2. EMISSION

### 2.1 Limit

### **Maximum permissible level of Line Conducted Emission**

FREQUENCY	Class A(dBuV)		Class B(dBuV)	
(MHz)	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note: The lower limit shall apply at the transition frequency.

# <u>Maximum permissible level of Common Mode Conducted Emission</u> (Asymmetric Mode)

### Class A

FREQUENCY	Voltage Limit(dBuV)		Current Limit(dBuA)	
(MHz)	(MHz) Quasi-peak		Quasi-peak	Average
0.15 - 0.5	97 - 87	84 - 74	53 - 43	40 - 30
0.5 - 30.0	87	74	43	30

### Class B

9.5.50 2						
FREQUENCY	Voltage Limit(dBuV)		Current Limit(dBuA)			
(MHz)	Quasi-peak	Average	Quasi-peak	Average		
0.15 - 0.5	84 - 74	74 - 64	40 - 30	30 - 20		
0.5 - 30.0	74	64	30	20		

Note: The lower limit shall apply at the transition frequency.

### Maximum permissible level of Radiated Emission measured at 10 meter

FREQUENCY	Class A(dBuV/m)	Class B(dBuV/m)	
(MHz)	Quasi - peak	Quasi - peak	
30 - 230	40	30	
230 - 1000	47	37	

Note: The lower limit shall apply at the transition frequency.



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### Maximum permissible level of Radiated Emission measured at 3 meter

Frequency range	Class A(dBuV/m)	Class B(dBuV/m)
(MHz)	Quasi - peak	Quasi - peak
30 - 230	50	40
230 - 1000	57	47

Note: The lower limit shall apply at the transition frequency.

### Limits above 1 GHz

### Limits for radiated disturbance of Class A ITE at a measurement distance of 3m

Frequency range (GHz)	Average Limit dB(µV/m)	Peak Limit dB(µV/m)
(GHZ)	\1 /	(1)
1 - 3	60	80
3 - 6	60	80

Note: The lower limit applies at the transition frequency.

### Limits for radiated disturbance of Class B ITE at a measurement distance of 3m

Fre	equency range	Average Limit	Peak Limit
	(GHz)	dB(μV/m)	dB(μV/m)
	1 - 3	54	74
	3 - 6	54	74

Note: The lower limit applies at the transition frequency.

### Requirements for radiated emissions from FM receivers

Frequency range		Class B Limit dB(µV/m)			
(MHz)	Facility	Distance (m)	Detector type / Bandwidth	Fundamental	Harmonics
30 - 230		10	Quasi Peak / 120 kHz	50	42
230 - 300	OATS/SAC				42
300 - 1000					46
30 - 230		ATS/SAC 3	Ougoi Dook /	60	52
230 - 300	OATS/SAC		Quasi Peak / 120 kHz		52
300 - 1000					56

These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the LO. Signals at all other frequencies shall be compliant with the limits

Note: SAC: Semi Anechoic Chamber OATS: Open Area Test Site



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### 2.2 Conducted Emission

### 2.2.1 Test Instruments

Conducted Emission Room # A									
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due				
Pulse Limiter	Schwarzbeck	VTSD 9561-F	BNC#211	03/13/2025	03/12/2026				
BNC CABLE	EMEC	EMG178	BNC#A9	03/13/2025	03/12/2026				
EMI Test Receiver	R&S	ESCI	101201	08/13/2024	08/12/2025				
LISN	Schwarzbeck	NNLK 8129	8129-286	06/24/2024	06/23/2025				
LISN(EUT)	Schwarzbeck	NSLK 8127	8127526	06/24/2024	06/23/2025				
Thermo-Hygro Meter	Wisewind	201A	SD-R038	06/26/2024	06/25/2025				
Current Sensor Probe	Teseq	CSP 9160A	76115	08/21/2024	08/20/2025				
Test S/W		EZ-EMC Ver.CCS-03A1							

Testing Site: No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan

Measurement Uncertainty of Conducted Emission

Expanded uncertainty Ulab (k=2) of Conducted Emission is 2.8 dB.

Expanded uncertainty Ulab (k=2) of ISN Conducted Emission is 2.8 dB.

Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of Conducted Emission measurement is 3.8 dB.

Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of ISN Conducted Emission measurement is 4.0 dB.

### 2.2.2 Measurement Level Calculation

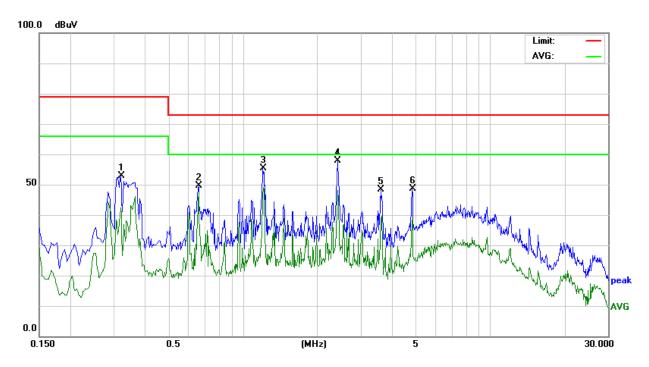
Factor = LISN insertion loss + Cable loss + Pulse Limiter insertion loss Measurement Level = Reading Level + Factor Over (Margin) = Measurement Level – Limit



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### 2.2.3 Measurement Data (CE)

Model No.	AV600-RH-AB	6dB Bandwidth	9 kHz
Environmental Conditions	21.5°C, 58% RH	Test Mode	Mode 2
Tested by	Alex Wang	Phase	L1
Standard	EN 55032 CLASS A	Test Date	2025/04/14



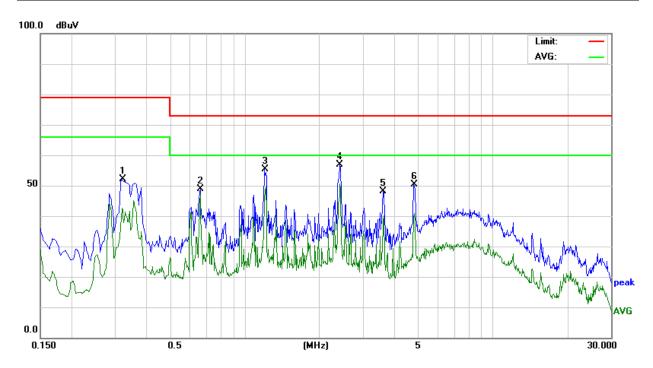
	Conducted Emission Readings										
Frequ	Frequency Range Investigated				150 kHz to	30 MHz					
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)				
0.3209	42.71	10.15	52.86	79.00	-26.14	Р	L1				
0.6630	39.44	10.18	49.62	73.00	-23.38	Р	L1				
1.2075	45.16	10.24	55.40	73.00	-17.60	Р	L1				
2.4090	47.45	10.33	57.78	73.00	-15.22	Р	L1				
3.6105	38.08	10.41	48.49	73.00	-24.51	Р	L1				
4.8435	38.12	10.47	48.59	73.00	-24.41	Р	L1				

**Note:** 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).



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Model No.	AV600-RH-AB	6dB Bandwidth	9 kHz
Environmental Conditions	21.5°C, 58% RH	Test Mode	Mode 2
Tested by	Alex Wang	Phase	L2
Standard	EN 55032 CLASS A	Test Date	2025/04/14



	Conducted Emission Readings										
Frequ	Frequency Range Investigated				150 kHz to	30 MHz					
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)				
0.3209	42.00	10.14	52.14	79.00	-26.86	Р	L2				
0.6629	38.65	10.16	48.81	73.00	-24.19	Р	L2				
1.2074	45.10	10.21	55.31	73.00	-17.69	Р	L2				
2.4134	46.57	10.28	56.85	73.00	-16.15	Р	L2				
3.6105	37.85	10.36	48.21	73.00	-24.79	Р	L2				
4.8165	40.06	10.42	50.48	73.00	-22.52	Р	L2				

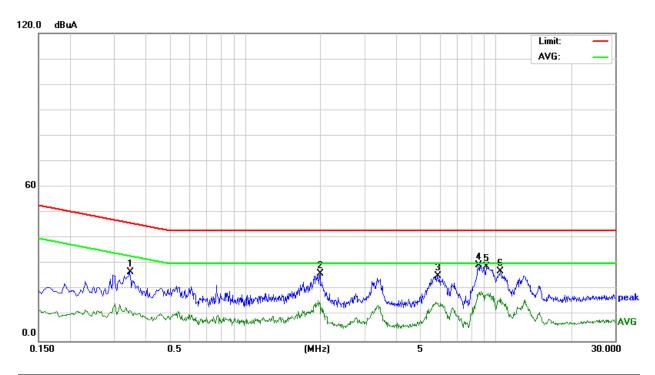
Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).



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### 2.2.4 Measurement Data (ISN)

Model No.	AV600-RH-AB	6dB Bandwidth	9 kHz
Environmental Conditions	21.5°C, 58% RH	Test Mode	Mode 1
Tested by	Alex Wang	Test Date	2025/04/14
Standard	EN 55032 CLASS A		



	Conducted Emission Readings									
Fred	Frequency Range Investigated			150 kHz to 30 MHz						
Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector (P/Q/A)				
0.3480	16.55	10.40	26.95	46.01	-19.06	Р				
1.9950	15.75	10.47	26.22	43.00	-16.78	Р				
5.8605	14.60	10.61	25.21	43.00	-17.79	Р				
8.5020	18.88	10.69	29.57	43.00	-13.43	Р				
9.1770	18.31	10.71	29.02	43.00	-13.98	Р				
10.4100	16.37	10.77	27.14	43.00	-15.86	Р				



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### 2.3 Radiated Emission

### 2.3.1 Test Instruments

### **Below 1GHz**

Open Area Test Site # H									
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due				
Bilog Antenna	Teseq	CBL 6112D	36995	05/29/2024	05/28/2025				
Cable	EMEC	CFD400E-LW	SD-R074	08/08/2024	08/07/2025				
EMI Test Receiver	R&S	ESCI	101340	01/14/2025	01/13/2026				
Pre-Amplifier	HP	8447D	1937A01554	09/20/2024	09/19/2025				
Thermo-Hygro Meter	Wisewind	201A	No. 03	04/29/2024	04/28/2025				
Test S/W	_	EZ-EMC Ver.CCS-03A1							

Testing Site: No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan

Measurement Uncertainty of Radiated Emission

Expanded uncertainty Ulab (k=2) of Radiated Emission is 5.1 dB.(30MHz-1000MHz)

Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of Radiated Emission measurement is 5.2 dB.(30MHz-1000MHz)

### **Above 1GHz**

	Chamber # E									
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due					
Horn Antenna	ETS-Lindgren	3117	00139062	05/30/2024	05/29/2025					
Microflex Cable x 7m	JMT	LF01	SD-R097	05/30/2024	05/29/2025					
K-Type Cable x 1m	JMT	LK01	SD-R087	05/29/2024	05/28/2025					
Pre-Amplifier	Com-Power	PAM-118A	551041	05/29/2024	05/28/2025					
Signal Analyzer	R&S	FSV40	101269	05/28/2024	05/27/2025					
Thermo-Hygro Meter	NDr.AV	GM-108A	SD-R099	07/15/2024	07/14/2025					
Test S/W		EZ-EMC Ver.CCS-03A1								

Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan

Measurement Uncertainty of Radiated Emission

Expanded uncertainty (k=2) of Radiated Emission measurement is 4.6 dB.(1-6GHz)

Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of Radiated Emission measurement is 5.5 dB.(1-6GHz)

### 2.3.2 Measurement Level Calculation

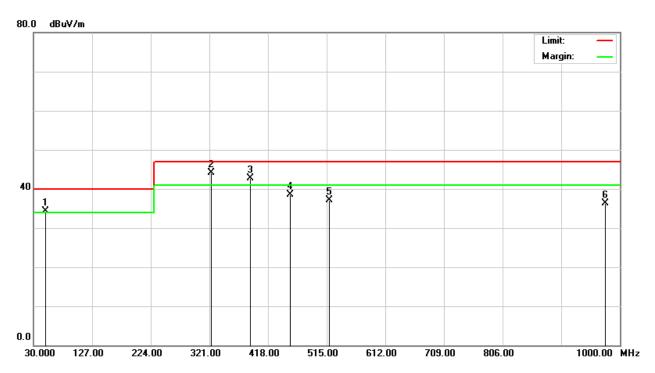
Correction Factor = Antenna Factor + Cable loss- Amplifier Gain Measurement Level = Reading Level + Correction Factor Over (Margin) = Measurement Level – Limit



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# 2.3.3 Measurement Data Below 1GHz

Model No.	AV600-RH-AB	Test Mode	Mode 2
Environmental Conditions	18.6°C, 65% RH	6dB Bandwidth	120 kHz
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Alex Wang
Standard	EN 55032 CLASS A	Test Date	2025/04/15



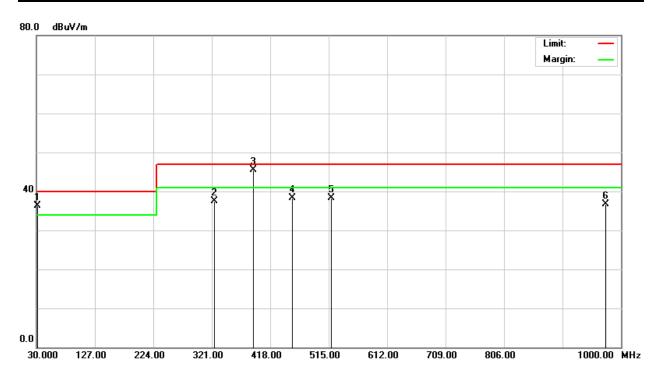
Radiated Emission Readings										
Frequency Range Investigated					30 N	/IHz to 10	00 MHz a	t 10m		
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Lin (dBu)		Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
50.6900	46.50	-12.23	34.27	40.	00	-5.73	100	156	Q	V
324.6200	48.80	-4.70	44.10	47.	00	-2.90	100	64	Q	V
389.5100	45.30	-2.69	42.61	47.	00	-4.39	100	259	Q	V
454.2700	39.52	-0.99	38.53	47.	00	-8.47	400	331	Q	V
519.6800	36.80	0.27	37.07	47.	00	-9.93	400	84	Q	٧
975.8400	30.20	6.06	36.26	47.	00	-10.74	400	195	Q	V

Note: 1. P= Peak Reading; Q= Quasi-peak Reading.



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Model No.	AV600-RH-AB	Test Mode	Mode 2
Environmental Conditions	18.6°C, 65% RH	6dB Bandwidth	120 kHz
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Alex Wang
Standard	EN 55032 CLASS A	Test Date	2025/04/15



	Radiated Emission Readings											
Fre	equency R	ange Inves	tigated			30	MHz to 10	000 MHz a	ıt 3m			
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Lin (dBu)		Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)		
32.1500	39.10	-2.81	36.29	40.	00	-3.71	400	269	Q	Н		
324.9500	42.10	-4.69	37.41	47.	00	-9.59	400	84	Q	Н		
389.6200	48.20	-2.69	45.51	47.	00	-1.49	400	113	Q	Н		
454.9700	39.20	-0.97	38.23	47.	00	-8.77	100	75	Q	Н		
519.2700	38.10	0.25	38.35	47.	00	-8.65	100	204	Q	Н		
975.2800	30.60	6.06	36.66	47.	00	-10.34	100	95	Q	Н		

Note: 1. P= Peak Reading; Q= Quasi-peak Reading.



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### **Above 1GHz**

Model No.	AV600-RH-AB	Test Mode	Mode 2	
Environmental Conditions	22.8°C, 54% RH	6dB Bandwidth	1 MHz	
Antenna Pole	Vertical / Horizontal	Antenna Distance	3m	
Highest frequency generated or used	5000MHz	Upper frequency	6000MHz	
Detector Function	Peak and average.	Tested by	Alex Wang	
Standard	EN 55032 CLASS A	Test Date	2025/04/15	

	Radiated Emission Readings										
Frequ	Frequency Range Investigated				Above 1GF	Iz at 3m					
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)				
1035.000	54.96	-9.03	45.93	80.00	-34.07	Р	V				
1295.000	48.56	-7.64	40.92	80.00	-39.08	Р	V				
1880.000	47.79	-4.82	42.97	80.00	-37.03	Р	V				
4115.000	48.50	-3.55	44.95	80.00	-35.05	Р	V				
5210.000	46.59	-1.34	45.25	80.00	-34.75	Р	٧				
5925.000	46.34	-0.04	46.30	80.00	-33.70	Р	V				

	Radiated Emission Readings										
Frequency Range Investigated				Above 1GHz at 3m							
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)				
1040.000	56.50	-9.18	47.32	80.00	-32.68	Р	Н				
1385.000	49.62	-7.46	42.16	80.00	-37.84	Р	Н				
1900.000	48.57	-4.62	43.95	80.00	-36.05	Р	Н				
3495.000	48.14	-3.59	44.55	80.00	-35.45	Р	Н				
4455.000	51.24	-2.44	48.80	80.00	-31.20	Р	Н				
5935.000	46.45	-0.05	46.40	80.00	-33.60	Р	Н				

**Note:** 1. P= Peak Reading; A= Average Reading.



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# 3. Harmonics

### 3.1 Test Instruments

	Immunity A										
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due						
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan											

### 3.2 Measurement Data

Remark: N/A: The subject equipment is not intended to be connected to AC mains supply. Therefore, this test is not applicable.



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## 4. Flicker

### 4.1 Test Instruments

	Immunity A										
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due						
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan											

### 4.2 Measurement Data

Remark: N/A: The subject equipment is not intended to be connected to AC mains supply. Therefore, this test is not applicable.



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## **5.IMMUNITY**

### 5.1 STANDARD PERFORMANCE CRITERIA DESCRIPTION

- Criterion A The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- Criterion B The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- Criterion C Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.



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### 5.2 SPECIAL PERFORMANCE CRITERIA DESCRIPTION

### 5.2.1 Performance Criteria Description for Print function

- Criterion A Apply criterion A as defined in 8.2. Additionally, the following shall not occur as a consequence of the application of the disturbance:
  - · change of operating state;
  - unintended pausing of the print operation;
  - a change of print quality or legibility, as appropriate to the test pattern;
  - · change of character font;
  - unintended line feed;
  - · unintended page feed;
  - paper feed failure.
- Criterion B Apply criterion B as defined in 8.3 with the following specifics and additional limitations. Paper feed failures are allowed only if, after removal of the jammed sheets, the job is automatically recovered and there is no loss of printed information. Any low-quality print output caused by the application of the disturbance shall not continue beyond the sheet of media being printed, or beyond the typical length of a finished page or sheet printed from continuous roll media. False indicators are permitted during the test provided that a normal operator response to that false indicator is simple (such as pressing a button). False indicators are not acceptable if they would cause the user to discard printing supplies such as ink, toner or paper, when those supplies are actually not empty or faulty. Any false indicator shall either clear automatically or after the operator's response. After the disturbance, the print function may print the remainder of the print job at a quality level within the manufacturer's specifications. Alternately, the print function may halt processing of a print job as a result of the disturbance, but only if the operator is capable of reprinting the job (for example, a fax printing job where the image to be printed still resides in local memory). Automatically restarting the print job from the beginning is also acceptable. In any scenario, the pairing of front and back images during double-sided printing shall be correct.
- Criterion C Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.



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### 5.2.2 Performance Criteria Description for Scan function

- Criterion A Apply criterion A as defined in 8.2. Additionally, the following shall not occur as a consequence of the application of the test:
  - change of settings, such as which side(s) of the page to be scanned, colour or monochrome, and resolution;
  - corruption of the image, for example stretching, compressing or change in colour;
  - paper feed failures;
  - errors in the reading of bar codes.
- Criterion B Apply criterion B as defined in 8.3 with the following specifics and additional limitations.
  - Document feed failures are allowed only if the original documents are undamaged and, after removal of the jammed sheets, the job is automatically recovered and there is no loss of scanned information.
  - During the test, the representation of the image shall not be degraded such that reading mistakes occur.
- Criterion C Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.

# 5.2.3 Performance Criteria Description for Display and display output function

- Criterion A Apply criterion A as defined in 8.2. Additionally, an increase in any degradation greater than just perceptible by observation of the image shall not occur as a consequence of the application of the test.

  Examples of such degradations are:
  - superimposed patterning;
  - positional disturbances due to synchronisation errors;
  - geometric distortion:
  - · change of contrast or brightness;
  - picture artefacts;
  - freezing or disturbance of motion;
  - · image loss;
  - · video data or decoding errors.
- Criterion B The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- Criterion C Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.



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### 5.2.4 Performance Criteria Description for Musical tone generating function

Criterion A - Performance criterion A is subdivided according to the type of equipment and its use. Three subgroups corresponding to different equipment types are defined in Table E.1 and have corresponding performance criteria A1, A2 and A3. The relevant subgroup shall be selected by the manufacturer in accordance with the product specification. The description of criteria A1, A2 and A3 are presented in Table E.2.

- Criterion B During the test, degradation of performance beyond that defined in criterion A1 of Table E.2 is allowed. However, sudden amplification of tone to a level that exceeds the expected level by more than 6 dB is not allowed. After the test, normal operation of the EUT shall be self-recovered. In the case of unintended tone holding caused by a MIDI protocol communication error, the EUT can be re-initialised by the operation of the controls by the user controls in accordance with the manufacturer's instructions. Due to the nature of the MIDI protocol, it is necessary to modify the performance criterion B to allow user intervention when the unintended tone holding is caused by a missing MIDI communication error (for example missing a 'NOTE OFF' message).
- Criterion C Degradation of the performance beyond that defined in criterion A1 of Table E.2 is permitted provided that the normal operation of the EUT can be restored after the test by operator intervention. However, sudden amplification of tone to a level that exceeds the expected level by more than 6 dB is not allowed.



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### 5.2.5 Performance Criteria Description for Networking function

Criterion A - Where relevant, during the application of the test the network function shall, as a minimum, operate ensuring that:

- established connections shall be maintained throughout the application of the test;
- no change of operational state or corruption of stored data occurs;
- no increase in error rate above the figure defined by the manufacturer occurs. The manufacturer should select the most appropriate performance measurement criteria for the product or system, for example bit error rate, block error rate;
- no request for retry above the figure defined by the manufacturer;.
- the data transmission rate does not reduce below the figure defined by the manufacturer;
- · no protocol failure occurs;
- the audio noise level at a two-wire analogue interface (supporting telephony) shall satisfy the requirements of Table G.3. The audio level measurements shall be performed at the demodulated frequency of the disturbance using a narrowband filter with a 3 dB bandwidth of 100 Hz using the method defined in table clause G.1.4. See G.6.1. As described in the example given in J.3.5 the networking function is monitored during testing using direct functions specified elsewhere in this document. If needed to verify the operation of the protocol, the following functions shall be verified as described in Table H.1 when performing the additional spot frequency tests contained in Clause 5:
- · ability to establish a connection,
- · ability to clear a connection.

Where an EUT has supervisory functions they shall not be affected. Elements that should be monitored include, but are not limited to:

- · alarms,
- · signalling lamps,
- printer output errors,
- network traffic rates,
- · network monitor errors.
- measured network parameters.



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Criterion B - Established connections shall be maintained throughout the test, or shall self-recover in a way and timescale that is imperceptible to the user.

The error rate, request for retry and data transmission rates may be degraded during the application of the test. Degradation of the performance as described in criterion A is permitted, provided that the normal operation of the EUT is self-recoverable to the condition established prior to the application of the test. Where required, as defined in Clause 5, the acceptable operation of the function shall be verified at the completion of the test as described in Table H.1, by confirming the following:

- the EUT's ability to establish a connection,
- the EUT's ability to clear a connection.

During surge testing disconnection is allowed on the analogue/digital data port being tested. If the EUT is a supervisory equipment, it shall not impact the normal operation of the network being monitored. In addition, any supervisory functions impacted during the period of the test shall return to the state prior to the test. Elements to consider include:

- · alarms,
- · signalling lamps,
- printer output,
- network traffic rates,
- network monitoring. is used as intended.

Criterion C - Degradation of performance as described in criteria A and B is permitted provided that the normal operation of the EUT is self-recoverable to the condition immediately before the application of the test, or can be restored after the test by the operator.



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### 5.2.6 Performance Criteria Description for Audio output function

Criterion A - The interference ratio (electrical or acoustic) shall meet the limits in column 3; or,

the acoustic level of the demodulated audio shall be less than the limits in column 4; or,

the digitally coded level of demodulated audio shall be less than limits in column 5; or,

the analogue level of the demodulated audio shall be less than the limits in column 6.

- Criterion B The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- Criterion C Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.

### 5.2.7 Performance Criteria Description for Telephony function

Function to be exercised	Performance criteria						
Function to be exercised	Α	В	С				
Establish new communication	At the additional spot frequency tests a, c	Performed before and after the application of the test or disturbance	Performed before and after the application of the test or disturbance				
Maintain established communication	Yes In addition, the requirements of Annex G for the audio output function shall be satisfied c	Yes b	No				
Terminate established communication	At the additional spot frequency tests a, c	Performed before and after the application of the test or disturbance	Performed before and after the application of the test or disturbance				

Communication refers to a telephone call or other form of voice connection.

a Applicable to TTE with a dial function that provides dedicated emergency service/safety of life call capability. Where the EUT does not provide this functionality, this limitation shall be stated in the equipment user manual.

b Communication shall be established prior to the application of the disturbance, the communication shall be maintained and the quality of that communication (for example, volume setting, the level of background noise) shall be maintained after completion of the test or disturbance.

c Where defined in Clause 5 (for the tests in Table 1 to Table 4), these functional tests shall be performed during the additional spot frequency tests.



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### 5.3 Test of IEC 61000-4-2

### 5.3.1 Test Instruments

Immunity Shielded Room									
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due				
Aneroid Barometer	SATO	7610-20	89090	07/23/2024	07/22/2025				
ESD Simulator	Teseq	NSG 437	1812	12/17/2024	12/16/2025				
Thermo-Hygro Meter	NDr.AV	GM-108A	SD-S071	12/24/2024	12/23/2025				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan									

### 5.3.2 EUT Operating Condition

### **Environment:**

Temperature	Humidity	Air Pressure
18.5 °C	48 %RH	1002 hpa



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### 5.3.3 Results of Electrostatic Discharge Test (ESD)

Model No. : AV600-RH-AB
Tested By : Alex Wang
Tested Date : April 15, 2025

Test Mode : Mode 2

Basic Standard : IEC 61000-4-2 Discharge Impedance : 330 ohm / 150 pF

Discharge Voltage : Air Discharge: <u>+</u>2, 4, 8 kV

Contact Discharge: +2, 4 kV

HCP/VCP: +2, 4 kV

Polarity : Positive/Negative

Number of Discharge : 10 times at each test point

Discharge Mode : Single Discharge

Discharge Period : 1 second

### A.Observations:

Test points: 1. Front side. 2. Back side. 3. Left side. 4. Right side.

5. Top side, 6. Bottom side.

Direct Ap	plication	Test Results		
Discharge Level (kV)	Discharge Level (kV) Polarity (+/-)		Contact Discharge	Air Discharge
2, 4, 8 (Air.)	+/-	1~6	N/A	N/A
2, 4 (Cont.)	+/-	1~5	A	N/A

**Remark:** A: No degradation of performance or loss of function.

N/A: Not Applicable.

### **B.Observations:**

Test points: 1. Front side. 2. Back side. 3. Left side. 4. Right side.

Indirect A	Application	Test Results		
Discharge Level Polarity (kV) (+/-)		Test Point	Horizontal Coupling	Vertical Coupling
2, 4 +/-		1-4	А	Α



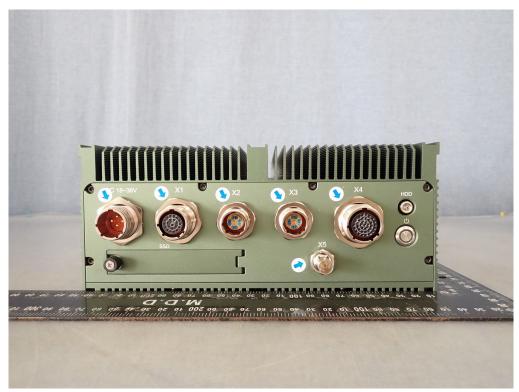
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### **ESD Test point**

### **Front**



Back

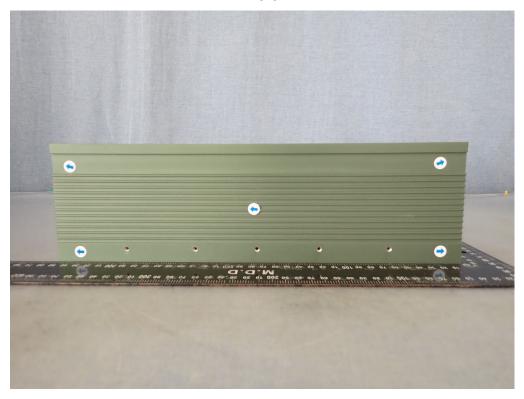


Air Discharge: 
Contact Discharge:

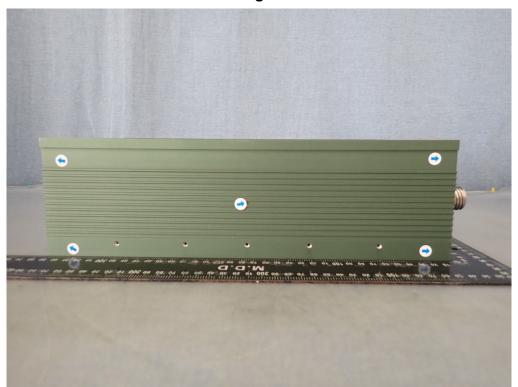


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### Left



Right

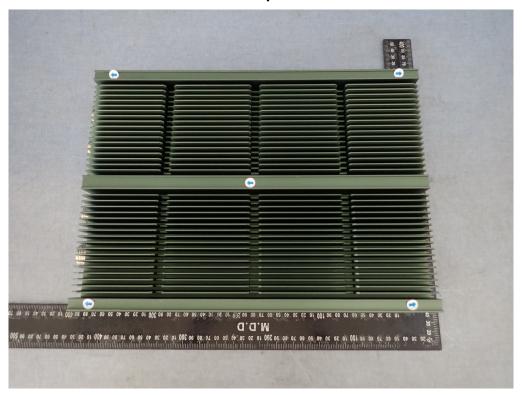


Air Discharge: 1 Contact Disch



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### Top



Air Discharge: 1 Contact Discharge: 1



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### 5.4 Test of IEC 61000-4-3

### 5.4.1 Test Instruments

	844 RS Chamber									
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due					
Electric Field Probe	AR	FL7006	0356656	02/28/2025	02/27/2026					
Field of Calibration	CCS	Chamber#RS	80-1000MHz	02/14/2025	02/13/2026					
RF Power Meter	Boonton	4242	17419	01/21/2025	01/20/2026					
Power Sensor	Boonton	51011A-EMC	36833	01/21/2025	01/20/2026					
Power Sensor	Boonton	51011A-EMC	36834	01/21/2025	01/20/2026					
Thermo-Hygro Meter	Wisewind	201A	SD-S019	09/10/2024	09/09/2025					
Broadband Antenna	AR	AT1080	311819	N.C.R	N.C.R					
Power Amplifier	Teseq	CBA1G-600D	1098099	N.C.R	N.C.R					
Analog Signal Generator	Agilent	E8257D	MY48051214	05/28/2024	05/27/2025					
Field of Calibration	C CS	Chamber#RS	1000-6000MHz	02/13/2025	02/12/2026					
Microwave Antenna	Schwarzbeck	STLP 9149	767	N.C.R	N.C.R					
Power Amplifier	Teseq	CBA6G-100D	1087370	N.C.R	N.C.R					
Test Software	Test Software EmcwareVer. 3.2									
Testing Site: No.163	esting Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan									

### 5.4.2 EUT Operating Condition

### **Environment:**

Temperature	Humidity	Air Pressure	
22.8 °C	52 % RH	1006 hpa	



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### 5.4.3 Results of Radiated Radio Frequency Electromagnetic (RS)

Model No. : AV600-RH-AB
Tested By : Alex Wang
Tested Date : April 15, 2025

Test Mode : Mode 2

Basic Standard : IEC 61000-4-3 Frequency range : 80 MHz - 1000 MHz

Frequency range : 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz (±1%)

Field strength : 3 V/m

Modulation : 80% AM (1kHz)

Frequency step : 1 % of the preceding frequency

Polarity of Antenna : Horizontal and Vertical

Dwell Time : 3 seconds

Test distance : 3 m

No.	Frequency (MHz)	Antenna Orientation	Observation	EUT Orientation
1	80 - 1000	Vertical/Horizontal	Α	0 degree
2	80 - 1000	Vertical/Horizontal	Α	90 degree
3	80 - 1000	Vertical/Horizontal	Α	180 degree
4	80 - 1000	Vertical/Horizontal	A	270 degree

**Remark:** A: No degradation of performance or loss of function.

No.	Frequency (MHz)	Antenna Orientation	Observation	EUT Orientation
1	1800, 2600, 3500, 5000 (±1%)	Vertical/Horizontal	Α	0 degree
2	1800, 2600, 3500, 5000 (±1%)	Vertical/Horizontal	Α	90 degree
3	1800, 2600, 3500, 5000 (±1%)	Vertical/Horizontal	A	180 degree
4	1800, 2600, 3500, 5000 (±1%)	Vertical/Horizontal	Α	270 degree



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### 5.5 Test of IEC 61000-4-4

#### 5.5.1 **Test Instruments**

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Capacitive Clamp	EMC-Partner	CN-EFT1000	589	02/11/2025	02/10/2026
EMC Test System	Teseq	NSG 3060	1718	11/18/2024	11/17/2025
Software WIN 3000Ver. 1.3.2					
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

#### **EUT Operating Condition** 5.5.2

### **Environment:**

Temperature	Humidity	Air Pressure
24.7 °C	54 %RH	1007 hpa

#### 5.5.3 **Results of Electrical Fast Transient (EFT)**

: AV600-RH-AB Model No. Tested By
Tested Date : Alex Wang : April 15, 2025

Test Mode : Mode 2

Basic Standard : IEC 6100
Test Voltage : DC Input
Signal/Comm. : ± 0.5 kV
Polarity : Positive/ : IEC 61000-4-4 : DC Input: ± 0.5 kV

Polarity : Positive/Negative

Impulse Frequency : 5 kHz Tr/Th : 5/50ns Burst : 15ms/300ms

### Observation:

Test Point	Polarity	Test Level (kV)	Results
L	+/-	0.5	Α
N	+/-	0.5	Α
L – N	+/-	0.5	Α
PE	+/-	0.5	Α
L – PE	+/-	0.5	Α
N – E	+/-	0.5	Α
L – N – PE	+/-	0.5	Α
RJ45 (M12)	+/-	0.5	Α
RJ45 (2.5G) (M12)	+/-	0.5	Α
SDI	+/-	0.5	А



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### 5.6 Test of IEC 61000-4-5

### 5.6.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE Manufacturer Model Number Serial Number Calibration Date Calibration Du					Calibration Due
CDN	EMC-Partner	CDN-UTP8	1505	11/19/2024	11/18/2025
EMC Test System	Teseq	NSG 3060	1718	11/18/2024	11/17/2025
Software WIN 3000Ver. 1.3.2					
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

### 5.6.2 EUT Operating Condition

#### **Environment:**

Temperature	Humidity	Air Pressure
24.7 °C	54 %RH	1007 hpa

### 5.6.3 Results of Surge Test

Model No. : AV600-RH-AB
Tested By : Alex Wang
Tested Date : April 15, 2025

Test Mode : Mode 2

Basic Standard : IEC 61000-4-5

Test Rate : 1 pulse every minute

No. of Tests : 5 positive and 5 negative pulses

Waveform : 1.2/50μs (8/20μs)

### **Observation Description**

DC input line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
L – PE	0	+/-	0.5	Α
N – PE	0	+/-	0.5	Α

**Remark:** A: No degradation of performance or loss of function.

Signal line:

Test Rate : 1 pulse every minute

No. of Tests : 5 positive and 5 negative pulses

Waveform :  $1.2/50 \mu s$  (8/20 $\mu s$ )

### **Observation Description**

Signal line:

- 1g.160 111101				
Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
RJ45 (M12)	No phase angle (degree)	+/-	0.5	Α
RJ45 (2.5G) (M12)	No phase angle (degree)	+/-	0.5	Α



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#### 5.7 Test of IEC 61000-4-6

#### 5.7.1 Test Instruments

CS Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Attenuator	EMCI	SA3NL	10006F	N.C.R	N.C.R
CDN	Teseq	CDN M016	35820	11/14/2024	11/13/2025
CDN	SCHAFFNER	CDN M325	17457	11/14/2024	11/13/2025
Compact Immunity Test System	Teseq	NSG 4070B-35	39581	09/19/2024	09/18/2025
EM Clamp	Schaffner	KEMZ 801	19227	11/14/2024	11/13/2025
Test Software	Test Software NSG 4070 Control Program Version: V1.2.0				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

#### 5.7.2 EUT Operating Condition

#### **Environment:**

Temperature	Humidity	Air Pressure	
23.8 °C	53 %RH	1006 hpa	

#### 5.7.3 Results of Immunity to Conducted Disturbances (CS)

Model No. : AV600-RH-AB
Tested By : Alex Wang
Tested Date : April 15, 2025

Test Mode : Mode 2

Basic Standard : IEC 61000-4-6 Frequency range : 0.15 MHz -10 MHz

Field strength : 3 Vrms

Frequency range : 10 MHz - 30 MHz Field strength : 3 V to 1Vrms Frequency range : 30 MHz - 80 MHz

Field strength : 1 Vrms

Modulation : 80% AM, 1 kHz Sinewave Frequency step : 1 % of the preceding frequency

Dwell Time : 3 seconds

Coupling Method : CDN-M2, EM-Clamp

Cable Description	Frequency (MHz)	Observation
DC input	0.15 - 80	A

#### Signal Ports

Cable Description	Frequency (MHz)	Observation
RJ45 (M12)	0.15 - 80	A
RJ45 (2.5G) (M12)	0.15 – 80	Α
SDI	0.15 – 80	A

**Remark:** A: No degradation of performance or loss of function.



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#### 5.8 Test of IEC 61000-4-8

#### 5.8.1 Test Instruments

Immunity Shield Room						
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due	
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan						

### 5.8.2 EUT Operating Condition

#### **Environment:**

Temperature	Humidity	Air Pressure
N/A	N/A	N/A

#### 5.8.3 Result of Immunity to Power Frequency Magnetic Field

Model No. : N/A
Tested By : N/A
Tested Date : N/A
Test Mode : N/A

Basic Standard : IEC 61000-4-8

Power Frequency : 50 Hz
Magnetic Field : 1 A/m(r.m.s)
Coil Orientation : X, Y, Z Axis

Observation : N/A

**Remark:** N/A: There is no any sensitive part for magnetic field test. Applicable only to equipment containing susceptible to magnetic field.



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#### 5.9 Test of IEC 61000-4-11

#### 5.9.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

## 5.9.2 EUT Operating Condition

#### **Environment:**

Temperature	Humidity	Air Pressure	
N/A	N/A	N/A	

## 5.9.3 Results of Voltage Dips Immunity Test

Model No. : N/A
Tested By : N/A
Tested Date : N/A
Test Mode : N/A

Basic Standard : IEC 61000-4-11
EUT Rated Voltage : 230 Volts.
Reduction Voltage : 30, >95 % Ut
Phase Angle : 0,180 degree
Total events : 3 dropouts
Event interval : 10 seconds

Test Power: 230Vac, 50Hz					
Environmental phenomena Test specification (% reduction) Duration (in periods of the rated frequency)					
Voltage Interruptions	>95	250	N/A		
Voltage dine	30	25	N/A		
Voltage dips	>95	0.5	N/A		

Test Power: 230Vac, 60Hz				
Environmental phenomena	Test specification (% reduction)	Duration (in periods of the rated frequency)	Observation	
Voltage Interruptions	>95	300	N/A	
Voltage dips	30	30	N/A	

**Remark:** N/A: The subject equipment is not intended to be connected to AC mains supply. Therefore, this test is not applicable.



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## **APPENDIX**

## **Photograph of Testing General Set-up**

**CE Testing Set-up** 

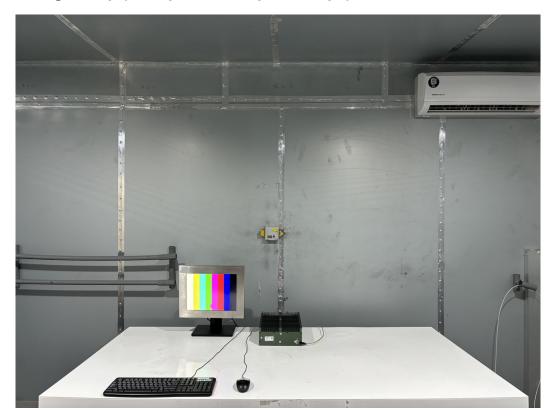






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## ISN Testing Set-up (10Mbps & 100Mbps & 1Gbps)

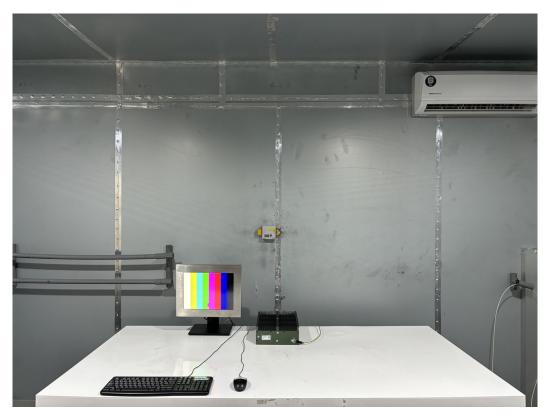






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## ISN Testing Set-up (SDI)







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# RE Testing Set-up Below 1GHz

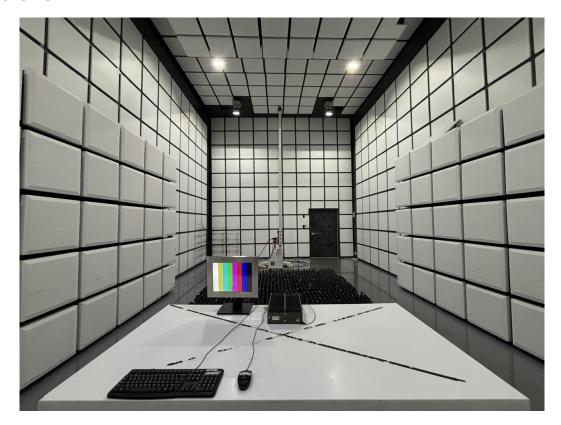


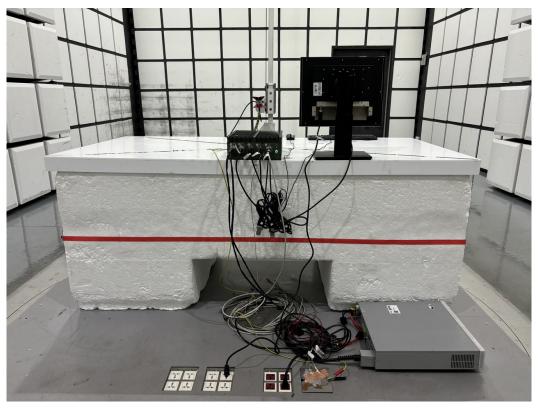




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#### **Above 1GHz**





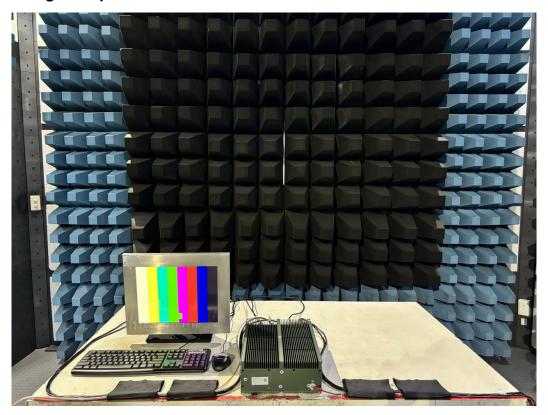


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## **ESD Testing Set-up**



## **RS Testing Set-up**





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## **EFT Testing Set-up**



EFT For RJ45 (M12) Testing Set-up





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## EFT For RJ45 (2.5G) (M12) Testing Set-up



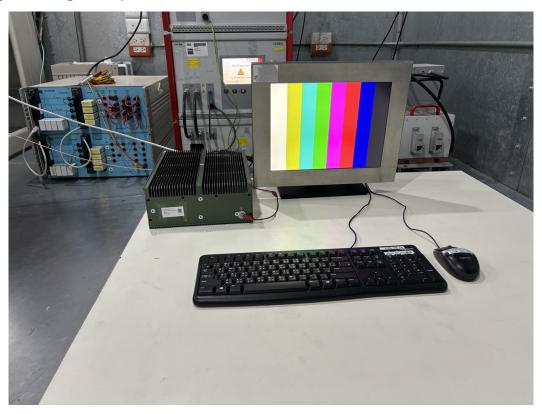
**EFT For SDI Testing Set-up** 





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## **Surge Testing Set-up**



Surge For RJ45 (M12) Testing Set-up



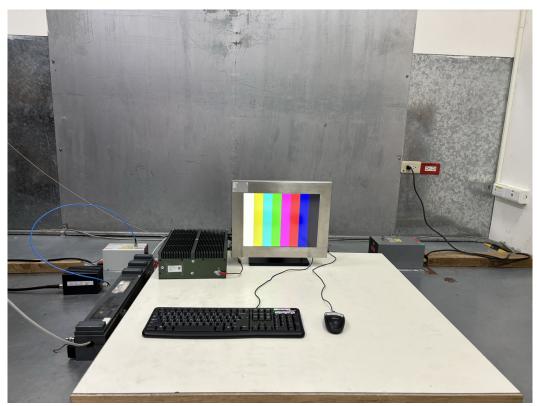


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## Surge For RJ45 (2.5G) (M12) Testing Set-up



## **CS Testing Set-up**





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## CS For RJ45 (M12) Testing Set-up



CS For RJ45 (2.5G) (M12) Testing Set-up





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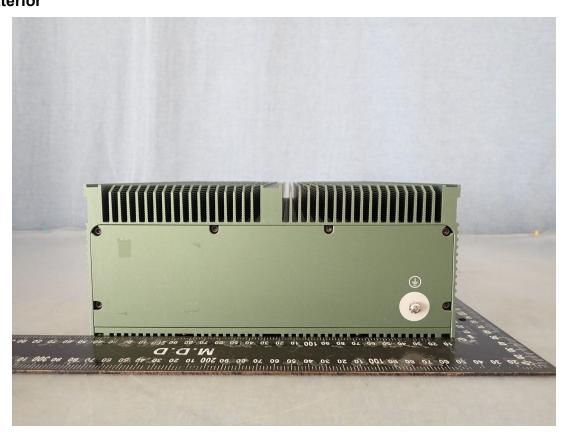
## **CS For SDI Testing Set-up**





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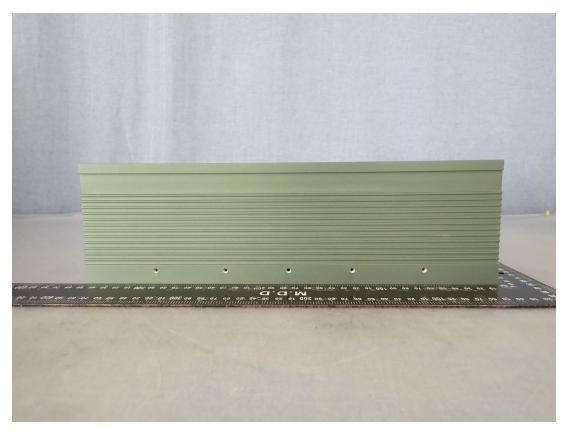
## Photographs of EUT Unit Exterior

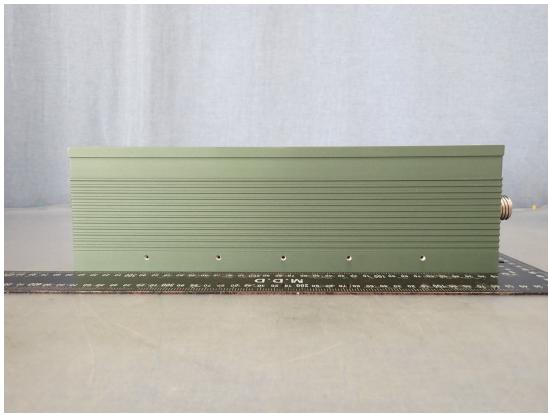






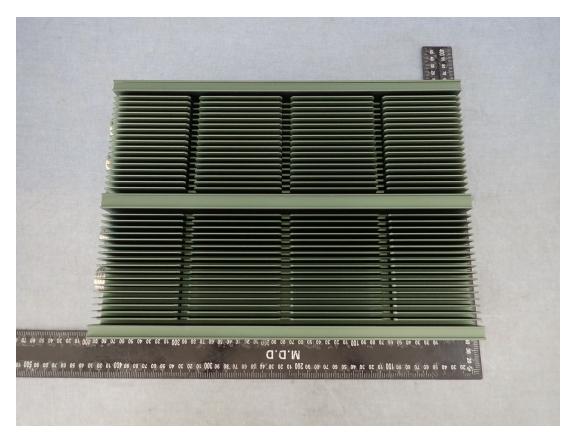
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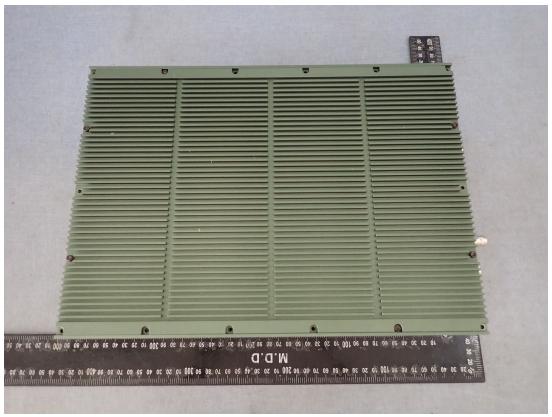






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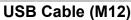




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**DC Power Cable** 









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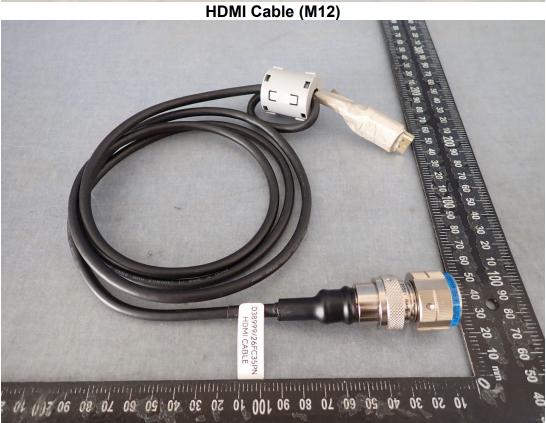






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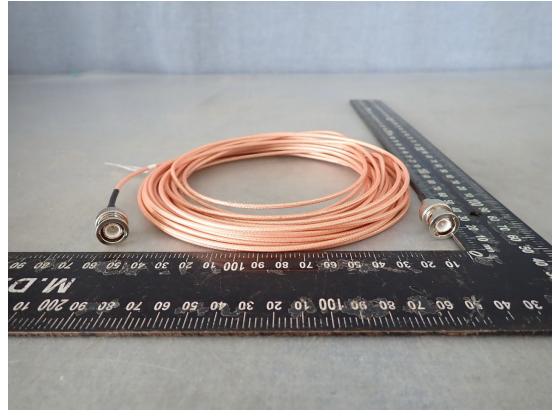




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**SDI Cable** 



\*\* End of Report \*\*