

CE/EMC COMPLIANCE REPORT

for

CHIPSEE CO., LIMITED.

Embedded Industrial Computer

Prepared for : CHIPSEE CO., LIMITED.

Address : Xinyuan Science Park B406, 97 Changping Road, Changping
District, Beijing, 102206, China

Prepared by : EST Technology Co., Ltd.

Address : Chilingxiang, Qishantou, Santun, Houjie, Dongguan,
Guangdong, China

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Report Number : ESTE-E2308071

Date of Report : Aug. 25, 2023



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EST Technology Co., Ltd.

Applicant:	CHIPSEE CO., LIMITED.		
Address:	Xinyuan Science Park B406, 97 Changping Road, Changping District, Beijing, 102206, China		
Manufacturer:	CHIPSEE CO., LIMITED.		
Address:	Xinyuan Science Park B406, 97 Changping Road, Changping District, Beijing, 102206, China		
Factory:	CHIPSEE CO., LIMITED.		
Address:	Xinyuan Science Park B406, 97 Changping Road, Changping District, Beijing, 102206, China		
E.U.T:	Embedded Industrial Computer		
Model Number:	CS12720-RK3568-050P		
Trade Name:	-----	Serial No:	-----
Date of Receipt:	Aug. 15, 2023	Date of Test:	Aug. 16~24, 2023
Test Specification:	EN 55032:2015+A1:2020 EN 55035:2017+A11:2020		
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied.		
		Issue Date: Aug. 25, 2023	
Prepared by:	Reviewed by:	Approved by:	
			
Lena / Assistant	Sean / Engineer	Iceman Hu / Manager	
Other Aspects:			
None.			
Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested			
This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd. The statement of compliance in this report is based on the limit in the test standard, the measurement uncertainty is not considered.			

1. GENERAL PRODUCT INFORMATION

1.1. Product Function

Refer to Technical Construction Form and User Manual.

1.2. Description of Device (EUT)

Description	: Embedded Industrial Computer
Model No.	: CS12720-RK3568-050P
System Input Voltage	: DC 12V From Battery
LAN Line	: Unshielded, Detachable 1.5m
DC Line	: Unshielded, Detachable 0.8m

1.3. Difference between Model Numbers

None.

1.4. Independent Operation Modes

The basic operation modes are:

1.4.1. USB Mode

1.4.2. TF Mode

1.4.3. Wi-Fi Mode

1.4.4. LAN Mode

1.4.5. Bluetooth Mode

1.5. Test Supporting System

2. TEST SITES

2.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION(EN 55032:2015+A1:2020)				
Description of Test Item	Standard	Limits		Results
Conducted emissions (AC mains power ports)	EN 55032:2015+A1:2020	-----		N/A
		Minimum passing margin is ***dB at ***MHz		
Asymmetric mode conducted emissions	EN 55032:2015+A1:2020	Class A		PASS
		Minimum passing margin is 28.95dB at 12.72MHz		
Conducted differential voltage emissions	EN 55032:2015+A1:2020	-----		N/A
		More than *** dB below the limit line.		
Radiated Emission	EN 55032:2015+A1:2020	Class A		PASS
		Minimum passing margin is 5.72dB at 499.48MHz		
Radiated Emission Test (above 1GHz)	EN 55032:2015+A1:2020	Class A		PASS
		Minimum passing margin is 17.73dB at 1725MHz		
Harmonic current emissions	EN IEC 61000-3-2:2019+A1:2021	-----		N/A
Voltage fluctuations & flicker	EN 61000-3-3:2013+A1:2019+A2:2021	-----		N/A
IMMUNITY (EN 55035:2017+A11:2020)				
Description of Test Item	Basic Standard	Performance Criteria	Observation Criteria	Results
Electrostatic discharge (ESD)	EN 61000-4-2:2009	B	B	PASS
Radio-frequency,Continuous radiated disturbance	EN 61000-4-3:2006+A1:2008+A2:2010	A	A	PASS
Electrical fast transient (EFT)	EN 61000-4-4:2012	B	B	PASS
Surge (Input a.c. power port)	EN 61000-4-5:2014	B	B	PASS
Radio-frequency, Continuous conducted disturbance	EN 61000-4-6:2014	A	A	PASS
Power frequency magnetic field	EN 61000-4-8:2010	A	A	PASS
Voltage dips, >95% reduction	EN 61000-4-11:2004	B	**	N/A
Voltage dips, 30% reduction		C	**	N/A
Voltage interruptions		C	**	N/A
N/A is an abbreviation for Not Applicable.				

2.2. Test Facilities

EMC Lab : Certificated by CNAS, CHINA
Registration No.: L5288
This Certificate is valid until: November 12, 2023

Certificated by FCC, USA
Designation Number: CN1215
This Certificate is valid until: January 31, 2024

Certificated by A2LA, USA
Registration No.: 4366.01
This Certificate is valid until: January 31, 2024

Certificated by Industry Canada
CAB identifier No.: CN0035
This Certificate is valid until: January 31, 2024

Certificated by VCCI, Japan
Registration No.: C-14103; T-20073; R-13663;
R-20103; G-20097
Date of registration: Apr. 20, 2020
This Certificate is valid until: Apr. 19, 2026

Certificated by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Certificated by Intertek
Registration No.: 2011-RTL-L2-64
Date of registration: November 08, 2018

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan,
Guangdong, China

2.3.List of Test and Measurement Instruments

2.3.1. For asymmetric mode conducted emissions test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESRP3	EST-E070	June 12,23	1 Year
ISN	Teseq	T8	EST-E041	June 12,23	1 Year
Current Transformer	SCHWARZBECK	SW9605	EST-E045	June 12,23	1 Year
Voltage Probe	SCHWARZBECK	TK9420	EST-E046	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A

2.3.2. For radiated emission test (3# 966 radiation)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESPI3	EST-E004	June 12,23	1 Year
Bilog Antenna	Teseq	CBL 6111D	EST-E076	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A

2.3.3. For radiated emission test (above 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	June 12,23	1 Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	EST-E031	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A

2.3.4. For electrostatic discharge immunity test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
ESD Generator	Teseq	NSG437	EST-E073	June 12,23	1 Year

2.3.5. For electrical fast transient/burst immunity test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EFT Generator	EMC PARTNER	TRANSIENT 2000	EST-E074	June 12,23	1 Year
Capacitive Coupling Clamp	HAEFELY	IP4A	EST-E040	June 12,23	1 Year

2.3.6. Radio Frequency Electromagnetic Field Immunity (R/S) Test\

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Agilent	N5181A	EST-E060	June 12,23	1 Year
Power Amplifier	SKET	HAP801000M-250W	EST-E061	N/A	N/A
Power Amplifier	SKET	HAP0103G-75W	EST-E062	N/A	N/A
Power Amplifier	SKET	HAP0306G-50W	EST-E063	N/A	N/A
Power Meter	Agilent	E4419B	EST-E064	June 12,23	1 Year
Power sensor	Agilent	E9301A	EST-E065	June 12,23	1 Year
Power sensor	HP	E9301A	EST-E066	June 12,23	1 Year
Antenna	Schwarzbeck	STLP 9129	EST-E059	N/A	N/A
E-Field Probe	Narda	EP-601	EST-E067	June 12,23	1 Year
Audio Analyzer	Rohde &Schwarz	UPV	EST-E024	June 12,23	1 Year
Test Software	SKET	EMC-S	V1.2.0.48	N/A	N/A

2.3.7. For surge immunity test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Surge Controller	HAEFELY	PSURGE8000	EST-E015	June 12,23	1 Year
Surge Impulse Module	HAEFELY	PIM100	EST-E016	June 12,23	1 Year
Surge Coupling Network	HAEFELY	PCD100	EST-E017	June 12,23	1 Year

2.3.8. For injected currents susceptibility test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Rohde &Schwarz	SMB100A	EST-E025	June 12,23	1 Year
Power Amplifier	FRANKONIA	CIT-10	EST-E021	N/A	N/A
Power Meter	Rohde &Schwarz	NRVS	EST-E027	June 12,23	1 Year
Audio Analyzer	Rohde &Schwarz	UPV	EST-E024	June 12,23	1 Year
CDN	FRANKONIA	CDN-M2+M3	EST-E022	June 12,23	1 Year
EM-Clamp	FRANKONIA	EMCL-20	EST-E042	June 12,23	1 Year
Test Software	SKET	EMC-S	V1.2.0.80	N/A	N/A

2.3.9. For power frequency magnetic field immunity test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Magnetic Field Tester	HAEFELY	MFS 100	EST-E018	June 12,23	1 Year

Note: All calibration reports of the equipment were provided by LiSai calibration and Testing

3. TEST SET-UP AND OPERATION MODES

3.1. Principle of Configuration Selection

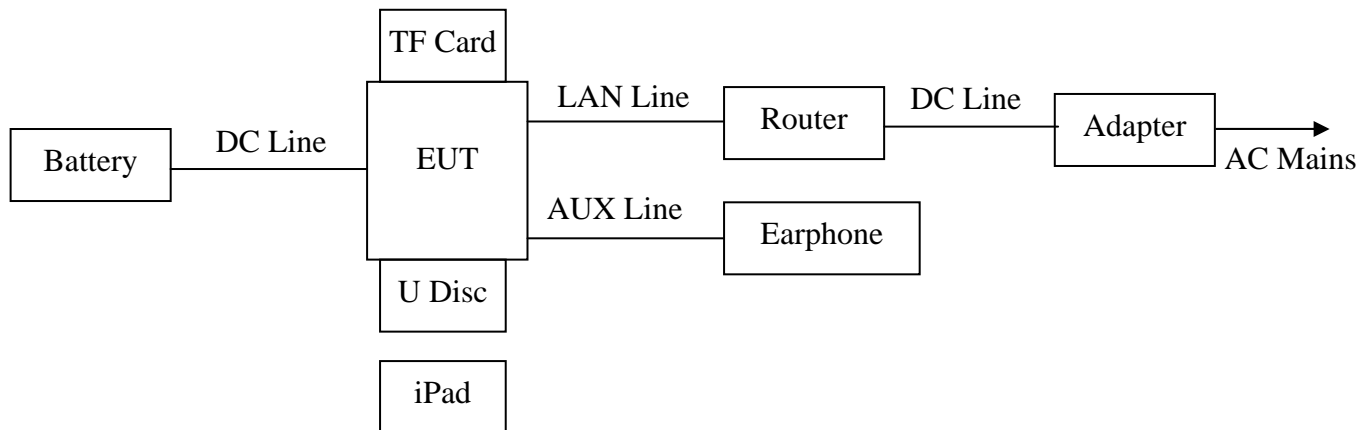
Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

Immunity: The equipment under test (EUT) was configured to the representative operating mode and conditions.

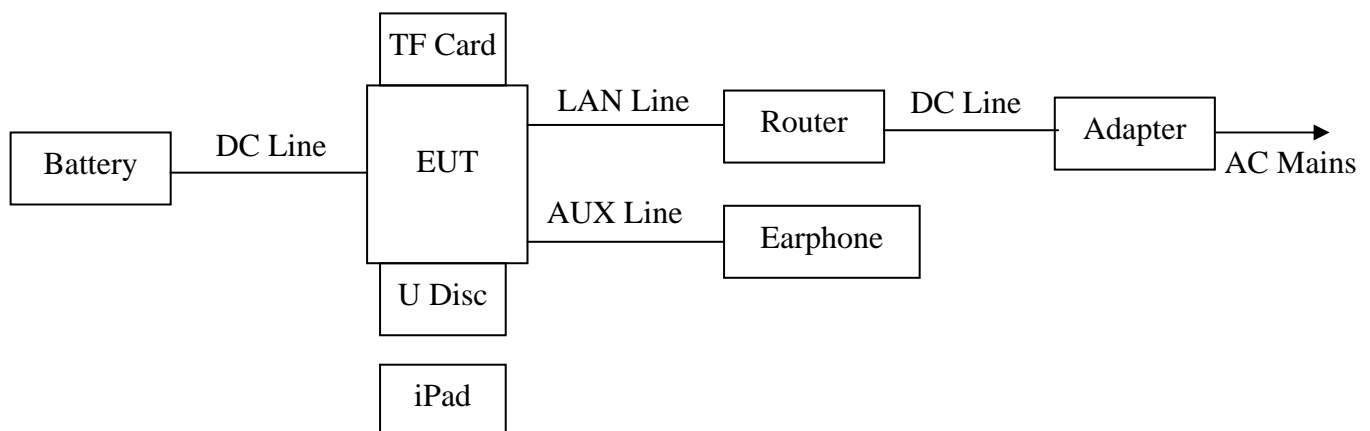
3.2. Block Diagram of Test Set-up

System Diagram of Connections Between EUT and Simulators

3.2.1. For emission test



3.2.2. For immunity test



(EUT: Embedded Industrial Computer)

3.3. Test Operation Mode and Test Software

Refer to Test Setup in clause 4 & 5.

3.4. Special Accessories and Auxiliary Equipment

3.4.1.Router

M / N	:	RT-AC66U
S / N	:	G1ICGG000260
Manufacturer	:	ASUS
Ethernet Line	:	Shielded, Detachable 1.5m

3.4.2.iPad

M / N	:	A1893
S / N	:	DMPY3KL5JF8K
Manufacturer	:	Apple

3.4.3.U Disc

M / N	:	SDCZ7-4096
S / N	:	BH0701AGOB
Manufacturer	:	SanDisk

3.4.4.Earphone

M / N	:	KDM-430
Manufacturer	:	KEENION
Data Cable	:	Unshielded, Undetachable, 1.6m

3.4.5.TF Card

M / N	:	SDSQUNC-032G-ZN6MA
Manufacturer	:	SanDisk

3.5. Countermeasures to Achieve EMC Compliance

None.

4. EMISSION TEST RESULTS

4.1. Asymmetric Mode Conducted Emissions Test

RESULT : **Pass**
Test procedure : EN 55032:2015+A1:2020
Frequency range : 0.15~30MHz
Test Site : Shielded Room
Limits : EN 55032:2015+A1:2020

Test Setup

Date of test : Aug. 21, 2023
Model No. : CS12720-RK3568-050P
Input Voltage : DC 12V From Battery
Operation Mode : LAN

The frequency range from 150 kHz to 30 MHz was investigated.

The bandwidth of the test receiver was set at 9 kHz.

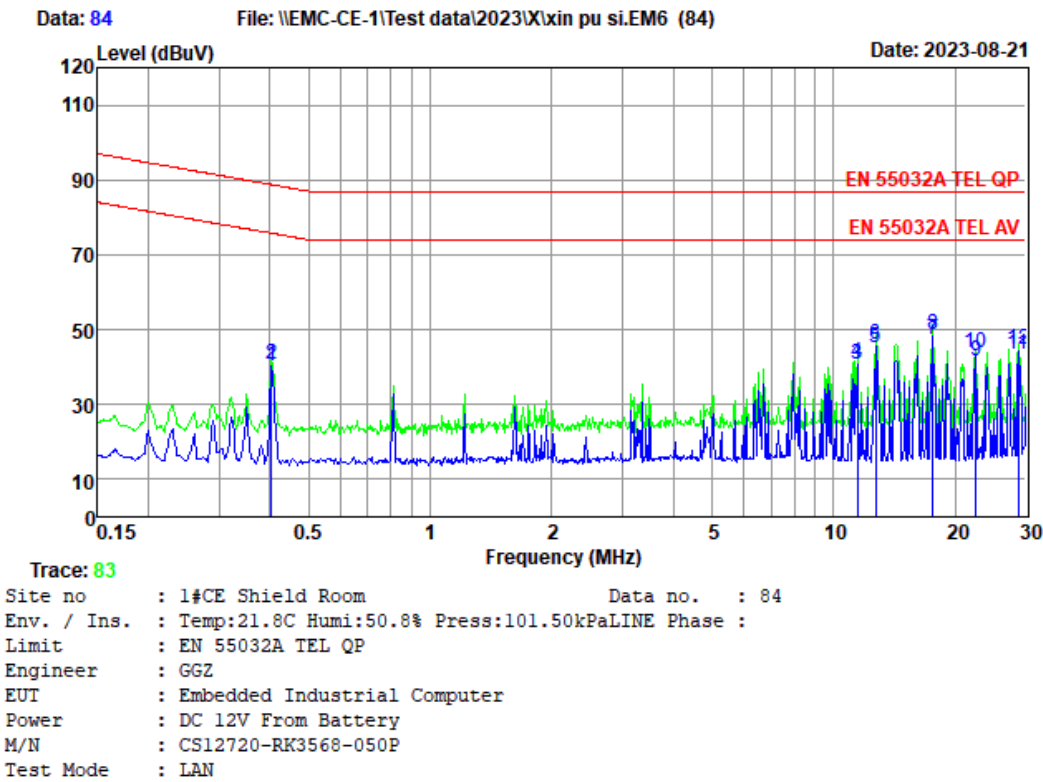
The test data of the worst case condition(s) was reported on the following page.

Note: Test uncertainty: $\pm 4.32\text{dB}$ at a level of confidence of 95%.

Test Data

EST Technology

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	Freq. (MHz)	ISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.40	9.76	9.91	20.78	40.45	75.77	35.32	Average
2	0.40	9.76	9.91	21.20	40.87	88.77	47.90	QP
3	11.44	9.66	9.91	21.07	40.64	74.00	33.36	Average
4	11.44	9.66	9.91	21.61	41.18	87.00	45.82	QP
5	12.72	9.69	9.95	25.41	45.05	74.00	28.95	Average
6	12.72	9.69	9.95	26.26	45.90	87.00	41.10	QP
7	17.66	9.77	10.04	27.69	47.50	74.00	26.50	Average
8	17.66	9.77	10.04	28.95	48.76	87.00	38.24	QP
9	22.54	9.80	10.09	21.82	41.71	74.00	32.29	Average
10	22.54	9.80	10.09	23.83	43.72	87.00	43.28	QP
11	28.75	9.86	10.11	23.23	43.20	74.00	30.80	Average
12	28.75	9.86	10.11	24.69	44.66	87.00	42.34	QP

Remarks: 1. Emission Level= ISN Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector,
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.



4.2. Radiated Emission Test

RESULT : **Pass**
Test procedure : EN 55032:2015+A1:2020
Frequency range : 30~1000MHz
Test Site : 3#966 Chamber
Limits : EN 55032:2015+A1:2020 Class A

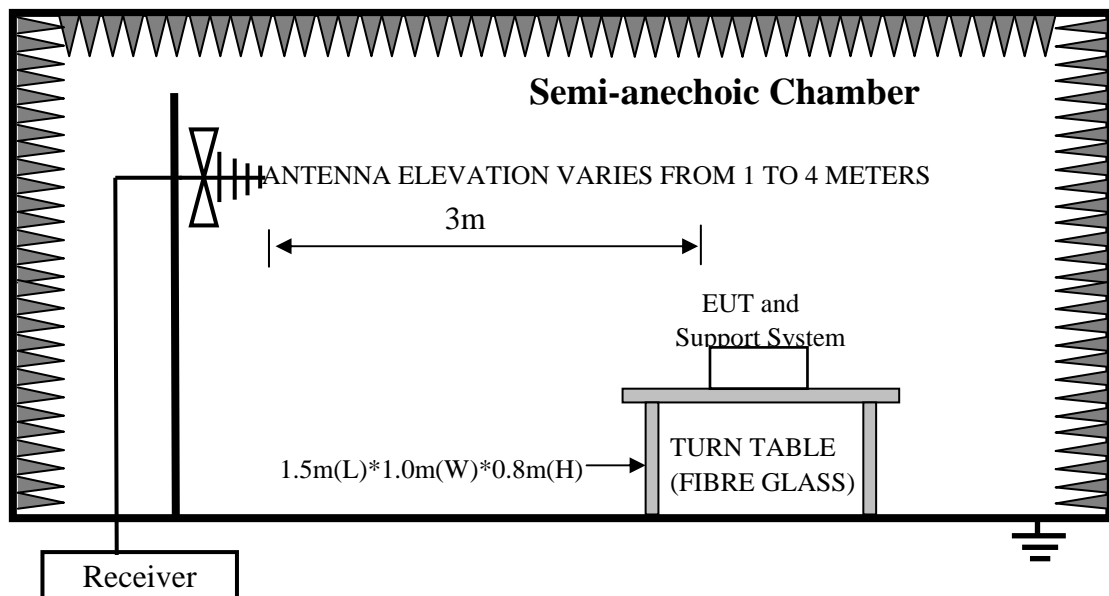
Test Setup

Date of test : Aug. 16, 2023
Model No. : CS12720-RK3568-050P
Input Voltage : DC 12V From Battery
Operation Mode : USB Mode, TF Mode, Wi-Fi Mode, Bluetooth Mode, LAN Mode

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth setting on the test receiver was 120 kHz.



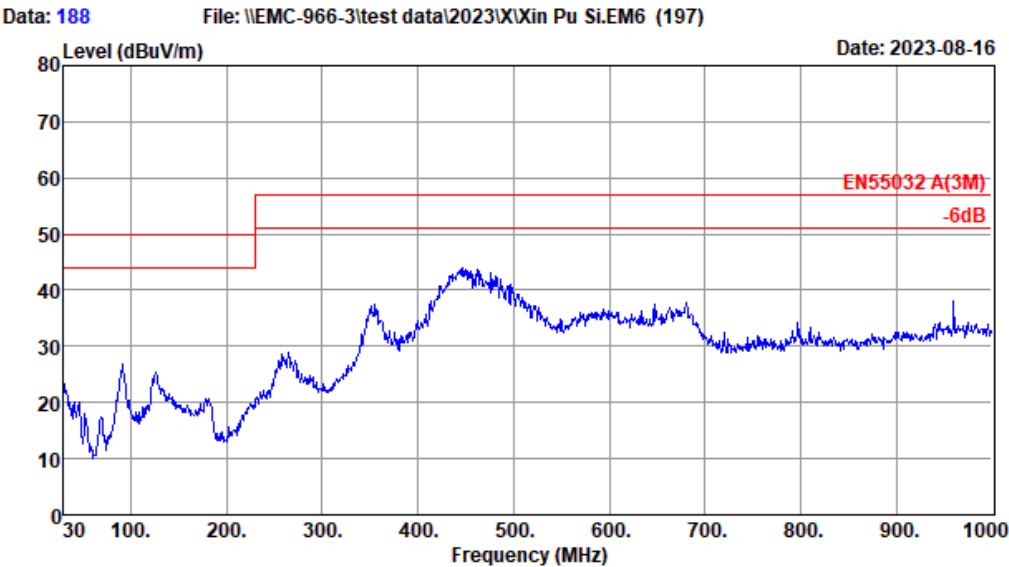
Note:

Test uncertainty: ± 4.10 dB (H); ± 4.34 dB (V) at a level of confidence of 95%.(3#966)

Test Data

EST Technology

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Houjie, Dongguan, Guangdong, China
Tel: +86-769-83081888
Fax: +86-769-83081878

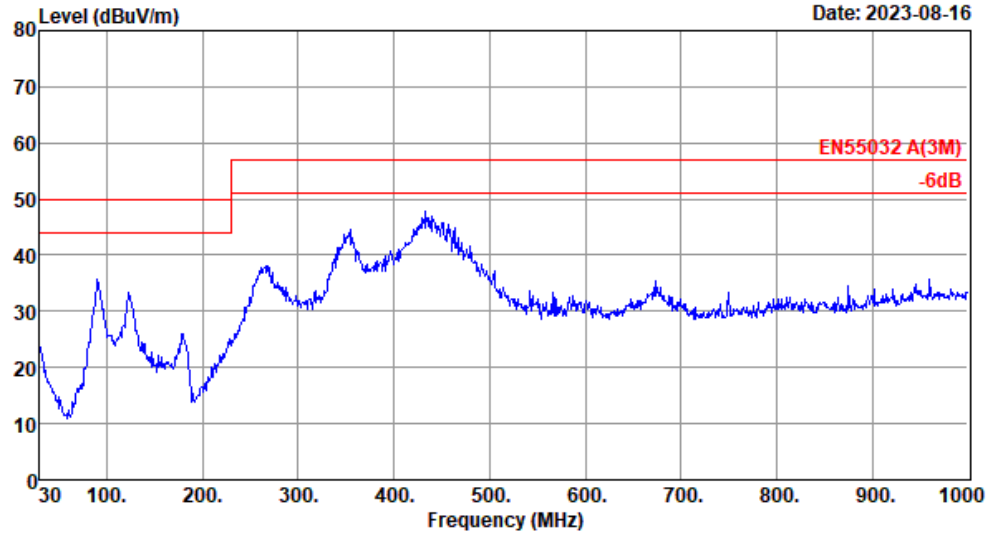


Site no.	: 3# 966 Chamber	Data no.	: 188
Dis. / Ant.	: 3m 31218	Ant. pol.	: VERTICAL
Limit	: EN55032 A(3M)		
Env. / Ins.	: Temp:21.6°C;Humi:56%;Press:101.52kPa		
Engineer	: JBR		
EUT	: Embedded Industrial Computer		
Power	: DC 12V From Battery		
M/N	: CS12720-RK3568-050P		
Test Mode	: USB Mode		

Data: 189

File: \\EMC-966-3\\test data\\2023\\X\\Xin Pu Si.EM6 (197)

Date: 2023-08-16

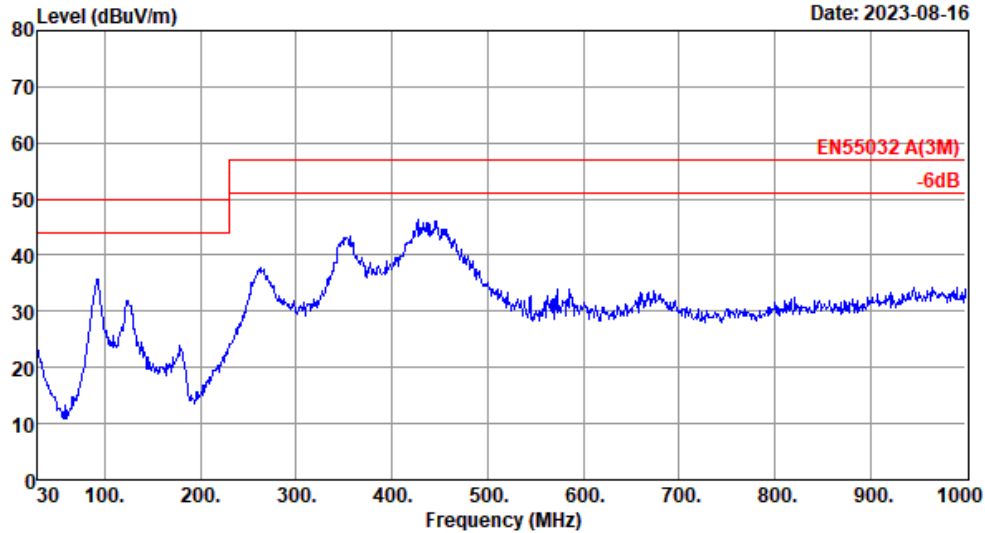


Site no. : 3# 966 Chamber Data no. : 189
Dis. / Ant. : 3m 31218 Ant. pol. : HORIZONTAL
Limit : EN55032 A(3M)
Env. / Ins. : Temp:21.6°C;Humi:56%;Press:101.52kPa
Engineer : JBR
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : USB Mode

Data: 190

File: \\EMC-966-3\\test data\\2023\\X\\Xin Pu Si.EM6 (197)

Date: 2023-08-16

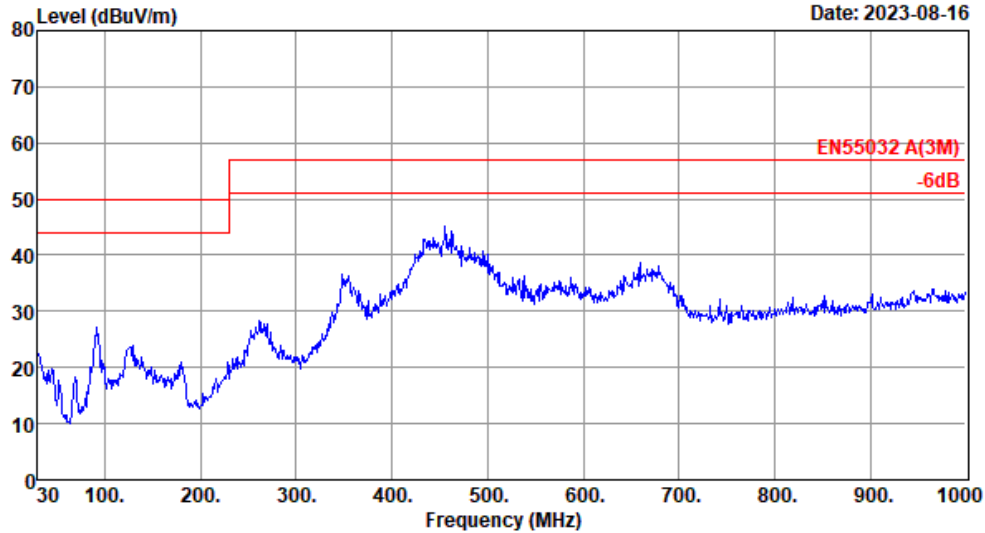


Site no. : 3# 966 Chamber Data no. : 190
Dis. / Ant. : 3m 31218 Ant. pol. : HORIZONTAL
Limit : EN55032 A(3M)
Env. / Ins. : Temp:21.6°C;Humi:56%;Press:101.52kPa
Engineer : JBR
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : TF Mode

Data: 191

File: \\EMC-966-3\\test data\\2023\\X\\Xin Pu Si.EM6 (197)

Date: 2023-08-16

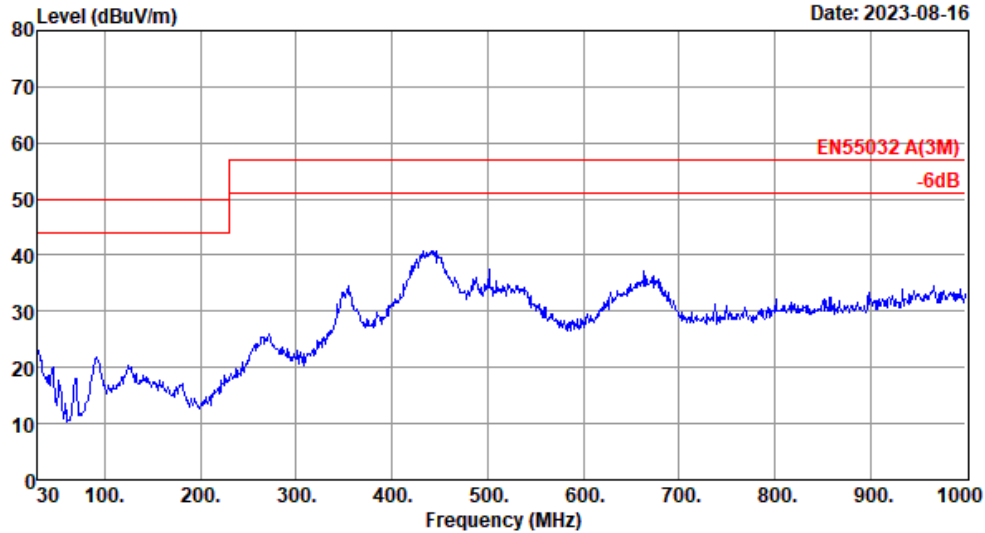


Site no. : 3# 966 Chamber Data no. : 191
Dis. / Ant. : 3m 31218 Ant. pol. : VERTICAL
Limit : EN55032 A(3M)
Env. / Ins. : Temp:21.6°C;Humi:56%;Press:101.52kPa
Engineer : JBR
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : TF Mode

Data: 192

File: \\EMC-966-3\\test data\\2023\\X\\Xin Pu Si.EM6 (197)

Date: 2023-08-16

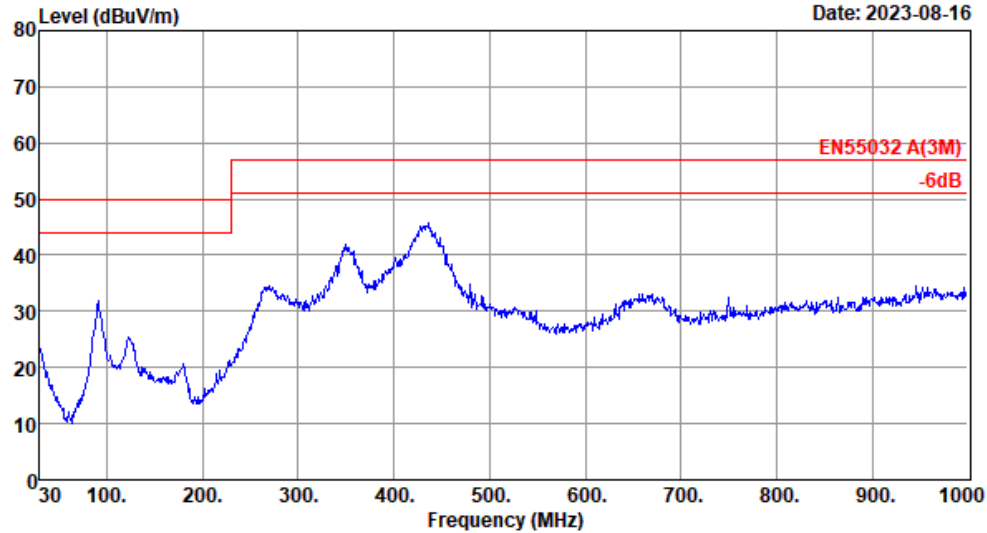


Site no. : 3# 966 Chamber Data no. : 192
Dis. / Ant. : 3m 31218 Ant. pol. : VERTICAL
Limit : EN55032 A(3M)
Env. / Ins. : Temp:21.6°C;Humi:56%;Press:101.52kPa
Engineer : JBR
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : Bluetooth Mode

Data: 193

File: \\EMC-966-3\\test data\\2023\\X\\Xin Pu Si.EM6 (197)

Date: 2023-08-16

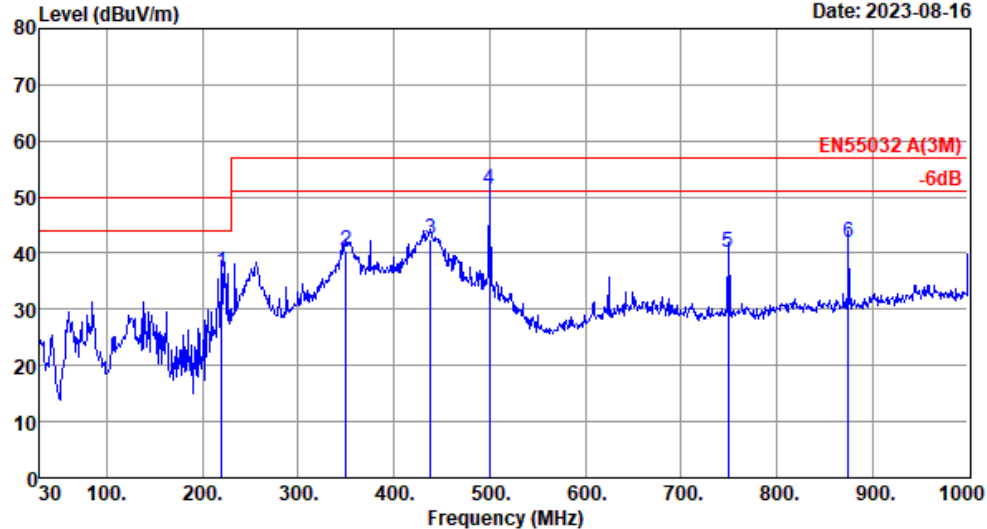


Site no. : 3# 966 Chamber Data no. : 193
Dis. / Ant. : 3m 31218 Ant. pol. : HORIZONTAL
Limit : EN55032 A(3M)
Env. / Ins. : Temp:21.6°C;Humi:56%;Press:101.52kPa
Engineer : JBR
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : Bluetooth Mode

Data: 194

File: \\EMC-966-3\\test data\\2023\\X\\Xin Pu Si.EM6 (197)

Date: 2023-08-16



Site no. : 3# 966 Chamber Data no. : 194
Dis. / Ant. : 3m 31218 Ant. pol. : HORIZONTAL
Limit : EN55032 A(3M)
Env. / Ins. : Temp:21.6°C;Humi:56%;Press:101.52kPa
Engineer : JBR
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : LAN Mode

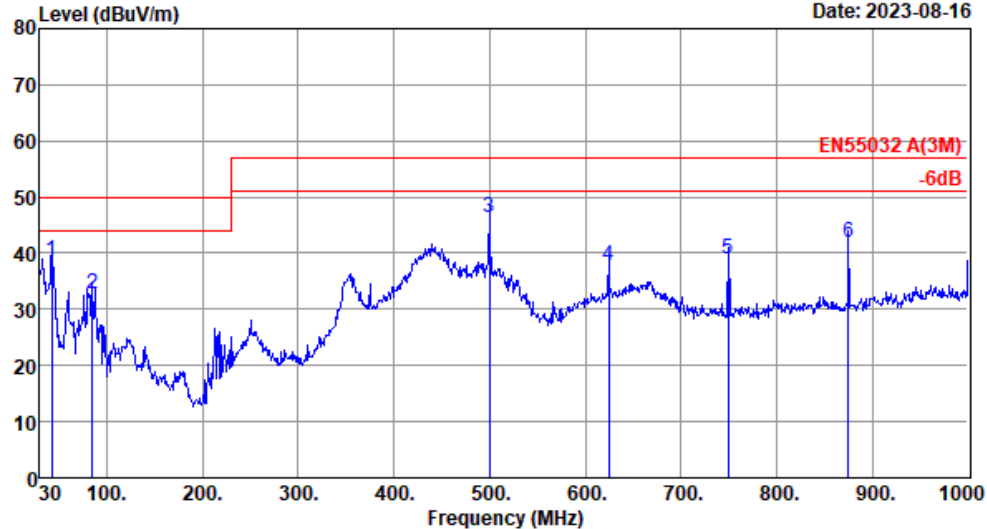
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	220.12	9.80	1.47	25.39	36.66	50.00	13.34	QP
2	350.10	15.30	1.96	23.32	40.58	57.00	16.42	QP
3	438.37	17.51	2.20	22.66	42.37	57.00	14.63	QP
4	499.48	18.48	2.35	30.45	51.28	57.00	5.72	QP
5	749.74	21.90	3.01	15.14	40.05	57.00	16.95	QP
6	874.87	23.60	3.33	14.92	41.85	57.00	15.15	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Data: 195

File: \\EMC-966-3\\test data\\2023\\X\\Xin Pu Si.EM6 (197)

Date: 2023-08-16



Site no. : 3# 966 Chamber Data no. : 195
Dis. / Ant. : 3m 31218 Ant. pol. : VERTICAL
Limit : EN55032 A(3M)
Env. / Ins. : Temp:21.6°C;Humi:56%;Press:101.52kPa
Engineer : JBR
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : LAN Mode

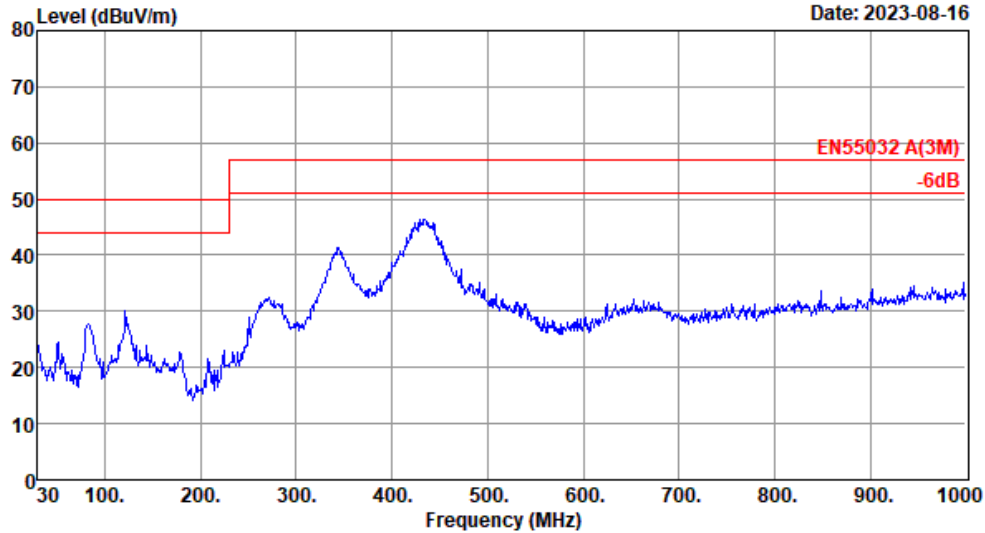
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	42.61	11.30	0.57	26.74	38.61	50.00	11.39	QP
2	85.29	8.40	0.86	23.51	32.77	50.00	17.23	QP
3	499.48	18.48	2.35	25.55	46.38	57.00	10.62	QP
4	624.61	20.69	2.71	14.32	37.72	57.00	19.28	QP
5	749.74	21.90	3.01	14.09	39.00	57.00	18.00	QP
6	874.87	23.60	3.33	15.12	42.05	57.00	14.95	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Data: 196

File: \\EMC-966-3\\test data\\2023\\X\\Xin Pu Si.EM6 (197)

Date: 2023-08-16

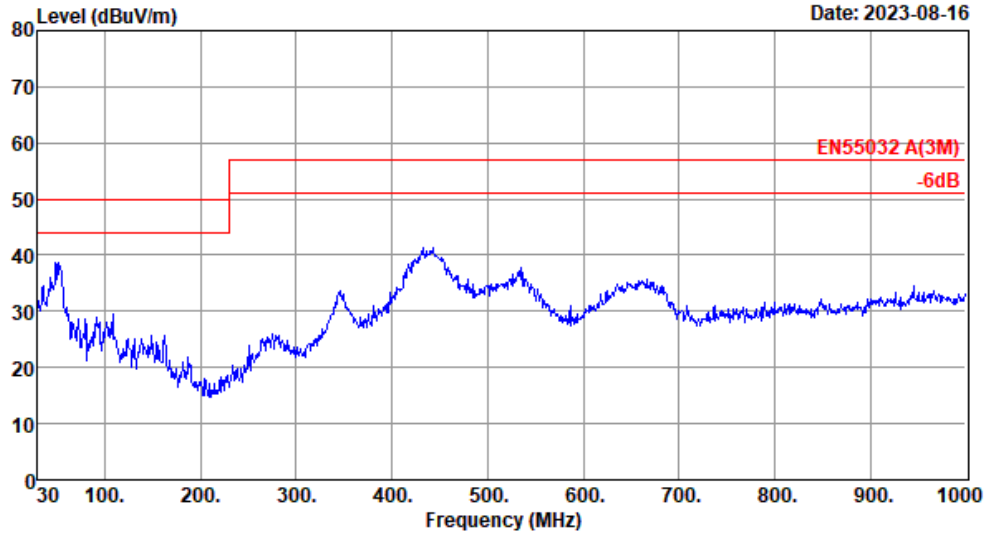


Site no. : 3# 966 Chamber Data no. : 196
Dis. / Ant. : 3m 31218 Ant. pol. : HORIZONTAL
Limit : EN55032 A(3M)
Env. / Ins. : Temp:21.6°C;Humi:56%;Press:101.52kPa
Engineer : JBR
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : Wi-Fi Mode

Data: 197

File: \\EMC-966-3\\test data\\2023\\X\\Xin Pu Si.EM6 (197)

Date: 2023-08-16



Site no. : 3# 966 Chamber Data no. : 197
Dis. / Ant. : 3m 31218 Ant. pol. : VERTICAL
Limit : EN55032 A(3M)
Env. / Ins. : Temp:21.6°C;Humi:56%;Press:101.52kPa
Engineer : JBR
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : Wi-Fi Mode

4.3. Radiated Emission Test (above 1GHz)

RESULT : **Pass**
Test procedure : EN 55032:2015+A1:2020
Frequency range : 1GHz-6GHz
Test Site : 966 Chamber
Limits : EN 55032:2015+A1:2020 Class A

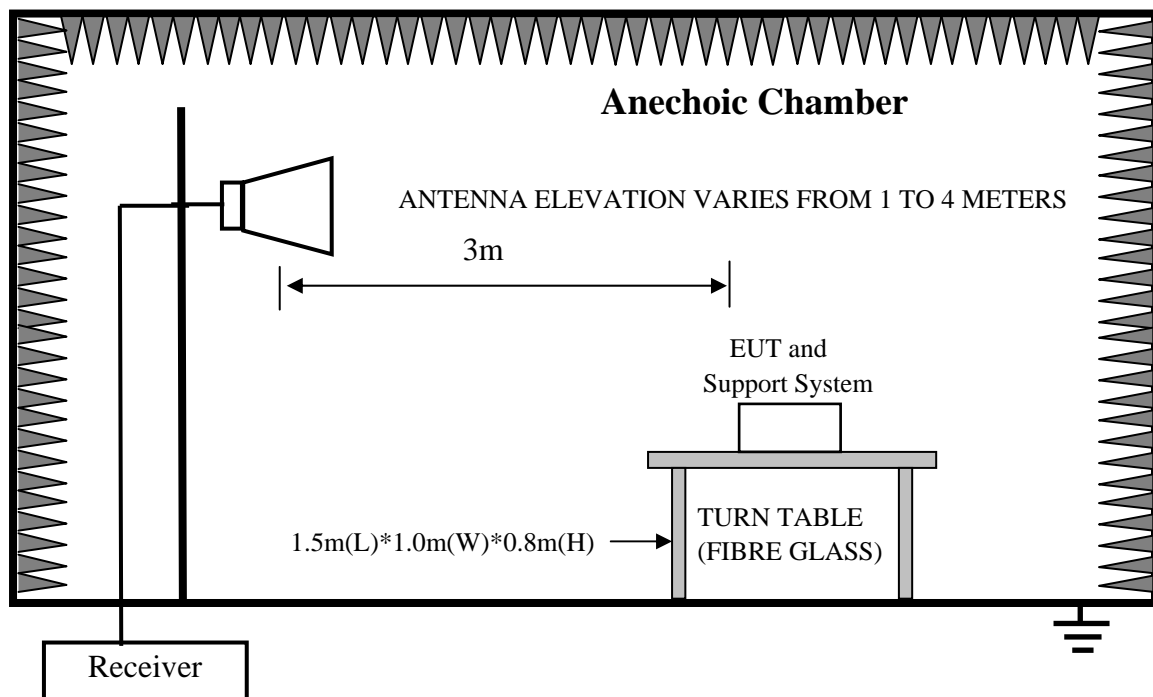
Test Setup

Date of test : Aug. 19, 2023
Model No. : CS12720-RK3568-050P
Input Voltage : DC 12V From Battery
Operation Mode : USB Mode, TF Mode, Wi-Fi Mode, Bluetooth Mode, LAN Mode

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector and Average detector from the spectrum, and all the final readings from the test receiver were measured with the Peak detector and Average detector.

The bandwidth setting on the test receiver was 1MHz(above 1GHz).

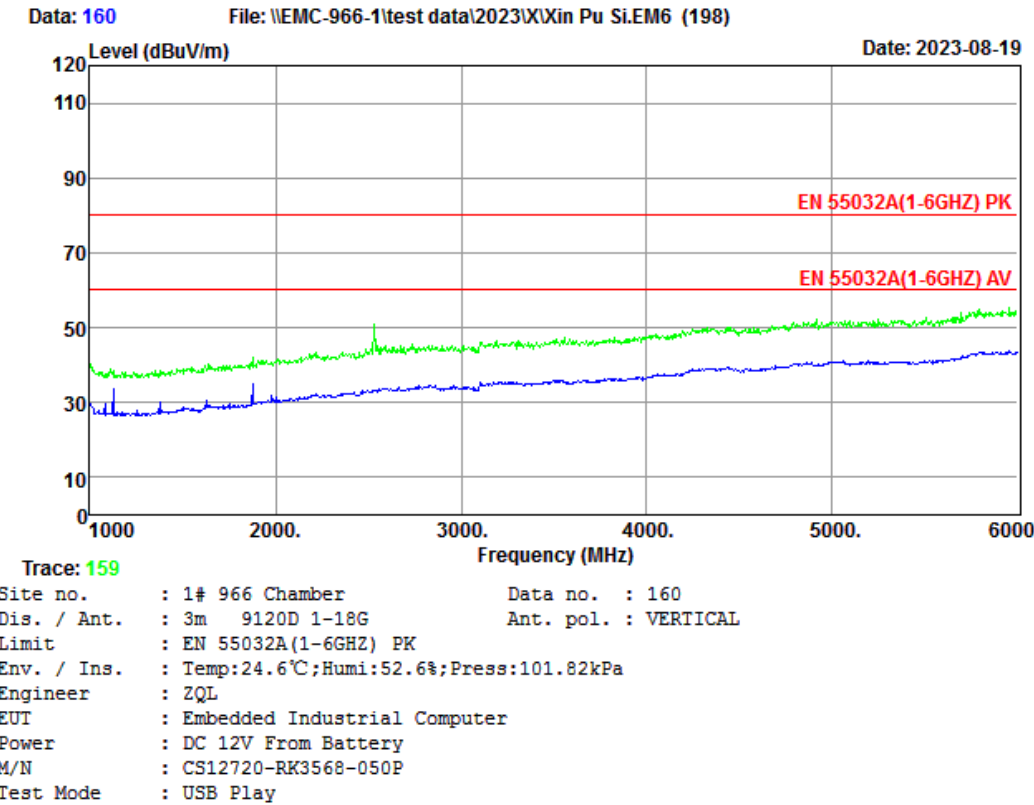


Note: Test uncertainty: $\pm 4.72\text{dB}$ at a level of confidence of 95%.

Test Data

EST Technology

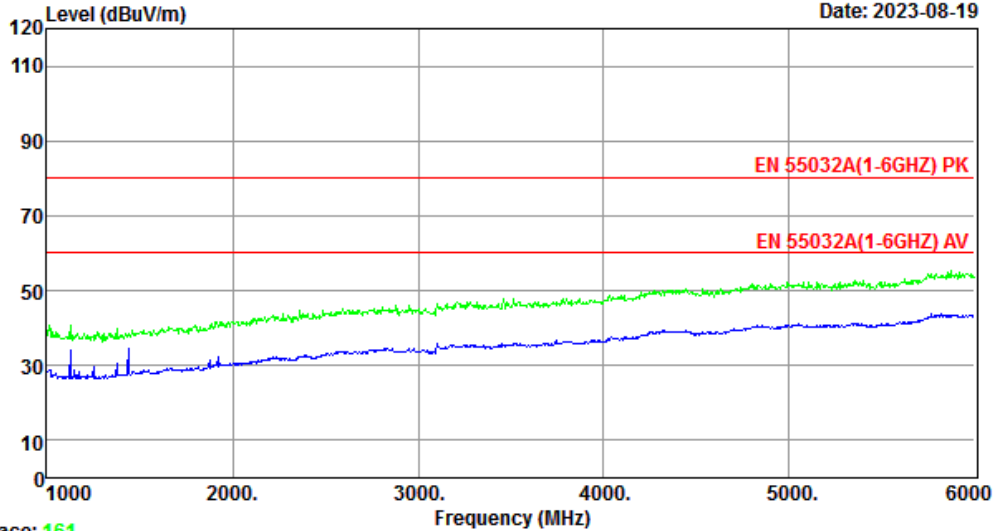
Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878



Data: 162

File: \\EMC-966-1\test data\2023\X\Xin Pu Si.EM6 (198)

Date: 2023-08-19



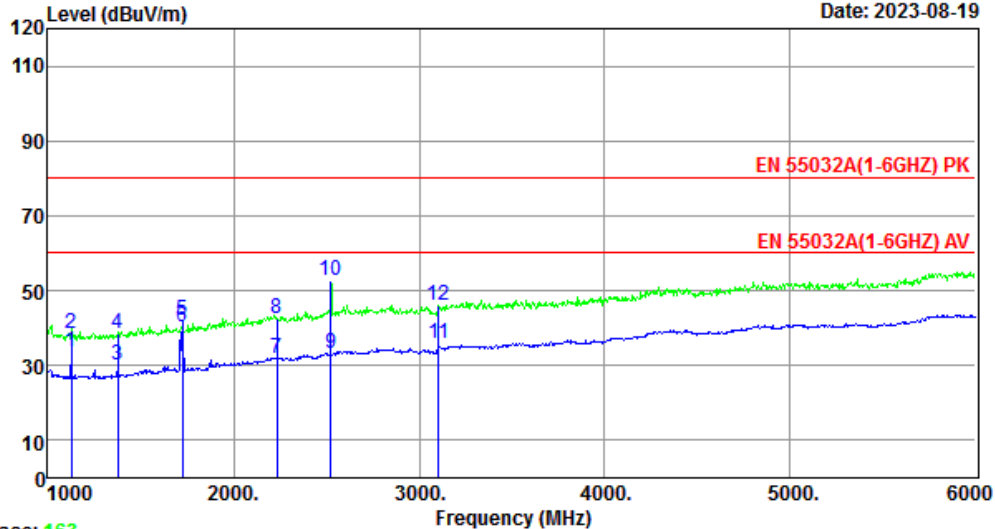
Trace: 161

Site no. : 1# 966 Chamber Data no. : 162
Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : HORIZONTAL
Limit : EN 55032A(1-6GHZ) PK
Env. / Ins. : Temp:24.6°C;Humi:52.6%;Press:101.82kPa
Engineer : ZQL
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : USB Play

Data: 164

File: \\EMC-966-1\test data\2023\Xin Pu Si.EM6 (198)

Date: 2023-08-19



Trace: 163

Site no. : 1# 966 Chamber Data no. : 164
 Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : HORIZONTAL
 Limit : EN 55032A(1-6GHZ) PK
 Env. / Ins. : Temp:24.6°C;Humi:52.6%;Press:101.82kPa
 Engineer : ZQL
 EUT : Embedded Industrial Computer
 Power : DC 12V From Battery
 M/N : CS12720-RK3568-050P
 Test Mode : TF Play

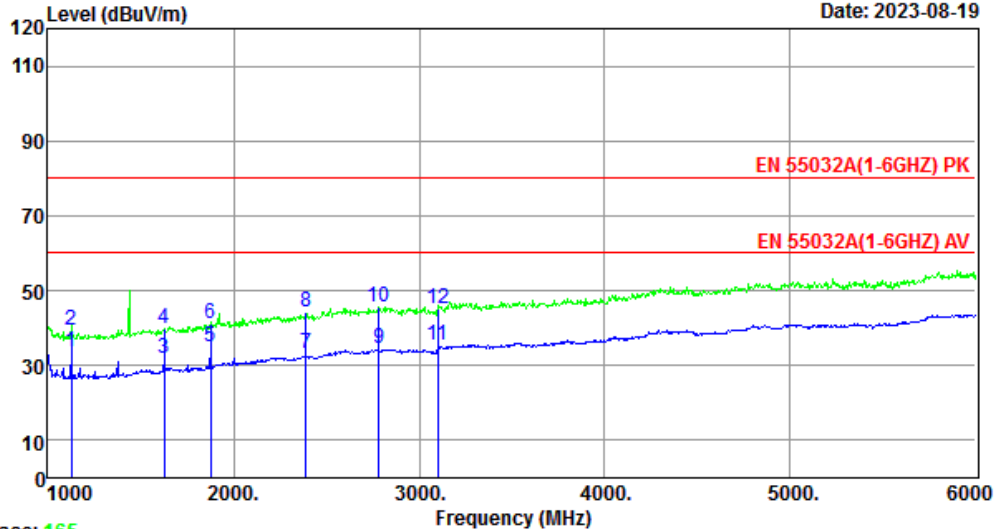
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1125.00	24.47	2.33	6.95	33.75	60.00	26.25	Average
2	1125.00	24.47	2.33	11.56	38.36	80.00	41.64	Peak
3	1375.00	24.87	2.60	2.77	30.24	60.00	29.76	Average
4	1375.00	24.87	2.60	11.26	38.73	80.00	41.27	Peak
5	1725.00	25.57	2.98	13.72	42.27	60.00	17.73	Average
6	1725.00	25.57	2.98	11.78	40.33	80.00	39.67	Peak
7	2235.00	27.63	3.44	0.89	31.96	60.00	28.04	Average
8	2235.00	27.63	3.44	11.65	42.72	80.00	37.28	Peak
9	2525.00	27.97	3.65	1.61	33.23	60.00	26.77	Average
10	2525.00	27.97	3.65	21.29	52.91	80.00	27.09	Peak
11	3105.00	29.70	4.04	1.99	35.73	60.00	24.27	Average
12	3105.00	29.70	4.04	12.23	45.97	80.00	34.03	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Data: 166

File: \\EMC-966-1\test data\2023\Xin Pu Si.EM6 (198)

Date: 2023-08-19



Trace: 165

Site no. : 1# 966 Chamber Data no. : 166
 Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : VERTICAL
 Limit : EN 55032A(1-6GHZ) PK
 Env. / Ins. : Temp:24.6°C;Humi:52.6%;Press:101.82kPa
 Engineer : ZQL
 EUT : Embedded Industrial Computer
 Power : DC 12V From Battery
 M/N : CS12720-RK3568-050P
 Test Mode : TF Play

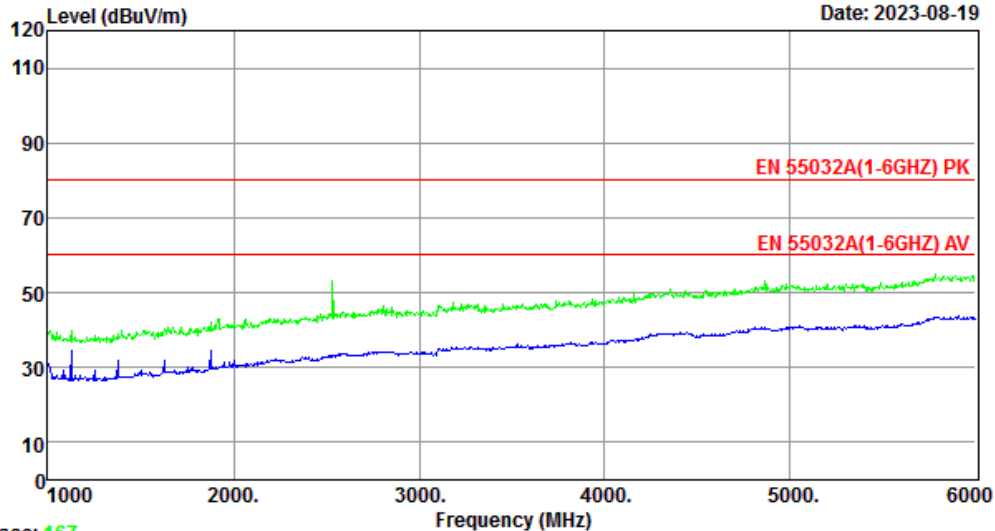
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1125.00	24.47	2.33	6.91	33.71	60.00	26.29	Average
2	1125.00	24.47	2.33	12.62	39.42	80.00	40.58	Peak
3	1625.00	25.77	2.87	3.16	31.80	60.00	28.20	Average
4	1625.00	25.77	2.87	11.12	39.76	80.00	40.24	Peak
5	1875.00	25.67	3.12	6.22	35.01	60.00	24.99	Average
6	1875.00	25.67	3.12	12.26	41.05	80.00	38.95	Peak
7	2390.00	27.80	3.55	1.68	33.03	60.00	26.97	Average
8	2390.00	27.80	3.55	12.95	44.30	80.00	35.70	Peak
9	2785.00	28.50	3.84	2.12	34.46	60.00	25.54	Average
10	2785.00	28.50	3.84	13.29	45.63	80.00	34.37	Peak
11	3100.00	29.70	4.04	1.58	35.32	60.00	24.68	Average
12	3100.00	29.70	4.04	11.56	45.30	80.00	34.70	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Data: 168

File: \\EMC-966-1\test data\2023\X\Xin Pu Si.EM6 (198)

Date: 2023-08-19



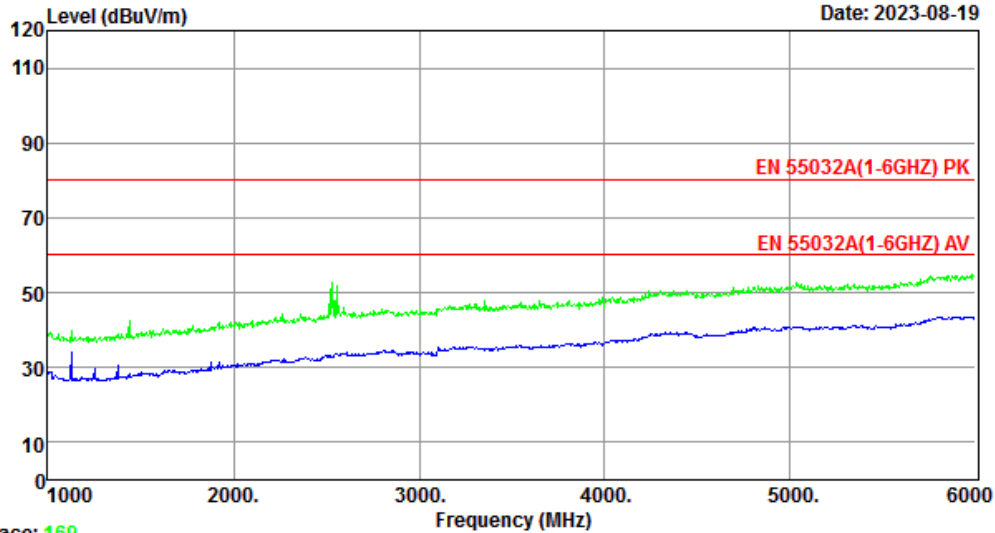
Trace: 167

Site no. : 1# 966 Chamber Data no. : 168
Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : VERTICAL
Limit : EN 55032A(1-6GHZ) PK
Env. / Ins. : Temp:24.6°C;Humi:52.6%;Press:101.82kPa
Engineer : ZQL
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : LAN Mode

Data: 170

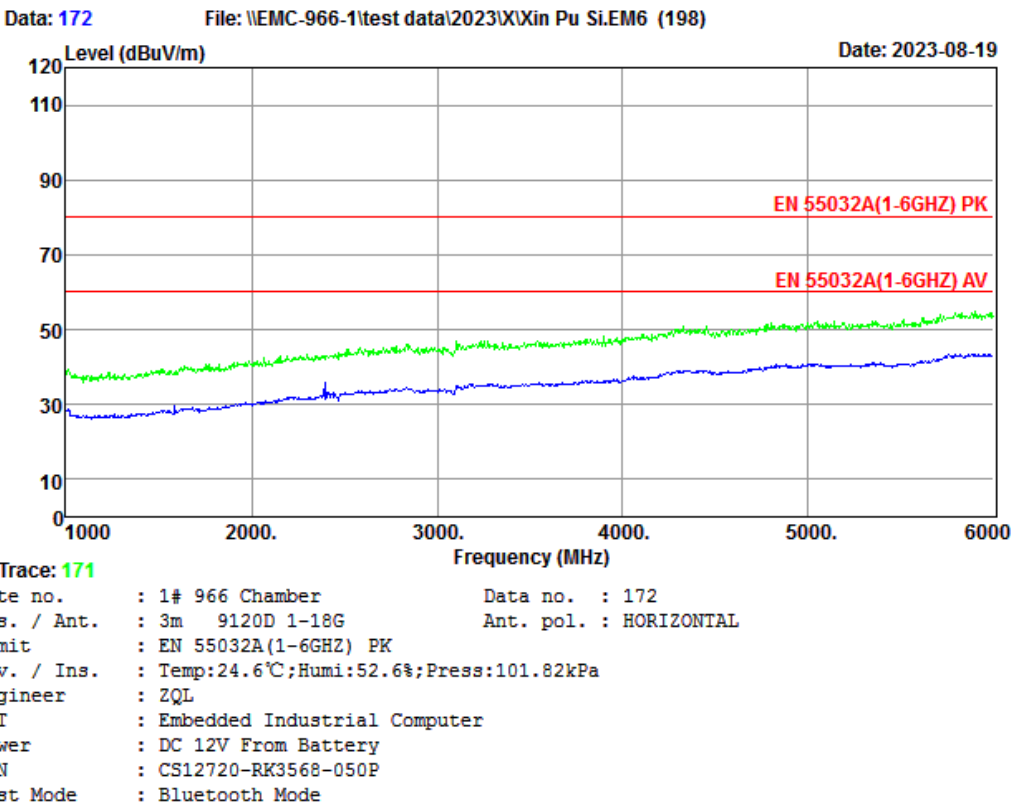
File: \\EMC-966-1\test data\2023\X\Xin Pu Si.EM6 (198)

Date: 2023-08-19



Trace: 169

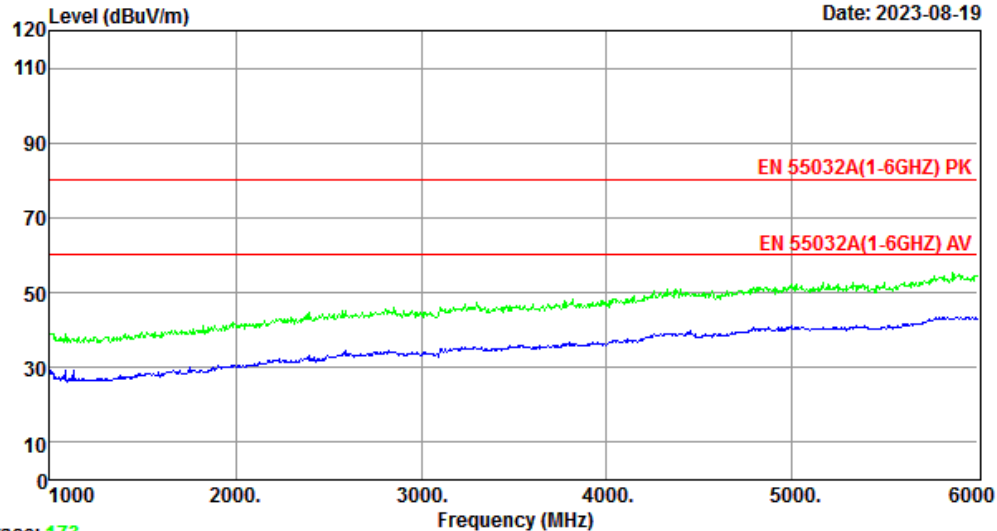
Site no. : 1# 966 Chamber Data no. : 170
Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : HORIZONTAL
Limit : EN 55032A(1-6GHZ) PK
Env. / Ins. : Temp:24.6°C;Humi:52.6%;Press:101.82kPa
Engineer : ZQL
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : LAN Mode



Data: 174

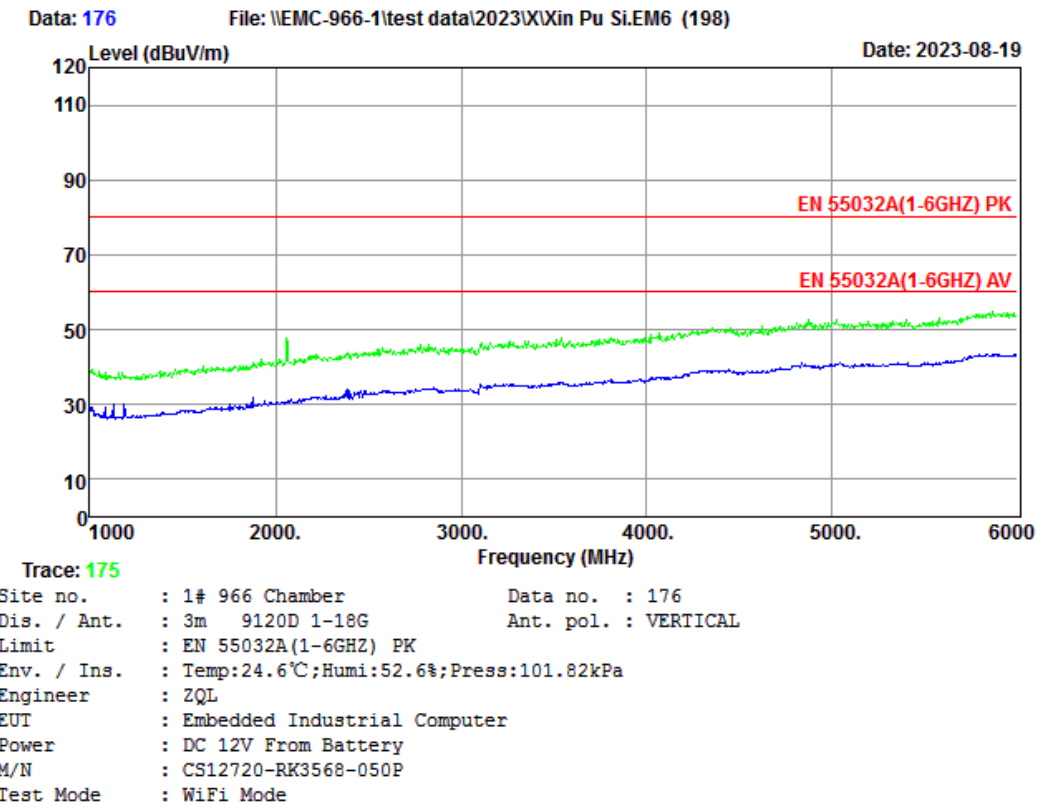
File: \\EMC-966-1\\test data\\2023\\X\\Xin Pu Si.EM6 (198)

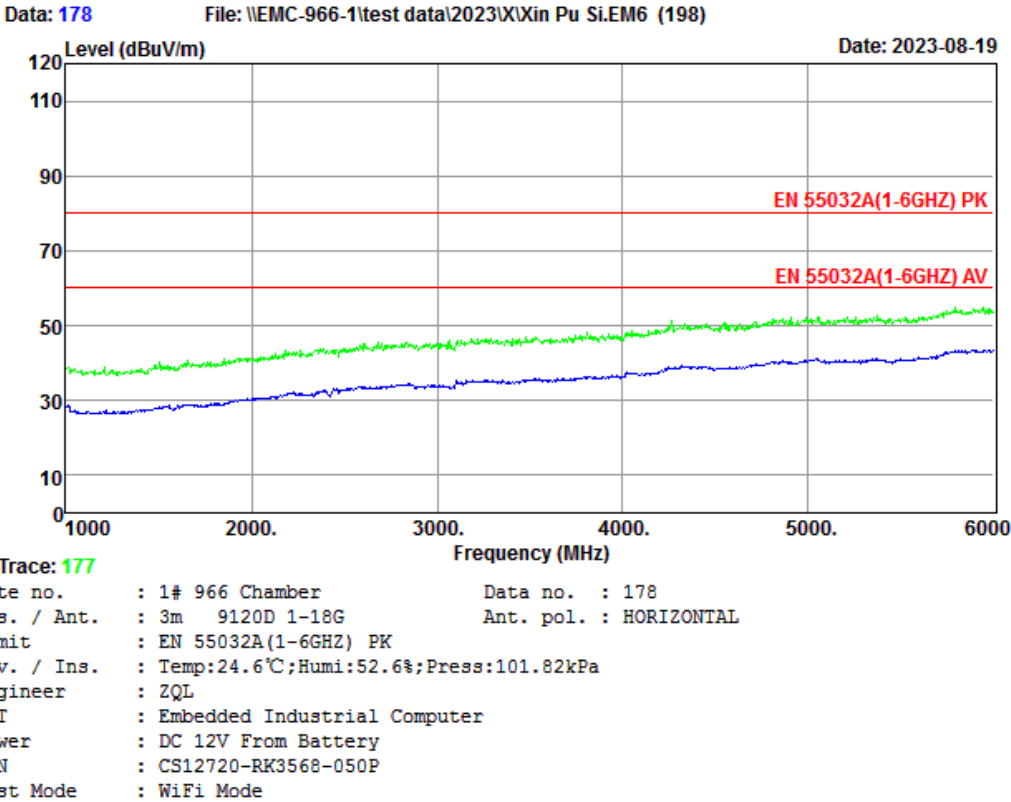
Date: 2023-08-19



Trace: 173

Site no. : 1# 966 Chamber Data no. : 174
Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : VERTICAL
Limit : EN 55032A(1-6GHZ) PK
Env. / Ins. : Temp:24.6°C;Humi:52.6%;Press:101.82kPa
Engineer : ZQL
EUT : Embedded Industrial Computer
Power : DC 12V From Battery
M/N : CS12720-RK3568-050P
Test Mode : Bluetooth Mode





5. IMMUNITY TEST RESULT

5.1. Description of Performance Criteria:

Performance criteria A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

For audio output device: The measured acoustic interference ratio and/or the measured electrical interference during the test shall be -20dB or better(see note1)

Performance criteria B

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criteria C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Note 1: This performance criterion only using for Continuous inducted RF disturbances and Continuous RF electromagnetic field disturbances item.

5.2. Electrostatic Discharge Immunity Test

RESULT : **Pass**

Test procedure : EN 55035:2017+A11:2020

Basic standard : EN 61000-4-2:2009

Test specification : +/-4.0kV(Contact discharge)
+/-8.0kV(Air discharge)

Number of discharges : ≥ 10 (Air discharge for single polarity discharge)
 ≥ 10 (Contact discharge for single polarity discharge)

Polarity : Positive/Negative

Performance criterion : B

Test Setup

Date of test : Aug. 24, 2023

Model No. : CS12720-RK3568-050P

Input Voltage : DC 12V From Battery

Operation Mode : USB Mode, TF Mode, Wi-Fi Mode, Bluetooth Mode,
LAN Mode

Temperature : 25°C

Humidity : 45%

Pressure : 101.10kPa

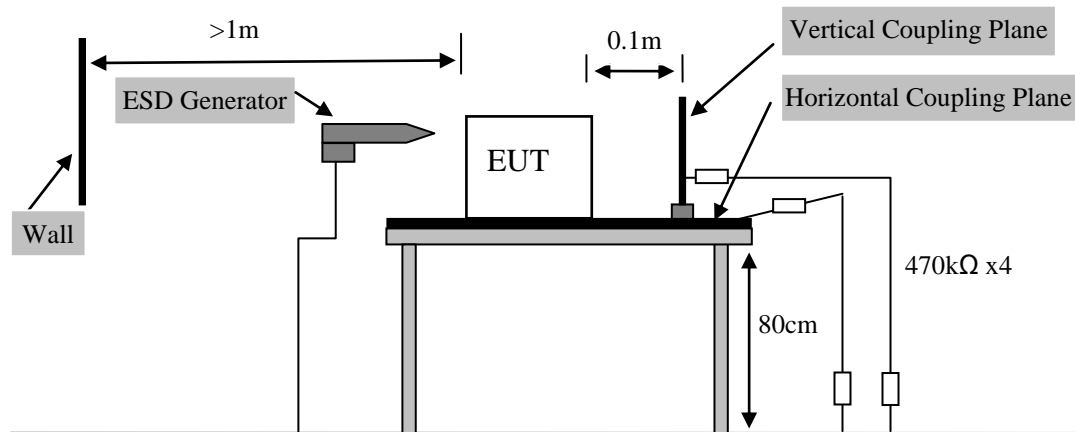


Table 1: Electrostatic Discharge Immunity Test Result

Discharge Location		Type of discharge	Result
HCP	4 points	Contact	Pass
VCP	4 points	Contact	Pass
USB	3 points	Contact	Pass
LAN	1 point	Contact	Pass
Metal	4 points	Contact	Pass
TYPE-C	1 point	Contact	Pass
Cell phone	1 point	Air	Pass
TF IN	1 point	Air	Pass
Screen	4 points	Air	Pass
Slot	4 points	Air	Pass
DC IN	1 point	Air	Pass

*Remark: 1. The screen was flashing during the test, but self-recoverable after the test
2. Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).*

5.3. Radio Frequency Electromagnetic Field Immunity(R/S) Test

RESULT : **Pass**
Test procedure : EN 55035:2017+A11:2020
Basic standard : EN 61000-4-3:2006+A1:2008+A2:2010
Frequency Range : 80-1000MHz,1800MHz, 2600MHz, 3500MHz, 5000MHz
Performance criterion : A
Test site : 866 Chamber

Test Setup

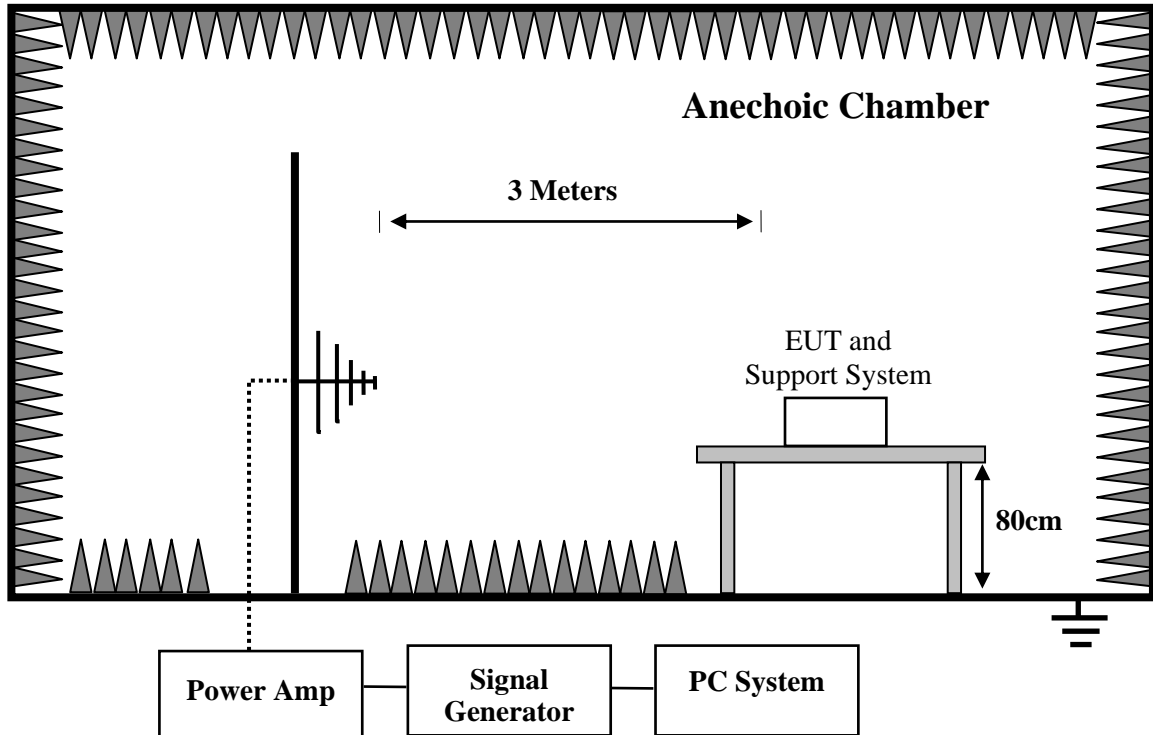
Date of test : Aug. 24, 2023
Model No. : CS12720-RK3568-050P
Input Voltage : DC 12V From Battery
Operation Mode : USB Mode, TF Mode, Wi-Fi Mode, Bluetooth Mode,
LAN Mode
Temperature : 25°C
Humidity : 58%
Pressure : 101.10kPa

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The EUT was set 3 m away from the transmitting antenna which was mounted on an antenna tower. Both horizontal and vertical polarization of the antenna were set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a CCD camera was used to monitor EUT screen.

All the scanning conditions were as follows:

Condition of Test	Remarks
1. Field Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 - 1000 MHz
4. Sweeping time of radiated	0.0015 decade/s
5. Dwell Time	at least 3 seconds



Condition of Test	Remarks
6. Field Strength	3 V/m (Severity Level 2)
7. Radiated Signal	Modulated
8. Scanning Frequency	1800MHz,2600MHz,3500MHz,5000MHz
9. Sweeping time of radiated	0.0015 decade/s
10. Dwell Time	at least 3 seconds

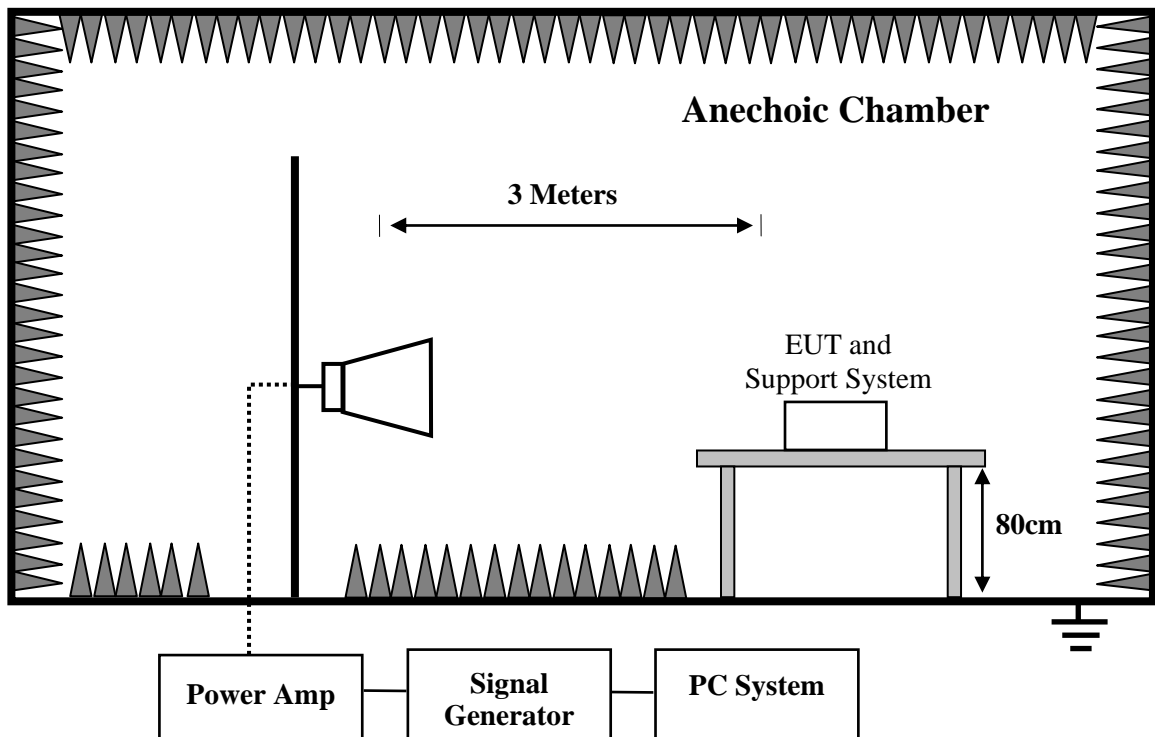


Table 2: Radio Frequency Electromagnetic Field Immunity Test Result

Field Strength (V/m)	Test Frequency (MHz)	Test mode	Polarization of antenna	Reference Level	Audio output	Limit	Interference Ratio (worst case)
3	80-1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz	USB Mode, TF Mode, Wi-Fi Mode, Bluetooth Mode, LAN Mode	H	75dBSPL	Speaker	\leq -20dB	-65.11 dB
			V	75dBSPL	Speaker		-68.03 dB

5.4. Electrical Fast Transient/Burst Immunity Test

RESULT	: Pass
Test procedure	: EN 55035:2017+A11:2020
Basic standard	: EN 61000-4-4:2012
Pulse form	: Tr/Th = 5/50ns
Repetition Frequency	: 5 kHz ; (100 kHz : only for single lines of xDSL equipment)
Test Duration	: 120s
Performance criterion	: B

Test Setup

Date of test	: Aug. 24, 2023
Model No.	: CS12720-RK3568-050P
Input Voltage	: DC 12V From Battery
Operation Mode	: USB Mode, TF Mode, Wi-Fi Mode, Bluetooth Mode, LAN Mode
Temperature	: 22°C
Humidity	: 50%
Pressure	: 101.32kPa

The EUT and its simulators were placed 0.1m high above the ground reference plane which was a min. 2m*2m metallic sheet with 0.65mm minimum thickness. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

1. For input and AC power ports:

The EUT was connected to the power mains by using a coupling device which coupled the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test can't less than 2 mains.

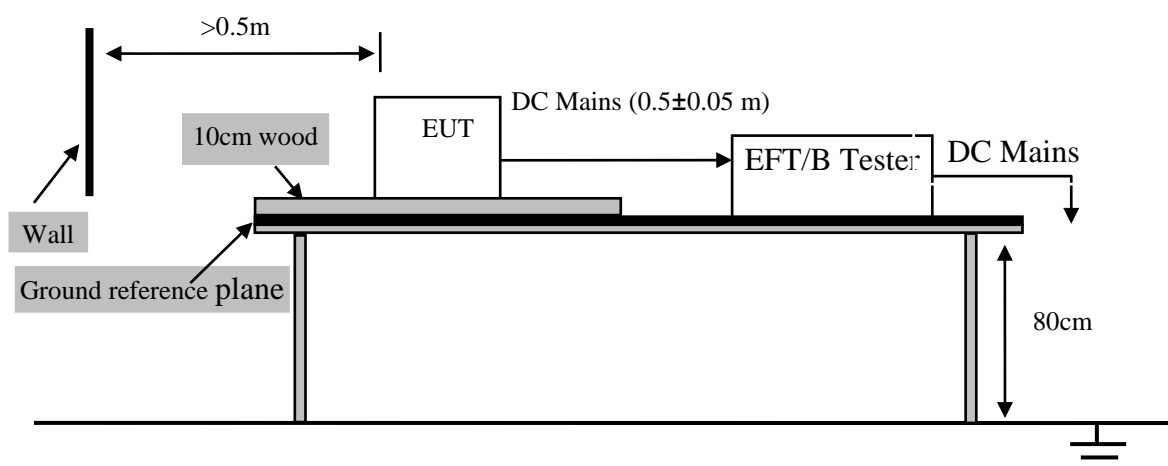


Table 5: Electrical Fast Transient/Burst Immunity Test Result

Coupling Ports		Coupling Voltage	Inject Method	Result
DC Power Ports	Signal Line	± 0.5 kV	Direct	Pass

Remark: The screen was flashing during the test, but self-recoverable after the test.

5.5. Surge Immunity Test

RESULT : **Pass**
Test procedure : EN 55035:2017+A11:2020
Basic standard : EN 61000-4-5:2014
Pulseform : $T_r/T_d = 1.2/50\mu s$
Test Duration : 60s
Performance criterion : B

Test Setup

Date of test : Aug. 24, 2023
Model No. : CS12720-RK3568-050P
Input Voltage : DC 12V From Battery
Operation Mode : USB Mode, TF Mode, Wi-Fi Mode, Bluetooth Mode, LAN Mode
Temperature : 25°C
Humidity : 58%
Pressure : 101.32kPa

2 Ω effective output impedance of the generator was used for L-N test. 12 Ω effective output impedance of the generator was used for L-PE, N-PE test.

5 positive and 5 negative (polarity) tests were applied successively synchronized to the voltage phase 90°, 270° to L-N respectively. The repetition rate was 1 per minute during test.

1. For input and AC power ports:

The EUT was connected to the power mains by using a coupling device which coupled the surge interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration was 1 minute.

2. For signal lines and control lines ports:

None.

3. For DC input and DC output power ports:

None.

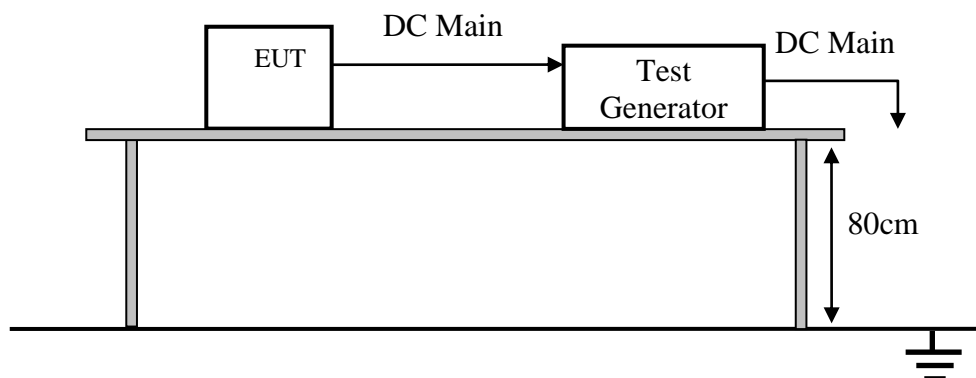


Table 4: Surge Immunity Test Result

Coupling Ports		Coupling Voltage	Coupling Phase / Result			
			0°	90°	180°	270°
DC power ports	Signal-PE	+/-0.5kV Direct	/	Pass	/	Pass

Remark: The screen was flashing during the test, but self-recoverable after the test

5.6. Injected Currents Susceptibility Test

RESULT : **Pass**

Test procedure : EN 55035:2017+A11:2020

Basic standard : EN 61000-4-6:2014

Test specification : 3 Vr.m.s, 3 Vr.m.s - 1Vr.m.s, 1Vr.m.s,
AM 80%, 0.15 MHz - 10 MHz, 10 MHz – 30 MHz,
30 MHz – 80MHz

Performance criterion : A

Test Setup

Date of test : Aug. 24, 2023

Model No. : CS12720-RK3568-050P

Input Voltage : DC 12V From Battery

Operation Mode : USB Mode, TF Mode, Wi-Fi Mode, Bluetooth Mode,
LAN Mode

Temperature : 25°C

Humidity : 56%

Pressure : 101.32kPa

The EUT were placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) was placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT were as short as possible, and their height above the ground reference plane were between 30 and 50 mm (where possible).

The frequency range was swept from 0.15 MHz - 10 MHz, 10 MHz – 30 MHz and 30 MHz – 80MHz using 3V, 3 V - 1V, 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.

The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency was swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

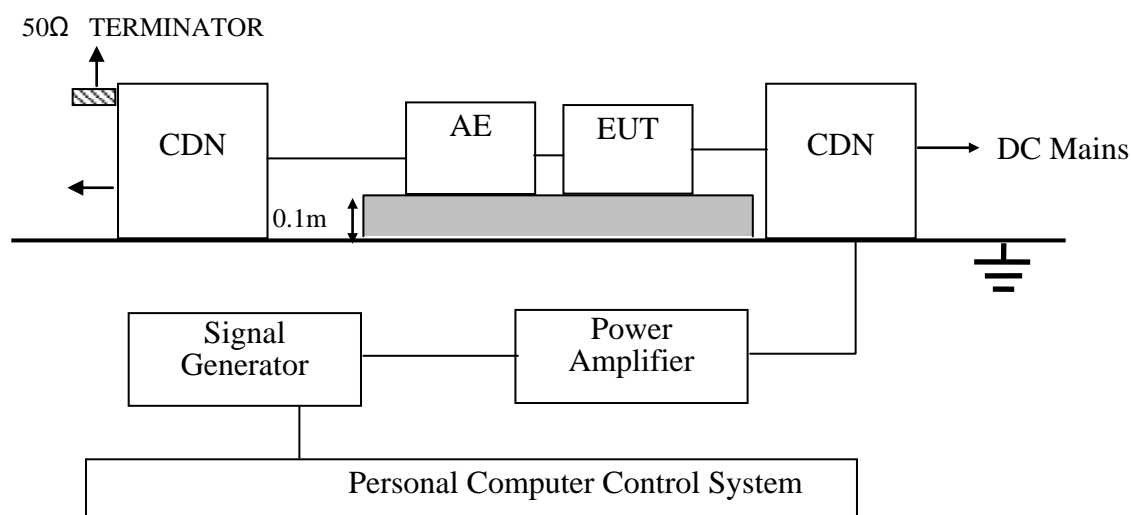


Table 5: Injected Currents Susceptibility Test Result

Voltage (V)	Test Frequency (MHz)	Test mode	Injection Method	Reference Level	Audio output	Limit	Interference Ratio (worst case)
3	0.15 –10 MHz	LAN	EM Clamp	75dBSPL	Speaker	≤ -20 dB	-45.63 dB
3 -1	10 –30 MHz						-56.78 dB
1	30 –80 MHz						-60.35 dB

5.7. Power Frequency Magnetic Field Immunity Test

RESULT : **Pass**
Test procedure : EN 55035:2017+A11:2020
Basic standard : EN 61000-4-8:2010
Test specification : 1 A/m
Performance criterion : A

Test Setup

Date of test : Aug. 24, 2023
Model No. : CS12720-RK3568-050P
Input Voltage : DC 12V From Battery
Operation Mode : USB Mode, TF Mode, Wi-Fi Mode, Bluetooth Mode, LAN Mode
Temperature : 25.1°C
Humidity : 59%
Pressure : 101.32kPa

The EUT was subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m). The induction coil then was rotated by 90° in order to expose the EUT to the test field with different orientations.

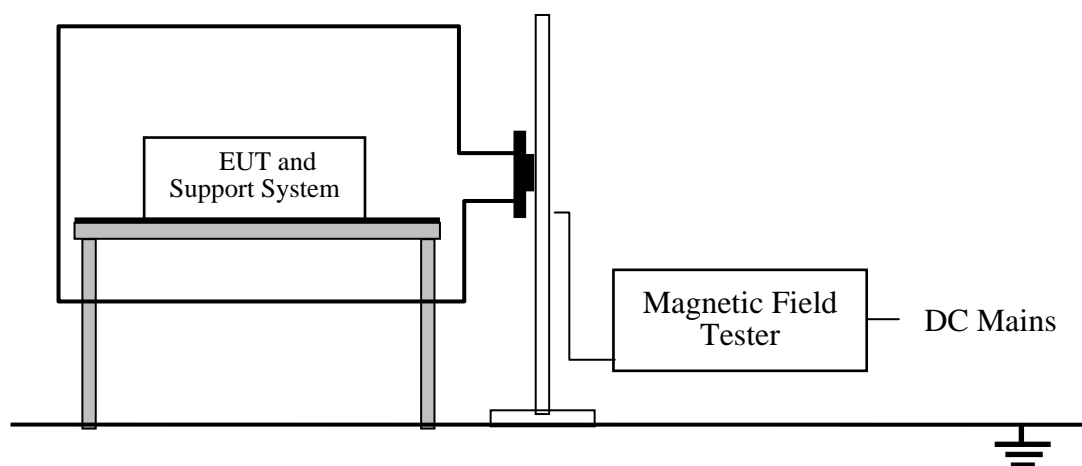


Table 6: Power Frequency Magnetic Field Immunity Test Result

Test Level	Testing Duration	Coil Orientation	Criterion	Result
1A/m	5 mins	X	A	Pass
1A/m	5 mins	Y	A	Pass
1A/m	5 mins	Z	A	Pass

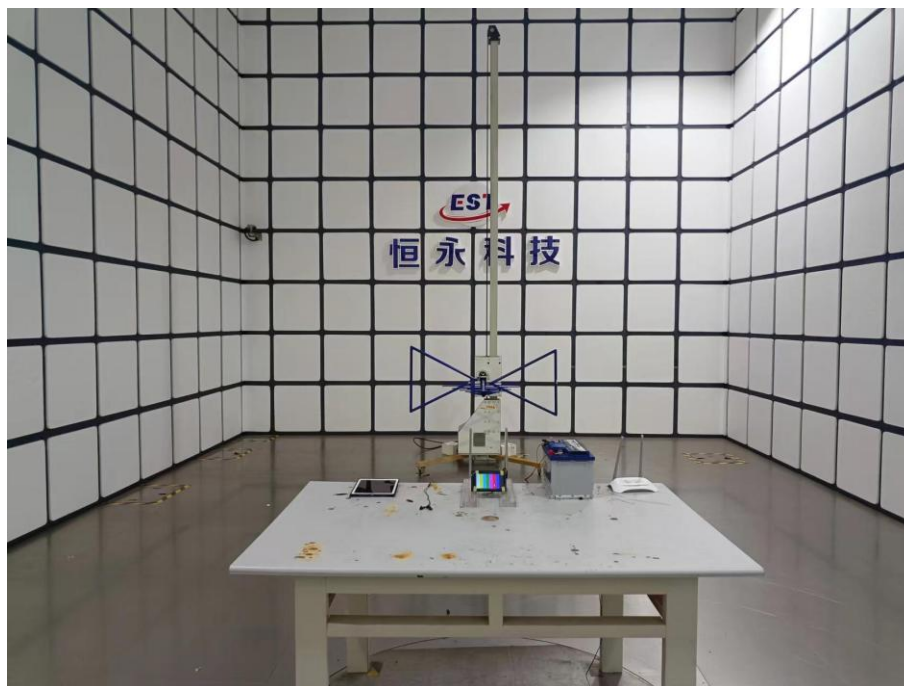
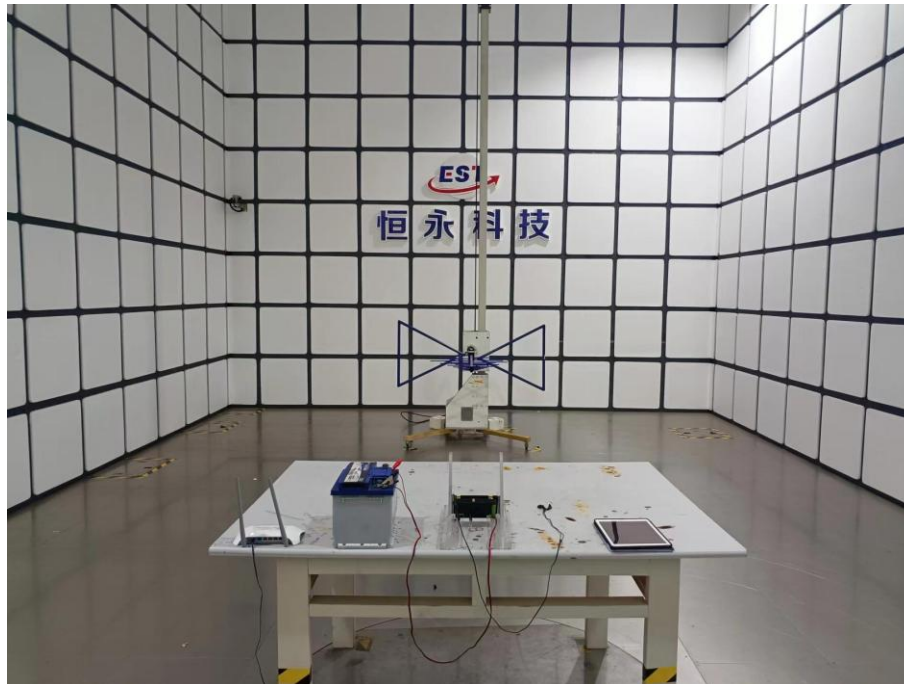
Remark: There was no change compared with initial operation during the test

6. PHOTOGRAPHS OF TEST SET-UP

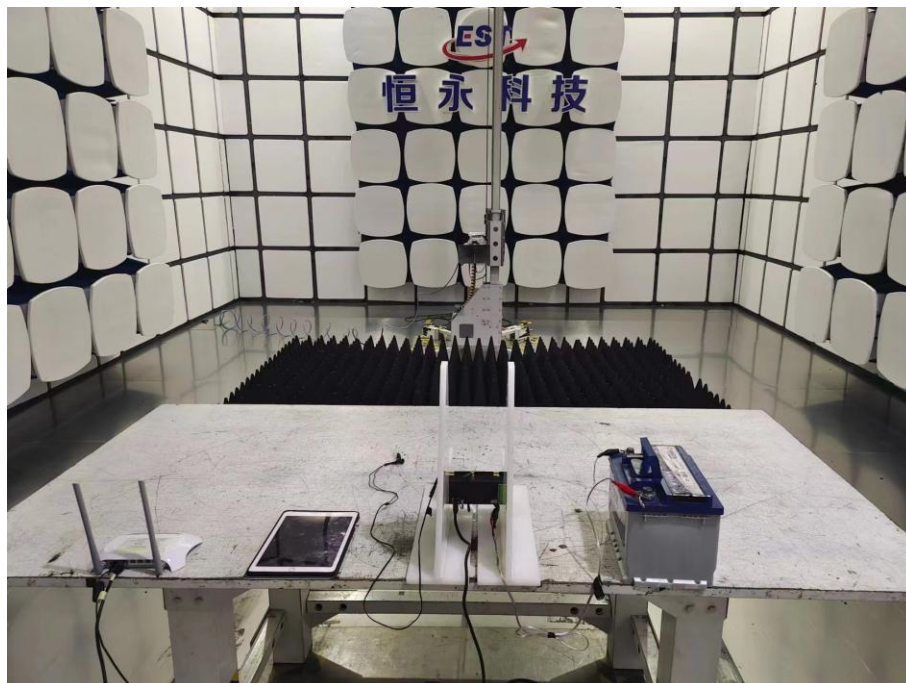
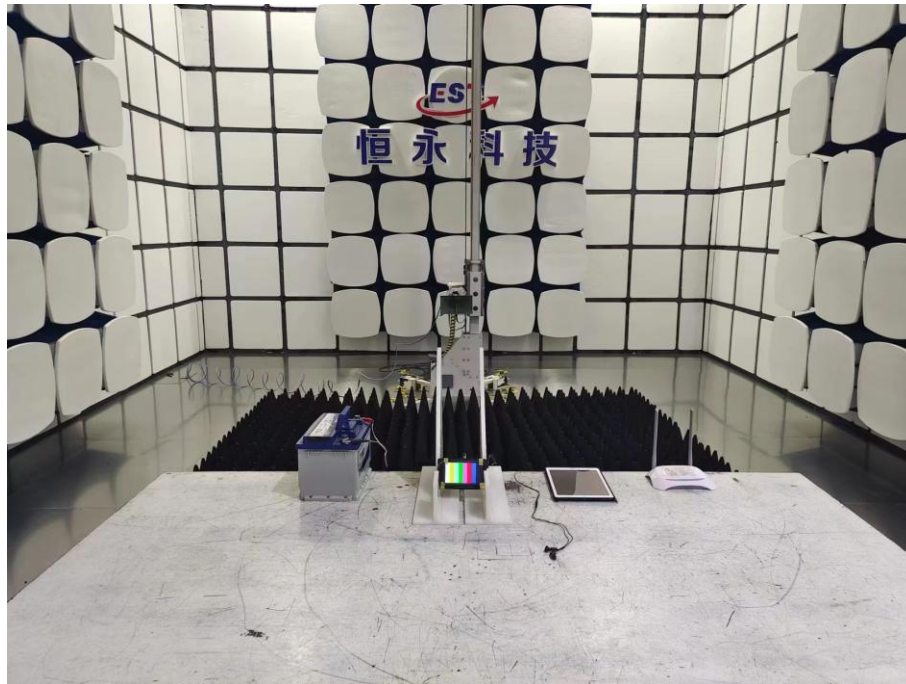
6.1.Set-up for Asymmetric Mode Conducted Emissions Test



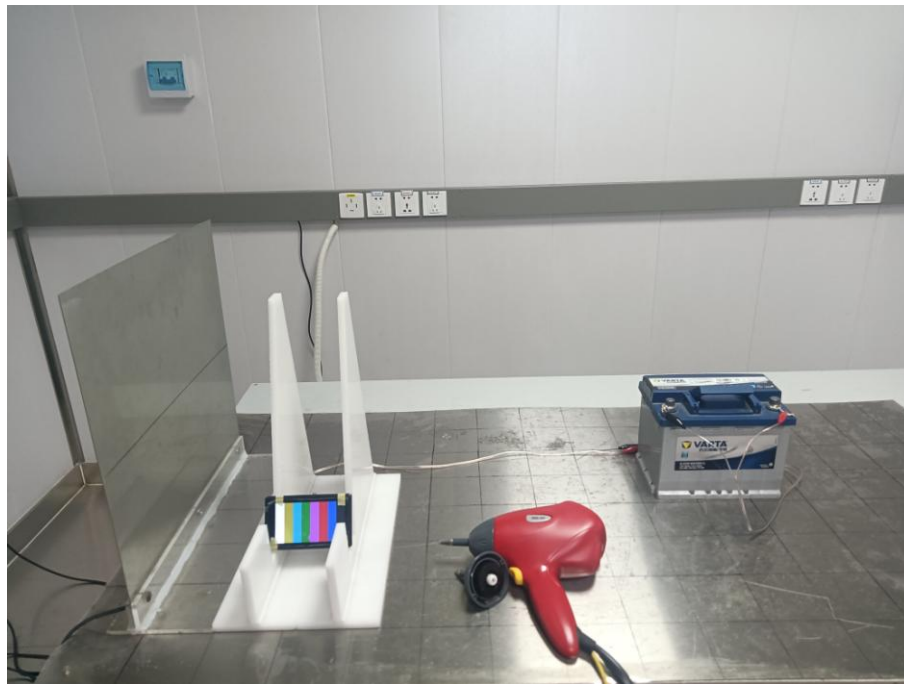
6.2.Set-up for Radiated Emission Test



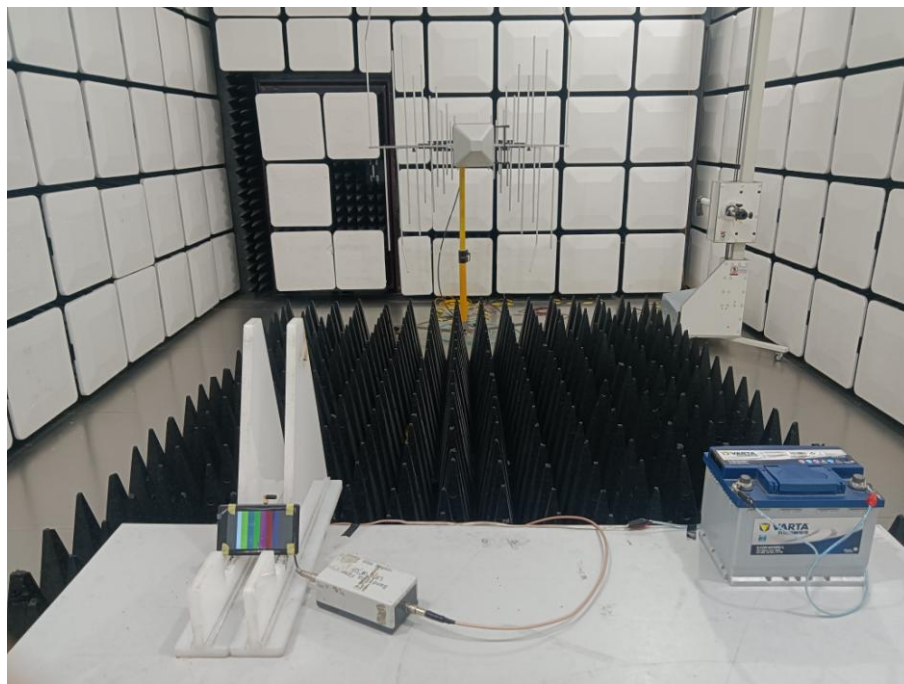
6.3.Set-up for Radiated Emission Test(above 1GHz)



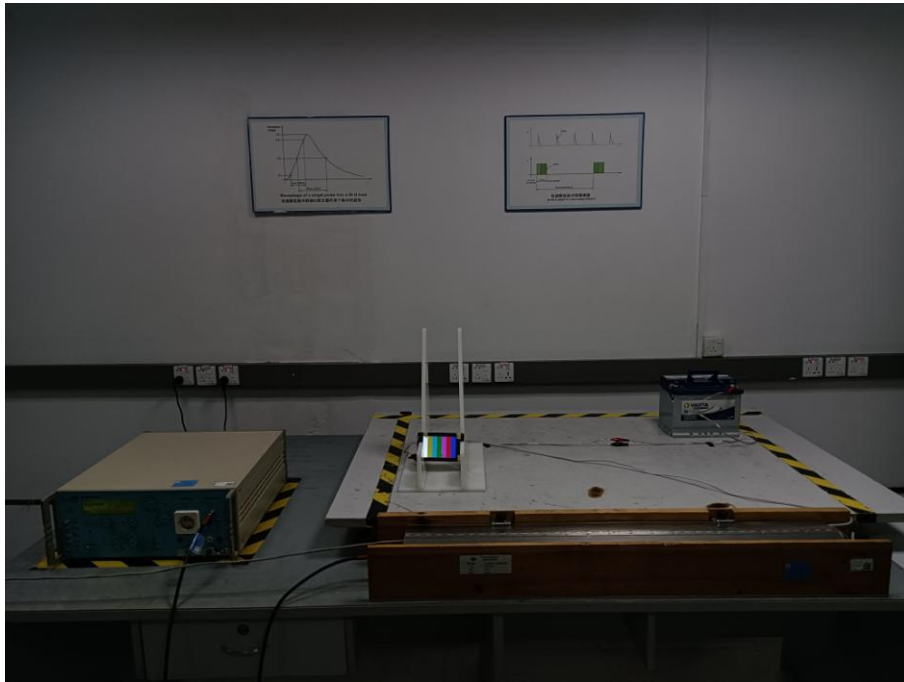
6.4.Set-up for Electrostatic Discharge Immunity Test



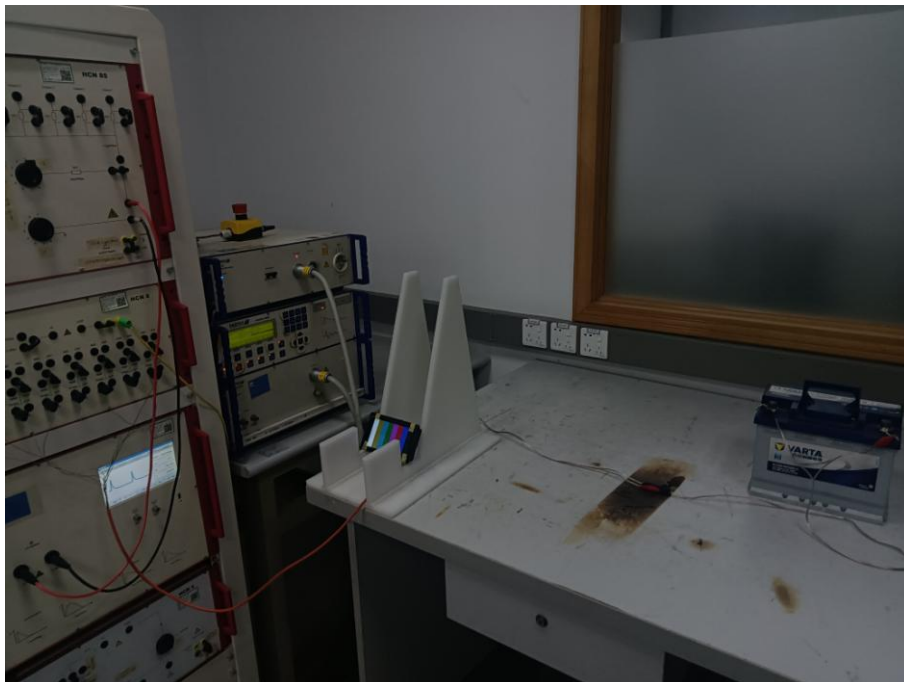
6.5.Set-up for Radio Frequency Electromagnetic Field Immunity(R/S) Test



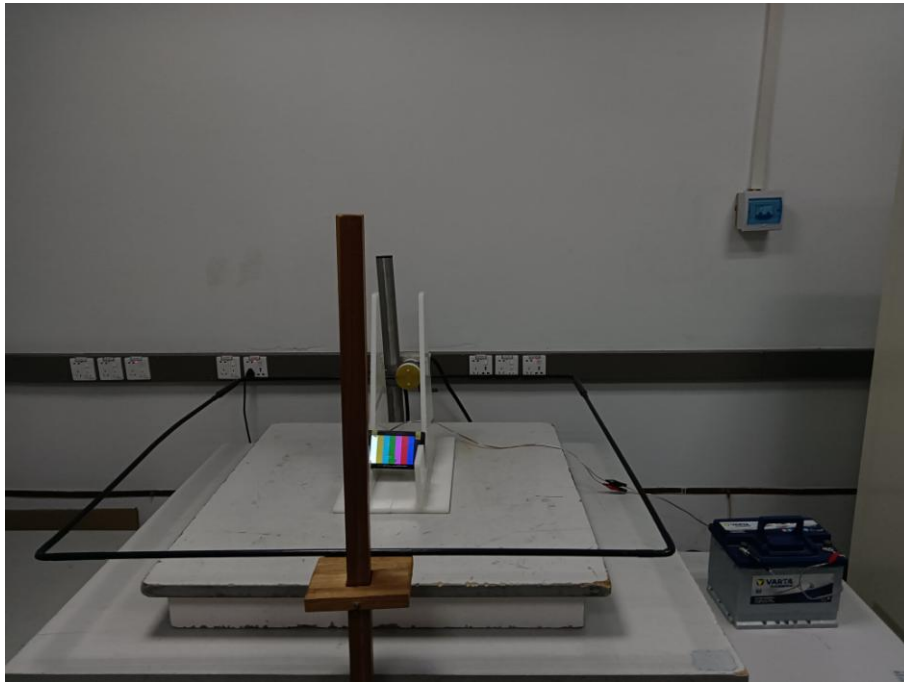
6.6.Set-up for Electrical Fast Transient/Burst Immunity Test



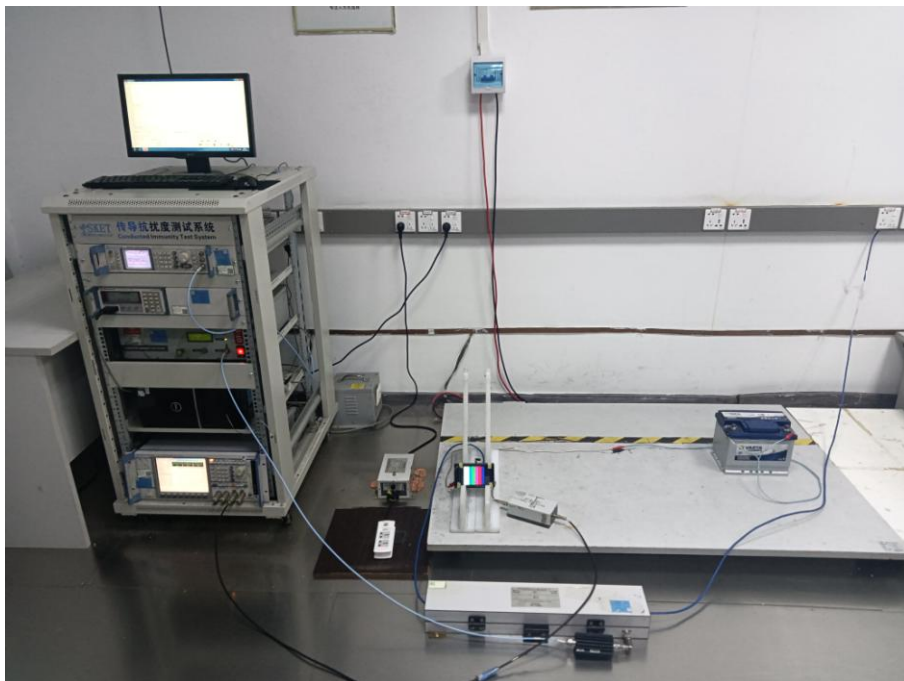
6.7.Set-up for Surge Immunity Test



6.8.Set-up for Power Frequency Magnetic Field Immunity Test



6.9.Set-up for Injected Currents Susceptibility Test



7. PHOTOGRAPHS OF THE EUT

Figure 1
General Appearance of the EUT



Figure 2
General Appearance of the EUT



Figure 3
General Appearance of the EUT



Figure 4
General Appearance of the EUT



Figure 5
Inside View of the EUT



Figure 6
Inside View of the EUT

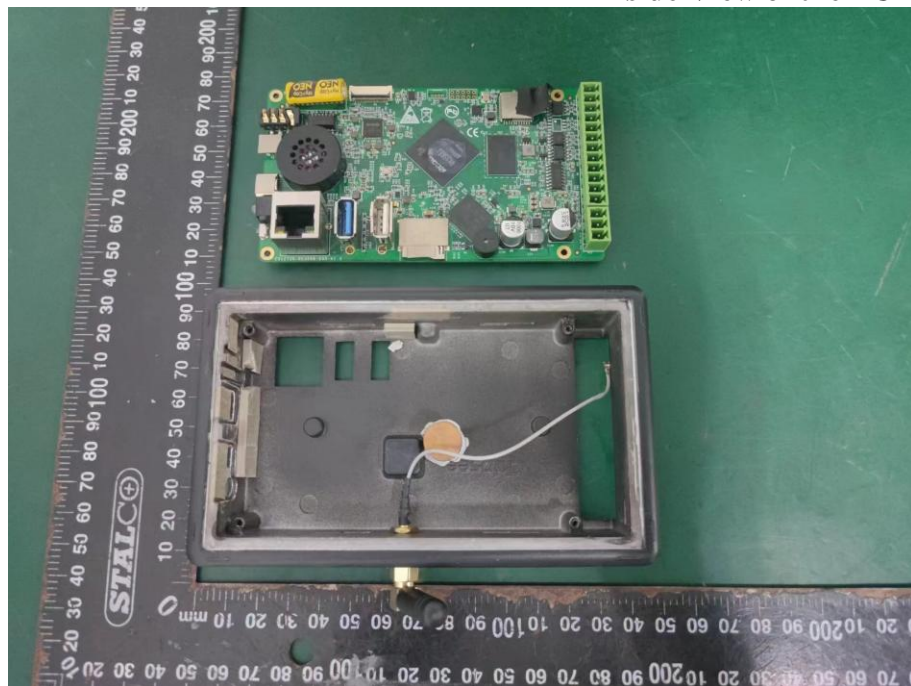


Figure 7
Inside View of the EUT



Figure 8
Inside View of the EUT



End of Test Report