


Prüfbericht-Nr.: <i>Test Report No.:</i>	CN217YR1 001	Auftrags-Nr.: <i>Order No.:</i>	190130973	Seite 1 von 22 <i>Page 1 of 22</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2021-01-14	
Auftraggeber: <i>Client:</i>	China Daheng Group, Inc. 15F Daheng Science & Technology Tower, No. 3 Suzhou Street, Haidian District Beijing 100080 P.R. China			
Prüfgegenstand: <i>Test item:</i>	Industry Camera			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	Refer to clause 2.2			
Auftrags-Inhalt: <i>Order content:</i>	CE EMC			
Prüfgrundlage: <i>Test specification:</i>	EN 55032:2012, EN 55032:2015, EN 55035:2017+A11			
Wareneingangsdatum: <i>Date of receipt:</i>	2021-01-14			
Prüfmuster-Nr.: <i>Test sample No.:</i>	Engineering sample			
Prüfzeitraum: <i>Testing period:</i>	2021-03-09 to 2021-03-11			
Ort der Prüfung: <i>Place of testing:</i>	Refer to section 1.1			
Prüflaboratorium: <i>Testing laboratory:</i>	Refer to section 1.1			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	Eugene Liu <i>Eugene Liu</i>	kontrolliert von: <i>reviewed by:</i>	Wang, Gang	
Datum: <i>Date:</i>	Xue, Yunfei	Datum: <i>Date:</i>	2021-04-26	
Stellung / Position:	Trainee, PE	Stellung / Position:	TC	
Sonstiges / Other: Manufacturer or/and his importer shall ensure product bears label requirements in article 7 and article 9 of the 2014/30/EU relate to name, batch number, post address prior place the product into EU market.				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar 4 = sufficient N/A = not applicable
Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory	5 = mangelhaft N/T = nicht getestet 5 = poor N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

v05

TEST SUMMARY

- 4.1.1 DISTURBANCE VOLTAGE ON AC MAINS PORT AND TELECOMMUNICATION PORT
Result:
N/A
- 4.2.1 RADIATED EMISSION
Result:
Pass
- 5.1.1 ELECTROSTATIC DISCHARGE
Result:
Pass
- 5.1.2 RF ELECTROMAGNETIC FIELD IMMUNITY TEST
Result:
Pass
- 5.1.3 POWER FREQUENCY MAGNETIC FIELD
Result:
N/A
- 5.2.1 FAST TRANSIENTS ON AC POWER LINE AND ANALOGUE/DIGITAL DATA LINE
Result:
Pass
- 5.2.2 INJECTED CURRENT INTO AC POWER LINE AND ANALOGUE/DIGITAL DATA LINE
Result:
Pass
- 5.2.3 SURGES TO AC POWER PORT AND ANALOGUE/DIGITAL DATA PORT
Result:
N/A
- 5.2.4 VOLTAGE DIPS AND INTERRUPTIONS TO AC POWER PORT
Result:
N/A

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1 Test Sites

1.1 Test Facilities

Laboratory: CHEARI (Beijing) Certification & Testing Co., Ltd.
Address: No.3, Boxing Balu, Beijing Economic & Technological Development Area,
Beijing, China

The used test equipment is in accordance with CISPR 16-1 for measurement of radio interference.

1.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Lab 1: (Electrostatic Discharge, Injected Current into Signal Port, Fast Transients into Signal Port, Radiated emission, RF electromagnetic field immunity test)

Equipment	Manufacturer	Model	Serial no. / Inventory no.	Cal. due date
EMI Receiver	R&S	ESCI7 (9kHz-7GHz)	0304826-03	2022-11-12
Bi-log Antenna	R&S	HL562 (30MHz-3GHz)	0304826-06	2022-11-17
Horn antenna	R&S	HF907 (1GHz-18GHz)	0304826-07	2022-10-14
Signal generator	R&S	SMB100A	0304827-02	2022-10-21
Power meter	R&S	NRP2	0304827-03	2022-11-16
Bi-con antenna	R&S	HL046E(80MHz-3GHz)	0304807-06	/
Horn antenna	R&S	SWB-STLP9149 ((0,6) 0,7 – 9 (10,5) GHz)	0304827-07	/
Test system for conducted immunity	TESEQ	NSG4070	03047393	2021-12-17
Coupling Network	EM TEST	CDN-M3	0311037-02	2022-03-28
Attenuator	EM TEST	ATT6	0311037-01	2022-03-28
EFT signal generator	TESEQ	NSG 3040	0304770	2022-03-29
Coupling Decoupling Network	TESEQ	CDN 3063	0304770	2022-03-29
Capacitive Coupling Clamp	TESEQ	CDN 3425/ INA 3825	0304770-01	----

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) are industry cameras. For further information, refer to the user's manual.

2.2 Ratings and System Details

Type	:	MER2-231-41GC	MER2-2000-6GC-P	ME2P-1230-9GM-P
		MER2-231-41GM	MER2-2000-6GM-P	ME2P-2621-4GC-P
		MER2-2000-6GC	MER2-202-60GC-P	ME2P-2621-4GM-P
		MER2-2000-6GM	MER2-202-60GM-P	ME2P-1840-6GC-P
		MER2-202-60GC	MER2-503-23GC-P	ME2P-1840-6GM-P
		MER2-202-60GM	MER2-503-23GM-P	ME2P-560-21GC-P
		MER2-302-37GC	MER2-203-56GC-P	ME2P-560-21GM-P
		MER2-302-37GM	MER2-203-56GM-P	ME2P-900-13GC-P
		MER2-1220-9GC	MER2-630-18GC-P	ME2P-900-13GM-P
		MER2-1220-9GM	MER2-630-18GM-P	MARS-1230-9GC-P
		MER2-503-23GC	MER2-1220-9GC-P	MARS-1230-9GM-P
		MER2-503-23GM	MER2-1220-9GM-P	MARS-880-13GC-P
		MER2-630-18GC	MER2-231-41GC-P	MARS-880-13GM-P
		MER2-630-18GM	MER2-231-41GM-P	MARS-2620-4GC-P
		MER2-041-302GC	MER2-302-37GC-P	MARS-2620-4GM-P
		MER2-041-302GM	MER2-302-37GM-P	MARS-881-13GC-P
		MER2-160-75GC	MER2-041-302GC-P	MARS-881-13GM-P
		MER2-160-75GM	MER2-041-302GM-P	MARS-3140-3GC-P
		MER2-203-56GC	MER2-160-75GC-P	MARS-3140-3GM-P
		MER2-203-56GM	MER2-160-75GM-P	MARS-880-13GC-P ETR
		MER2-503-23GM- P POL	ME2P-1230-9GC-P	MARS-880-13GM-P ETR

System input voltage	:	DC12~24V or PoE
Power	:	< 4W @DC12~24V, < 4.75W @ PoE
Class	:	A
Protection class	:	III

Identities and difference:

All EMC test items were performed on MER2-231-41GC.

Series	Differences between Models in Series	Differences in Series
MER2-Gx-P	1. The model difference of MER2-Gx-P series is the same as MER2-Gx.	1. The schematic diagram is basically the same, the main chip FPGA is different. The FPGA is from the same manufacturer, for the same series, the process, speed, and power consumption parameters are the same, but the chip capacity and package size are different. 2. PCB diagram is different. The board size and wiring is different according to customer needs. 3. The housing and mechanical dimensions are different. 4. The characteristics of the peripheral interface are the same.
MARS-Gx-P	1. MARS-Gx-P Series: Including three PCB (IO FPC, BE PCB and sensor PCB). BE PCB is flex-rigid PCB. 2. Only the sensor PCB is different between each model in the series: Different models use different sensor, resulting in different PCB layout and wiring. The other parts are exactly the same.	
MER2-Gx	1. MER2-Gx Series: Including three PCB (IO PCB, BE PCB and sensor PCB). BE PCB is flex-rigid PCB. 2. Only the sensor PCB is different between each model in the series: Different models use different sensor, resulting in different PCB layout and wiring. The other parts are exactly the same.	
ME2P-Gx-P	1. The model difference of ME2P-Gx-P series is the same as MER2-Gx.	

2.3 Independent Operation Modes

The basic operation modes are:

On: acquisition process in continuous mode
Off.

2.4 Noise Generating and Noise Suppressing Parts

Refer to the circuit diagram for further information.

2.5 Submitted Documents

Nameplate.

User's manual, and Circuit diagram, PCB layout, BOM.

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 conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

3.2 Physical Configuration for Testing

Refer to the related paragraph of this report.
The test was performed at the status of DC12V.

3.3 Test Operation and Test Software

Refer to the related paragraph of this report.
The software “GalaxyView” was used.

3.4 Special Accessories and Auxiliary Equipment

No.	Name	Model	Manufactory
1	LCD monitor	LS24D360	SAMSUNG
2	Personal computer	/	/

3.5 Countermeasures to achieve EMC Compliance

None.

4 Test Results EMISSION

4.1 Emission in the Frequency Range up to 30 MHz

4.1.1 Disturbance Voltage on AC mains port and Telecommunication port

Result:

N/A

The EUT cannot connect the public mains supply directly, therefore no test was needed on the AC mains supply.

The EUT does not have the telecommunication port, therefore no test is needed on the telecommunication port.

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4.2 Emission in the Frequency Range above 30 MHz

4.2.1 Radiated emission

Result:**Pass**

Date of testing : 2021-03-10
Test procedure : EN 55032:2012, EN 55032:2015 and CISPR 16-1
Product category : Class A
Frequency range : 30 - 1000MHz
Limits : 30-230MHz, 50dB μ V/m with 3m test distance;
230-1000MHz, 57dB μ V/m with 3m test distance.

Kind of test site : Semi-anechoic chamber
Operation mode : On

The measurement setup was made according to EN 55032:2012 and EN 55032:2015.

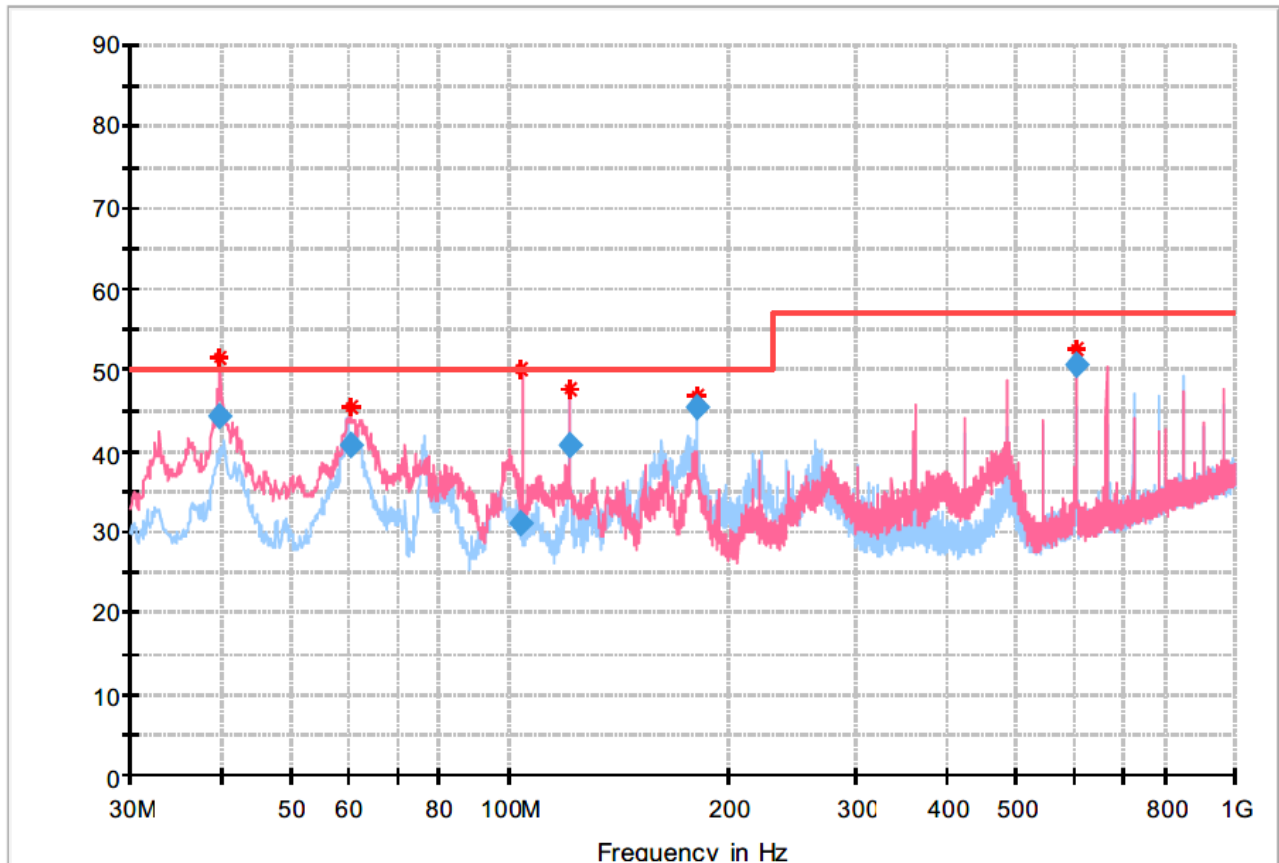
The test equipment listed in 1.1, table 1 of this report are as specified in CISPR 16-1.

The EUT was placed on a turntable. The turntable can turn in 360°. A log periodic antenna is fixed 3m from boundary of EUT.

During the test, the turntable was rotated fully with a measurement antenna oriented for both horizontal and vertical polarisation. The antenna was adjusted between 1m and 4m in height above the ground plane to find the max disturbance.

Figure 1: Spectral diagrams and measurement results 30-1000MHz, Horizontal and Vertical

Level in dBµV/m



Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
39.862500	44.30	--	--	50.00	5.70	1000.0	120.000	99.9	V
60.313750	40.72	--	--	50.00	9.28	1000.0	120.000	300.0	V
103.605000	31.15	--	--	50.00	18.85	1000.0	120.000	99.9	V
121.018000	40.68	--	--	50.00	9.32	1000.0	120.000	99.9	H
181.481250	45.33	--	--	50.00	4.67	1000.0	120.000	99.9	H
605.007750	50.73	--	--	57.00	6.27	1000.0	120.000	200.0	V

5 Test Results IMMUNITY

During the immunity tests, the EUT was operated under conditions specified by clause 3.1 of this report.

Performance according to EN 55035:2017+A11:

Performance criterion 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.

Performance criterion 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 criterion 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.

5.1 Enclosure

5.1.1 Electrostatic Discharge

Result:

Pass

The immunity against electrostatic discharge was tested in accordance with EN 55035:2017+A11. Test setup and ESD-Generator are according to IEC 61000-4-2:2008 which is specified by EN 55035:2017+A11.

The EUT is placed on 0.8m wood table above the ground plane. And the minimum distance between the EUT and all other conductive structures except the ground plane beneath the EUT is more than 0.5m.

The reference ground plane is an aluminum sheet of 0.25mm minimum thickness. The reference ground plane is connected to the protective earth. The size of the ground plane is 2m x 2m.

A horizontal coupling plane (HCP) 1.6m x 0.8m, placed on the table and isolates the EUT 0.5mm thick. Vertical coupling plane (VCP) of dimensions 0.5m x 0.5m is placed parallel to and positioned at a distance of 0.1m from the EUT.

Date of testing : 2021-03-11
 Test procedure : IEC 61000-4-2:2008
 Test level : $\pm 4.0\text{kV}$ contact discharge;
 $\pm 2.0\text{kV}$, $\pm 4.0\text{kV}$, $\pm 8.0\text{kV}$ air discharge
 Polarity : Positive / Negative
 Number of discharges : 10 at each point
 Performance : B
 Ambient condition : Temperature: 21°C, Relative humidity: 35%

Table 2: Electrostatic discharge immunity test results

Position	Kind of Discharge	Result	Remarks
Metallic Enclosure	Contact discharge $\pm 4\text{kV}$	Pass	No disturbance of function
Non-metallic enclosure, Signal line	Air discharge $\pm 2.0\text{kV}$, $\pm 4.0\text{kV}$, $\pm 8.0\text{kV}$	Pass	No disturbance of function
Coupling plane (VCP and HCP)	Contact discharge $\pm 4\text{kV}$	Pass	No disturbance of function

5.1.2 RF electromagnetic field immunity test

Result:
Pass

The test level 10V/m for frequency range 80MHz-6GHz was performed inside a 3m modified semi-anechoic chamber with a test disturbance of 3m as the applicant required. The field uniformity of the test sites is regularly calibrated to ensure the 0-6dB field uniformity criterion as specified by IEC 61000-4-3:2006+A1+A2 are met.

Date of testing : 2021-03-11
 Basic standard : IEC 61000-4-3:2006+A1+A2
 Test level : 10V/m
 Frequency range : 10 V/m (80 MHz to 6 GHz)
 Modulation : 80% 1kHz AM
 Frequency scan speed : Frequency step: 1%; Dwell time: 3s
 Performance : A
 Ambient condition : Temperature: 20°C, Relative humidity: 35%

Table 3: RF electromagnetic field immunity test results

Polarization	Result	Remarks
Horizontal	Pass	During the test, the EUT can operate as intended.
Vertical	Pass	During the test, the EUT can operate as intended.

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5.1.3 Power frequency magnetic field

Result:

N/A

Due to the EUT does not contain components susceptible to magnetic fields, such as Hall elements or magnetic field sensors. Therefore, the EUT is deemed to meet the requirement without actual testing.

5.2 Input and Output AC Power Port and analogue/digital data port

5.2.1 Fast Transients on AC Power Line and analogue/digital data line

Result:

Pass

During the test, the EUT was placed on a 0.1m high insulating support above the reference ground plane. The minimum distance between the EUT and all other conductive structures except the reference ground plane beneath the EUT is more than 0.5m.

The length between the coupling device and the EUT is less than 1m. The excessive part of the power cord longer than 1m was folded forth and back parallel so as to form a bundle with a length between 0.3m and 0.4m.

Date of testing : 2021-03-11
 Test procedure : IEC 61000-4-4:2012
 Test level : $\pm 2.0\text{kV}$, 5kHz, for mains port
 $\pm 1\text{kV}$, 5kHz, for signal port
 Polarity : +/-
 Coupling duration : 1min/polarity
 Performance : B
 Ambient condition : Temperature: 22°C, Relative humidity: 35%

Table 4: EFT/B immunity test results for signal cable

Coupling mode	Result	Remarks
AC mains port	N/A	The EUT cannot connect the public mains supply directly, therefore no test was needed on the AC mains supply.
signal cable	Pass	During the test, the EUT can operate as intended.

5.2.2 Injected Current into AC Power Line and analogue/digital data line

Result:
Pass

During the test, the sample was placed on a 0.1m wooden support above the reference ground plane. The minimum distance between the sample and all other conductive structures except the reference ground plane beneath the EUT is more than 0.5m.

A EM clamp was used to couple the disturbing signal onto the signal port of the sample. The distance between the EUT and the EM clamp is within 0.1-0.3m. The cable between the EUT and EM clamp is placed about 50mm above the reference ground plane. 10V test level was performed on EUT as the applicant required.

Date of testing : 2021-03-11
 Basic standard : IEC 61000-4-6:2008
 Test level and Frequency : 10V: 0.15MHz-80MHz
 range
 Modulation : 80% AM, 1kHz
 Frequency scan speed : Frequency step: 1%; Dwell time: 3s
 Performance : A
 Ambient conditions : Temperature: 23°C, Relative humidity: 35%

Table 5: Injected current, signal port

Port	Result	Remarks
AC mains port	N/A	The EUT cannot connect the public mains supply directly, therefore no test was needed on the AC mains supply.
signal cable	Pass	During the test, the EUT can operate as intended.

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5.2.3 Surges to AC Power Port and analogue/digital data port

Result:	N/A
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Date of testing : /
Test procedure : IEC 61000-4-5:2005

Note: The EUT cannot connect the public mains supply directly and the signal line is not greater than 30m, therefore no test was needed on the AC mains supply.

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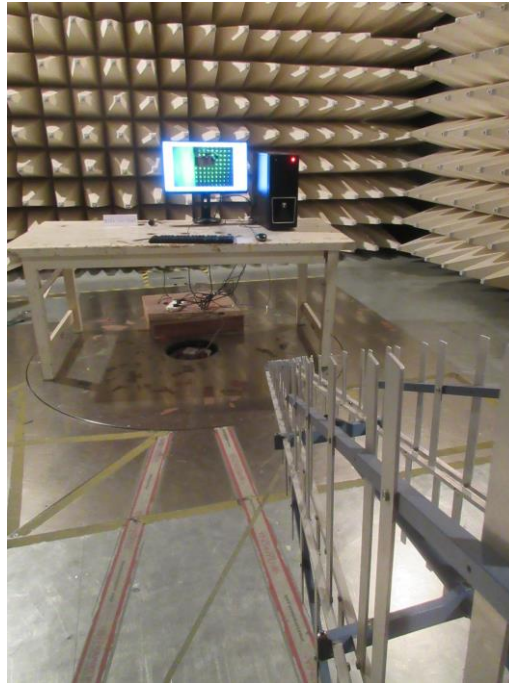
5.2.4 Voltage dips and interruptions to AC Power Port

Result:	N/A
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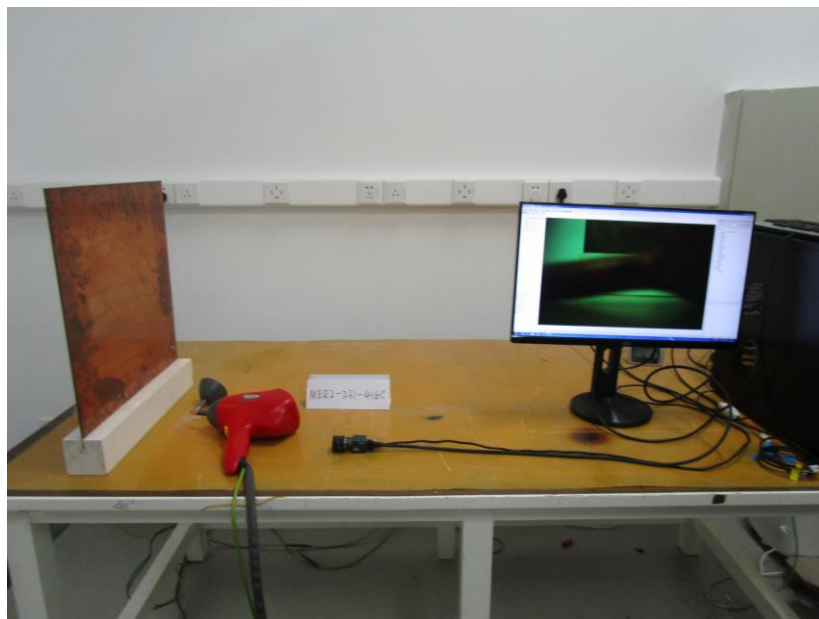
The EUT cannot connect the public mains supply directly, therefore no test was needed.

6 Photographs of the Test Set-Up

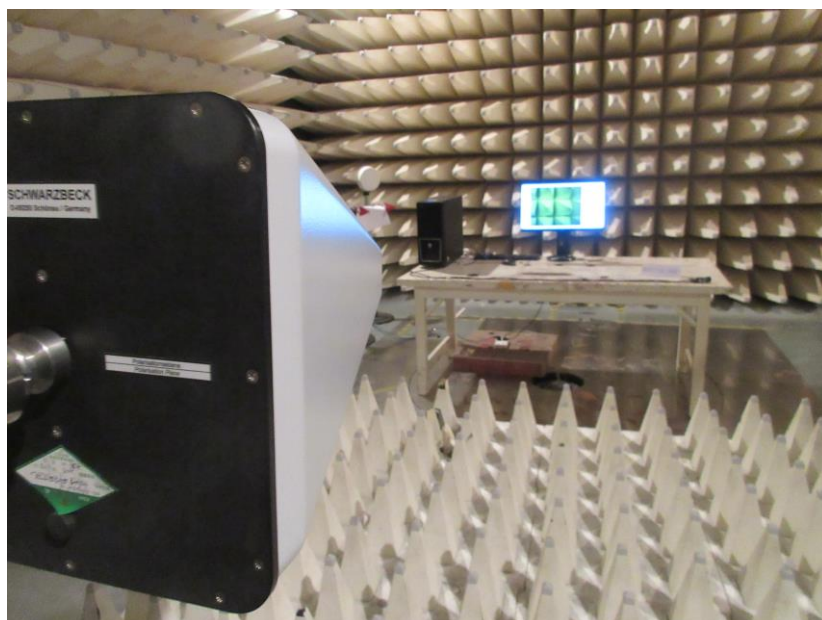
Photograph 1: Set-up for measurement of radiated emission



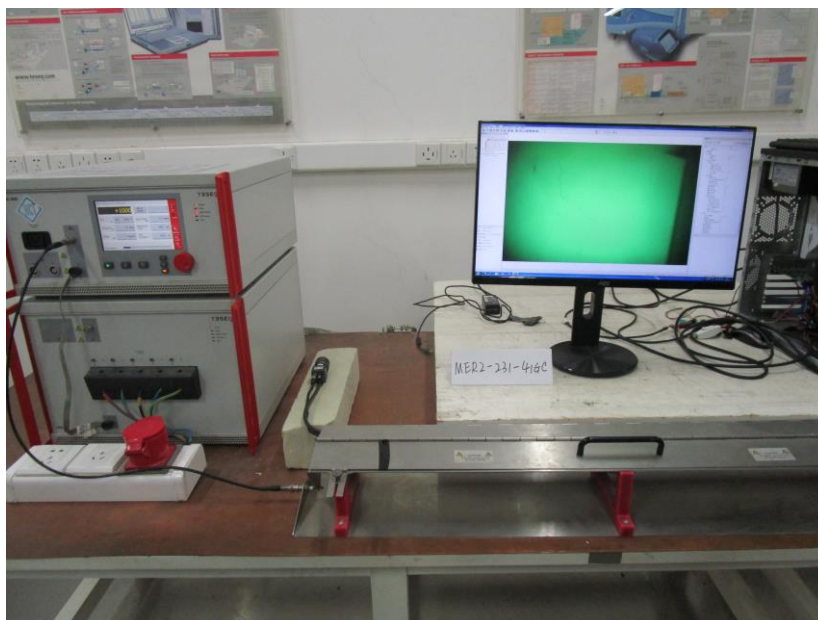
Photograph 2: Set-up for immunity test of electrostatic discharge



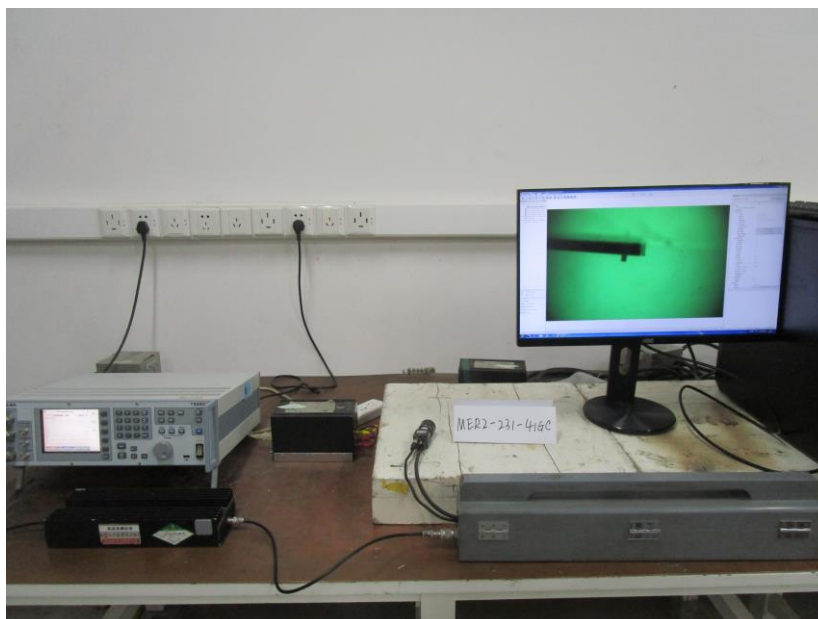
Photograph 3: Set-up for immunity test of RF electromagnetic field



Photograph 4: Set-up for immunity test of fast transient/burst



Photograph 5: Set-up for immunity test of Injected current



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