

Seite 1 von 22 Prüfbericht-Nr.: CN21KFI0 001 Auftrags-Nr.: 190130973 Page 1 of 22 Test Report No.: Order No.:

Kunden-Referenz-Nr.: N/A Auftragsdatum: 2021-01-14

Client Reference No.: Order date:

China Daheng Group, Inc. Auftraggeber:

15F Daheng Science & Technology Tower, No. 3 Suzhou Street, Haidian District Client:

Beijing 100080 P.R. China

Industry Camera Prüfgegenstand:

Test item:

Bezeichnung / Typ-Nr.:

Refer to clause 2.2 Identification / Type No.:

Auftrags-Inhalt: CE EMC Order content:

Prüfgrundlage:

EN 55032:2012, EN 55032:2015, EN 55035:2017+A11 Test specification:

Wareneingangsdatum: 2021-01-14

Date of receipt:

Engineering sample Prüfmuster-Nr.:

Test sample No.:

Prüfzeitraum: 2021-03-10 to 2021-03-11

Testing period:

Ort der Prüfung: Refer to section 1.1

Place of testing:

Prüflaboratorium: Refer to section 1.1

Testing laboratory.

Prüfergebnis\*: Pass

Test result\*:

geprüft von: kontrolliert von: Eugene Lin Eugene Liu Wang, Gang tested by. reviewed by.

Xue. Yunfei Datum:

Date: 2021-04-26

**Stellung** / Position: TC

**Stellung** / Position: Trainee, PE

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.

Datum:

Date:

2021-04-26

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt Condition of the test item at delivery: Test item complete and undamaged

\* Legende: 1 = sehr gut 2 = gut3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nichtN/T = nicht getestet anwendbar Legend: 1 = very good 2 = good3 = satisfactory 4 = sufficient 5 = poorP(ass) = passed a.m testN/A = notN/T = not testedF(ail) = failed a.m. test specification(s)specification(s) applicable

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.

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.



Prüfbericht - Nr.: CN21KFI0 001

Test Report No.: Seite 2 von 22

Page 2 of 22

### **TEST SUMMARY**

4.1.1 DISTURBANCE VOLTAGE ON ACMAINS 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 ACPOWER LINE AND ANALOGUE/DIGITAL DATA LINE

Result:

Pass

5.2.2 INJECTED CURRENT INTO A CPOWER 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 ACPOWER PORT

Result:

N/A



Prüfbericht - Nr.: CN21KFI0 001

Test Report No.:

Seite 3 von 22 Page 3 of 22

# **Contents**

1.1 TEST FACILITIES	4556
2 GENERAL PRODUCT INFORMATION	5 5 6
2.1 PRODUCT FUNCTION AND INTENDED USE	5 6
2.2 RATINGS AND SYSTEM DETAILS	5 6
	6 6
	6
2.3 Independent Operation Modes	
2.4 Noise Generating and Noise Suppressing Parts	6
2.5 SUBMITTED DOCUMENTS	
3 TEST SET-UP AND OPERATION MODES	7
3.1 Principle of Configuration Selection	7
3.2 PHYSICAL CONFIGURATION FOR TESTING	7
3.3 TEST OPERATION AND TEST SOFTWARE	7
3.4 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	7
3.5 COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE	7
4 TEST RESULTS E M I S S I O N	8
4.1 Emission in the Frequency Range up to 30 MHz	8
4.1.1 Disturbance Voltage on AC mains port and Telecommunication port	8
4.2 EMISSION IN THE FREQUENCY RANGE ABOVE 30 MHz	9
4.2.1 Radiated emission	9
5 TEST RESULTS I M M U N I T Y	11
5.1 Enclosure	12
5.1.1 Electrostatic Discharge	12
5.1.2 RF electromagnetic field immunity test	13
5.1.3 Power frequency magnetic field	14
5.2 INPUT AND OUTPUT AC POWER PORT AND ANALOGUE/DIGITAL DATA PORT	15
5.2.1 Fast Transients on AC Power Line and analogue/digital data line	15
5.2.2 Injected Current into AC Power Line and analogue/digital data line	16
5.2.3 Surges to AC Power Port and analogue/digital data port	17
5.2.4 Voltage dips and interruptions to AC Power Port	18
6 PHOTOGRAPHS OF THE TEST SET-UP	
7 LIST OF TABLES	22
8 LIST OF FIGURES	22
9 LIST OF PHOTOGRAPHS	22



Prüfbericht - Nr.: CN21KFI0 001
Test Report No.: Seite 4 von 22
Page 4 of 22

### 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)

<b>Equipme nt</b>	Manufac	Model	Serial no. /	Cal. due date
	turer		Inventory no.	
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	



Prüfbericht - Nr.: CN21KFI0 001
Test Report No.: Seite 5 von 22
Page 5 of 22

## **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 :

MER2-502-79U3C	MER2-301-125U3M	MER2-507-60U3C-L
MER2-502-79U3M	MER2-231-41U3C	MER2-507-60U3M
MER2-502-79U3C-L	MER2-231-41U3C-L	MER2-507-60U3M-L
MER2-502-79U3M-L	MER2-231-41U3M	MER2-506-60U3C
MER2-2000-19U3C	MER2-231-41U3M-L	MER2-506-60U3C-L
MER2-2000-19U3C-L	MER2-230-168U3C	MER2-506-60U3M
MER2-2000-19U3M	MER2-230-168U3C-L	MER2-506-60U3M-L
MER2-2000-19U3M-L	MER2-230-168U3M	MER2-503-36U3M POL
MER2-503-36U3C-L	MER2-230-168U3M-L	MER2-630-60U3C-W90
MER2-503-36U3M	MER2-041-436U3C	MER2-630-60U3M-W90
MER2-503-36U3M-L	MER2-041-436U3C-L	MER2-2000-19U3C-W90
MER2-301-125U3C	MER2-041-436U3M	MER2-2000-19U3M-W90
MER2-301-125U3C-L	MER2-041-436U3M-L	MER2-1220-32U3M-W90
MER2-301-125U3M-L	MER2-160-227U3C	MER2-1220-32U3C-W90
MER2-630-60U3C	MER2-160-227U3C-L	ME2P-1230-23U3C
MER2-630-60U3C-L	MER2-160-227U3M	ME2P-1230-23U3M
MER2-630-60U3M	MER2-160-227U3M-L	ME2P-2621-15U3C
MER2-630-60U3M-L	MER2-302-56U3C	ME2P-2621-15U3M
MER2-1220-32U3C	MER2-302-56U3C-L	ME2P-2621-15U3M NIR
MER2-1220-32U3C-L	MER2-302-56U3M	ME2P-500-14U3M
MER2-1220-32U3M	MER2-302-56U3M-L	MARS-1230-23U3C
MER2-1220-32U3M-L	MER2-502-79U3C- 512MB	MARS-1230-23U3M
MER2-503-36U3C	MER2-507-60U3C	MARS-1231-32U3C
MARS-1231-32U3M	MARS-880-32U3C	MARS-880-32U3M
MARS-882-44U3C	MARS-882-44U3M	MARS-4630-8U3C
/	/	MARS-4630-8U3M
DC5V		

System input : DC5V

voltage

Power : <4W@DC5V

Class : A Protection : III

class



Prüfbericht - Nr.: CN21KFI0 001

Test Report No.: Seite 6 von 22

Page 6 of 22

Identities and difference:

All EMC test items were performed on MER2-231-41U3C-L.

Series	Differences between Models in Series	Differences in Series
MER2-U3	1.The model difference of MER2-U3-W90 series is the same as MARS-U3.	The difference between four series:  1. The schematic diagram is basically the
MER2-U3- W90	1.The model difference of MER2-U3-W90 series is the same as MARS-U3.	same, the main chip FPGA is different. The FPGA is from the same
ME2P-U3	1.The model difference of ME2P-U3 series is the same as MARS-U3.	manufacturer, for the same series, the process, speed, and power
MARS-U3	1. MARS-U3 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.	consumption parameters are the same, but the chip capacity and package size are different.  2. PCB diagram is different according to customer needs.  3. The housing and mechanical dimensions are different.  4. The characteristics of the peripheral interface are the same.

## 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.



Prüfbericht - Nr.: CN21KFI0 001 Seite 7 von 22
Test Report No.: Page 7 of 22

## 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 DC5V.

## 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.



Products		
Prüfbericht - Nr.: Test Report No.:	CN21KFI0 001	<b>Seite 8 von 22</b> Page 8 of 22
4 Test Results	EMISSION	
4.1 Emission in th	ne Frequency Range up to	30 MHz
_	oltage on AC mains port and	_
Result:		N/A
AC mains supply. The EUT does not helecommunication	nave the telecommunication port, then port.	refore no test is needed on the



Prüfbericht - Nr.: CN21KFI0 001
Test Report No.: Seite 9 von 22
Page 9 of 22

#### 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 - 1000 MHz

Limits : 30-230MHz, 50dBμV/m with 3m test distance;

230-1000MHz,  $57dB\mu V/m$  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.

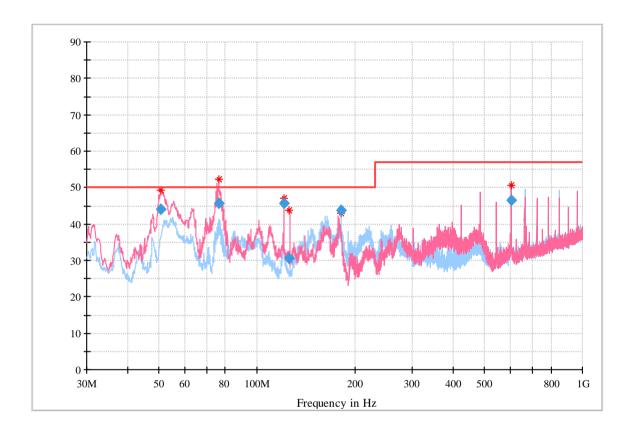
The EUT was placed on a turntable. The turntable can turn in 360°. A log periodic antenna is fixed 3m from boundary of EUT.

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.



Prüfbericht - Nr.: CN21KFI0 001 Seite 10 von 22
Test Report No.: Page 10 of 22

Figure 1: Spectral diagrams and measurement results 30-1000MHz, Horizontal and Vertical Level in  $dB\mu V/m$ 



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
50.775000	43.92			50.00	6.08	1000.0	120.000	99.9	٧
76.680000	45.64	_	_	50.00	4.36	1000.0	120.000	200.0	٧
121.018000	45.81			50.00	4.19	1000.0	120.000	99.9	٧
125.152500	30.42			50.00	19.58	1000.0	120.000	99.9	٧
181.481250	43.74		-	50.00	6.26	1000.0	120.000	100.0	Н
605.007750	46.40			57.00	10.60	1000.0	120.000	99.9	٧



Prüfbericht - Nr.: CN21KFI0 001 Seite 11 von 22
Test Report No.: Page 11 of 22

#### 5 Test Results I M M U N I T Y

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.



Prüfbericht - Nr.: CN21KFI0 001 Seite 12 von 22
Test Report No.: Page 12 of 22

#### 5.1 Enclosure

#### **5.1.1** Electrostatic Discharge

Result:	Pass
ACSUIL.	1 ass

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 : ±4.0kVcontact discharge;

±2.0kV, ±4.0kV, ±8.0kV 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 ±4kV	Pass	No disturbance of function
Non-metallic enclosure, Signal line	Air discharge ±2.0kV, ±4.0kV, ±8.0kV	Pass	No disturbance of function
Coupling plane (VCP and HCP)	Contact discharge ±4kV	Pass	No disturbance of function



Prüfbericht - Nr.: CN21KFI0 001 Seite 13 von 22
Test Report No.: Page 13 of 22

#### 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.



Prüfbericht - Nr.: Test Report No.:	CN21KFI0 001	<b>Seite 14 von 22</b> Page 14 of 22
5.1.3 Power freque	ncy magnetic field	
Result:		N/A
Due to the EUT of elements or magnification without actual test	does not contain components susceptible tic field sensors. Therefore, the EUT sting.	ble to magnetic fields, such as Hall Γ is deemed to meet the requirement



Prüfbericht - Nr.: CN21KFI0 001 Seite 15 von 22
Test Report No.: Page 15 of 22

### 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 61000-4-4:2004

Test level :  $\pm 2.0$ kV, 5kHz, for mains port

±1kV, 5kHz, for USB port

Polarity : +/-

Coupling duration : 1min/polarity

Performance : B

Ambient condition : Temperature: 22°C, Relative humidity: 35%

#### Table 4: EFT/B immunity test results for USB 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.
USB cable	Pass	During the test, the EUT can operate as intended.



Prüfbericht - Nr.: CN21KFI0 001 Seite 16 von 22
Test Report No.: Page 16 of 22

### 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, USB cable

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.
USB cable	Pass	During the test, the EUT can operate as
USB cable		intended.



Prüfbericht - Nr.: CN21KFI0 001 Seite 17 von 22
Test Report No.: Page 17 of 22

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

Result:	N/A

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.



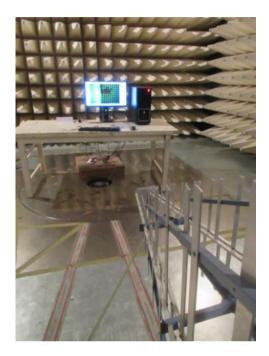
Prüfbericht - Nr.: Test Report No.:	CN21KFI0 001	<b>Seite 18 von 22</b> Page 18 of 22			
5.2.4 Voltage dips and interruptions to AC Power Port					
Result:		N/A			
The EUT cannot connect the public mains supply directly, therefore no test was needed.					



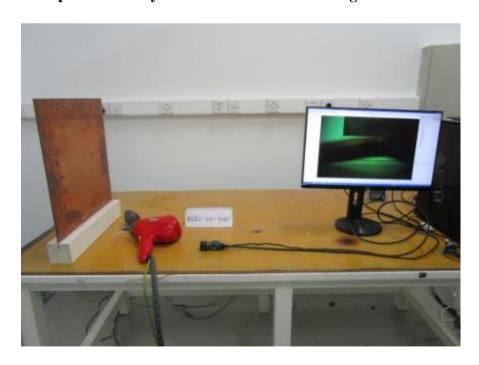
Prüfbericht - Nr.: CN21KFI0 001 Seite 19 von 22
Test Report No.: Page 19 of 22

# 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





Prüfbericht - Nr.: CN21KFI0 001 Seite 20 von 22
Test Report No.: Page 20 of 22

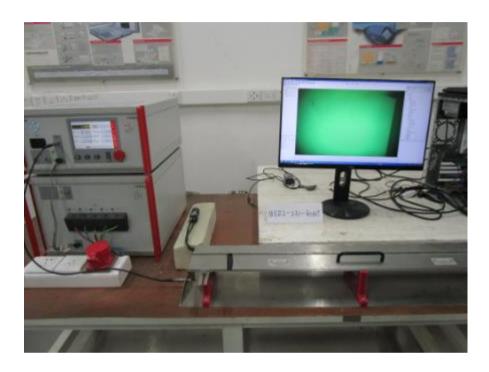
### Photograph 3: Set-up for immunity test of RF electromagnetic field



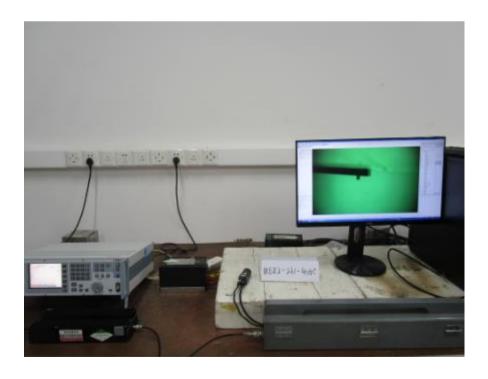


Prüfbericht - Nr.: CN21KFI0 001 Seite 21 von 22
Test Report No.: Page 21 of 22

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



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





Prüfbericht - Nr.: CN21KFI0 001 Seite 22 von 22 Page 22 of 22 Test Report No.: List of Tables List of Figures 8 List of Photographs