



**CTS (NINGBO) TESTING SERVICE TECHNOLOGY  
INTERNATIONAL**

**OPERATE ACCORDING TO ISO/IEC 17025**

# **EMC TEST REPORT**

**TEST REPORT NUMBER : CNB3160908-00970-E**



**CTS (Ningbo) Testing Service Technology Co., Ltd.**

Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd., Hi-Tech Zone, Ningbo, Zhejiang, China

<b>TEST REPORT</b> <b>EN 61000-6-3:2007+A1:2011+AC:2012</b> Electromagnetic compatibility (EMC) —Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments <b>EN 61000-6-1:2007</b> Electromagnetic compatibility (EMC) —Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments	
<b>Report Reference No.</b> .....	CNB3160908-00970-E
<b>Date of issue</b> .....	14 September 2016
<b>Testing Laboratory Name</b> .....	<b>CTS (Ningbo) Testing Service Technology Co., Ltd.</b>
<b>Address</b> .....	GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China
<b>Testing location/ procedure</b> .....	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
<b>Applicant's name</b> .....	YUEQING LANGIR ELECRIC CO., LTD.
<b>Address</b> .....	4F, NO.188, LIUQING NORTH ROAD, LIUSHI TOWN, YUEQING CITY, WENZHOU, CHINA
<b>Test specification:</b>	
<b>Standard</b> .....	<b>EN 61000-6-3:2007+A1:2011+AC:2012, EN 61000-6-1:2007</b>
<b>Test Report Form No.</b> .....	CTSEMC-1.0
<b>TRF Originator</b> .....	CTS (Ningbo) Testing Service Technology Co., Ltd.
<b>Master TRF</b> .....	Dated 2009-01
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<b>Test item description</b> .....	CAPACITIVE SWITCH
<b>Trade Mark</b> .....	LANGIR
<b>Manufacturer</b> .....	YUEQING LANGIR ELECRIC CO., LTD.
<b>Model/Type reference</b> .....	CP19
<b>Ratings</b> .....	DC 24V, 200mAW(A)
<b>Result</b> .....	<b>PASSED</b>

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## EMC -- TEST REPORT

<b>Test Report No. : CNB3160908-00970-E</b>	<u>14 September 2016</u> Date of issue
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Type / Model.....	CP19
EUT.....	CAPACITIVE SWITCH
<b>Applicant</b> .....	YUEQING LANGIR ELECRCO CO., LTD.
Address.....	4F, NO.188, LIUQING NORTH ROAD, LIUSHI TOWN, YUEQING CITY, WENZHOU, CHINA
Telephone.....	+86-577-62737670
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Contact.....	Miss Ni
<b>Manufacturer</b> .....	YUEQING LANGIR ELECRCO CO., LTD.
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Contact.....	Miss Ni
<b>Factory</b> .....	YUEQING LANGIR ELECRCO CO., LTD.
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Contact.....	Miss Ni

The test report merely corresponds to the test sample.  
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## 1 TEST STANDARDS

The tests were performed according to following standards:

EN 61000-6-3:2007+A1:2011+AC:2012 Electromagnetic compatibility (EMC) —Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments

EN 61000-6-1:2007 Electromagnetic compatibility (EMC) —Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments

## 2 SUMMARY

### 2.1 GENERAL REMARKS

Date of receipt of test sample	08 September 2016
Testing commenced on	08~12 September 2016
Testing concluded on	14 September 2016

### 2.2 FINAL ASSESSMENT

The EMC requirements pertaining to the technical standards and tested operation modes are

- fulfilled.

- **not** fulfilled.

The equipment under test

- fulfils the EMC requirements cited on page 1.

- **does not** fulfil the EMC requirements cited on page 1.



### 3 EQUIPMENT UNDER TEST

#### 3.1 Power supply system utilised

Power supply voltage:  DC 24V  
 Other (Specified blank below)

#### 3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: 1  
Serial number: Prototype

#### 3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

–Normal

**Operating Mode:** Normal

Emissions tests.....: According to EN 61000-6-3, searching for the highest disturbance.

Immunity tests ..... : According to EN 61000-6-1, searching for the highest susceptibility.

### 3.4 EUT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement:

Not applicable

### 3.5 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

### 3.6 Definition related to the performance level

- based on the used product standard
- based on the declaration of the manufacturer, requestor or purchaser

**Criterion A:**

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

**Criterion B:**

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

**Criterion C:**

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

**Criterion D:**

Definition: loss of function or degradation of performance, which is not recoverable, owing to damage to hardware or software, or loss of data:



## 4 TEST ENVIRONMENT

### 4.1 Address of the test laboratory

GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China

Tel: +86-20-85543113 (32 lines)

Fax: +86-20-38780406

### 4.2 Test facility

The test facility is recognized, certified, or accredited by the following organizations:

#### **CNAS-Lab Code: L3394**

CTS (Ningbo) Testing Service Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### **IC-Registration No.: 8374A**

The 3m Alternate Test Site of CTS (Ningbo) Testing Service Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374A on May 22, 2014.

#### **FCC-Registration No.: 971995**

CTS (Ningbo) Testing Service Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No.971995, July 13, 2012.

### 4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 ° C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

### 4.4 Definitions of symbols used in this test report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

### 4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the CTS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

#### 4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	±1.22dB	(1)
Power disturbance	30MHz~300MHz	±1.38dB	(1)
Radiation emission (3m)	30MHz~300MHz	±3.14dB	(1)
	300MHz~1000MHz	±3.18dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

#### 4.7 Test Description

##### 4.7.1 Description of Standards and Results

EMISSION (EN 61000-6-3:2007+A1:2011+AC:2012)			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	EN 61000-6-3:2007+A1:2011+AC:2012	-----	PASS
Conducted disturbance at telecommunication port	EN 61000-6-3:2007+A1:2011+AC:2012	-----	N/A
Radiated disturbance	EN 61000-6-3:2007+A1:2011+AC:2012	-----	PASS
Harmonic current emissions	EN 61000-3-2:2014	Class D	N/A
Voltage fluctuations & flicker	EN 61000-3-3:2013	-----	N/A
IMMUNITY (EN 61000-6-1:2007)			
Description of Test Item	Basic Standard	Performance Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2: 2008	B	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2006 +A1:2007+A2:2010	A	PASS
Electrical fast transient (EFT)	IEC 61000-4-4:2012	B	PASS
Surge (Input a.c. power ports)	IEC 61000-4-5: 2014	B	PASS
Surge (Telecommunication ports)		B	N/A
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6: 2013	A	PASS
Power frequency magnetic field	IEC 61000-4-8: 2009	A	PASS
Voltage dips, >95% reduction	IEC 61000-4-11: 2004	B	N/A
Voltage dips, 30% reduction		B	N/A
Voltage interruptions		C	N/A
N/A is an abbreviation for Not Applicable.			

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## 5 TEST CONDITIONS AND RESULTS

### 5.1 Conducted disturbance

For test instruments and accessories used see section 6 part 6.2.

#### 5.1.1 Description of the test location

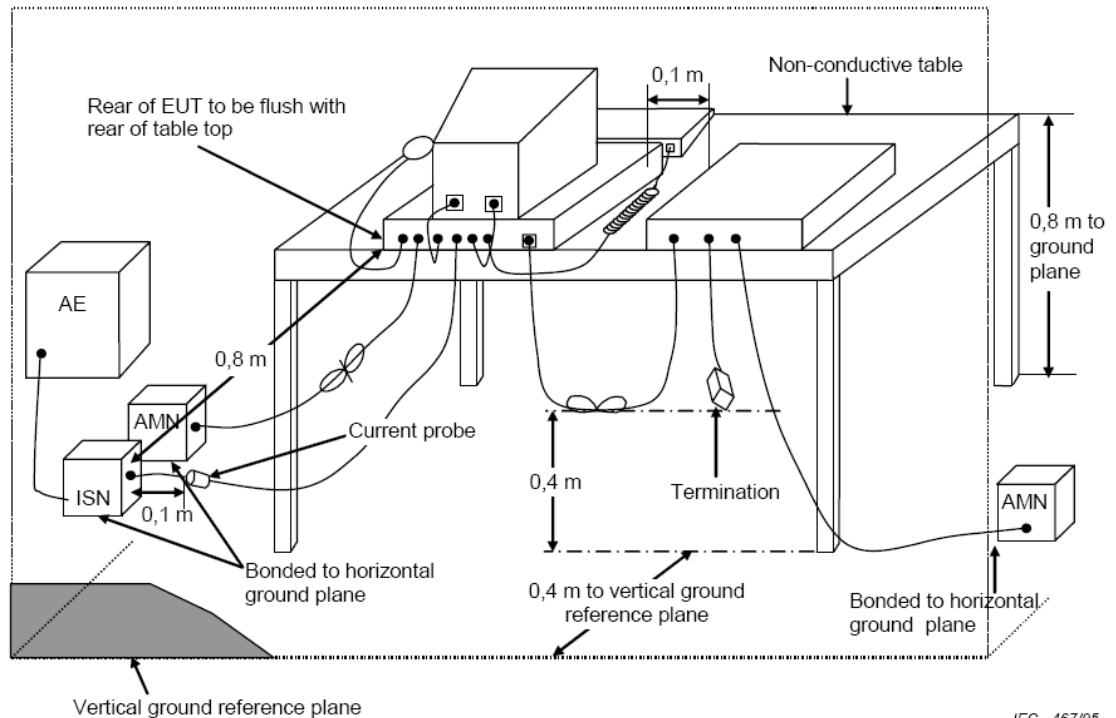
Test location: Shielded room

#### 5.1.2 Description of the test set-up

##### 5.1.2.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

##### 5.1.2.2 Block Diagram of Test Setup



#### 5.1.3 Limits disturbance

Frequency	Maximum RF Line Voltage (dB $\mu$ V)	
	Quasi-peak Level	Average Level
150kHz ~ 500kHz	79	66
500kHz ~ 30MHz	73	60

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

**5.1.4 Test result**

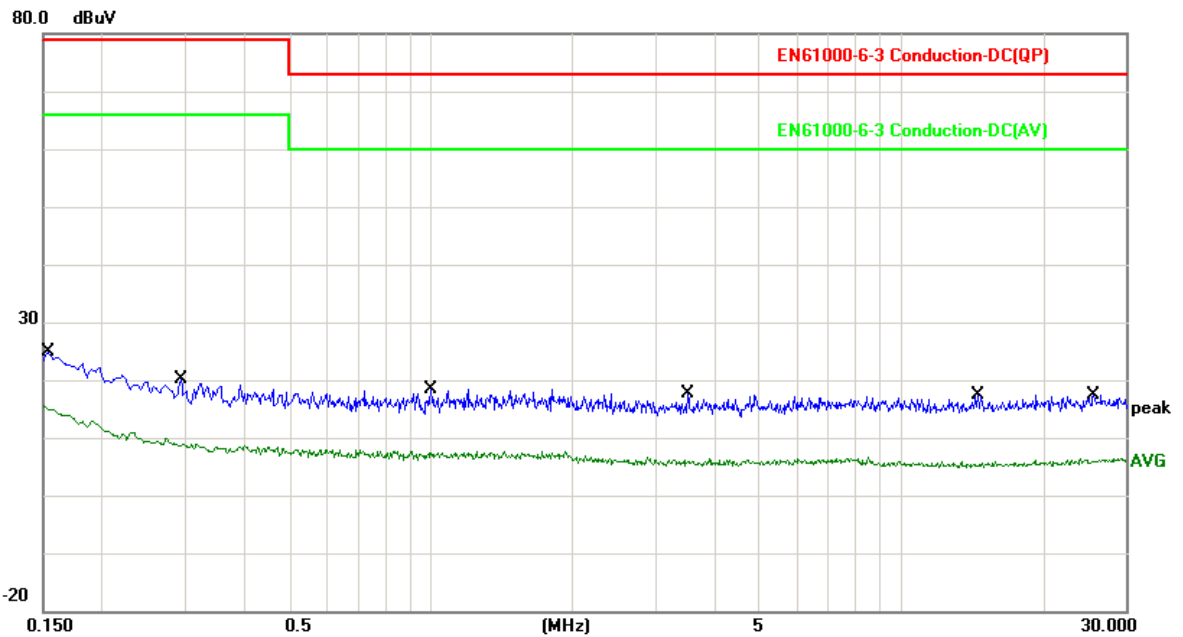
The requirements are	<b>Fulfilled</b>
Band width	9kHz
Frequency range	0.15 MHz - 30 MHz
Min. limit margin	>51.54 dB at 0.15 - 30 MHz

**Remarks:** The limits are kept. For detailed results, please see the following page(s).

5.1.5 Test protocol

Test point Operation mode Remarks:	DC Port Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
--	-------------------	---------	---

EUT	CAPACITIVE SWITCH
MODEL NO.	CP19
Operating Condition	DC 24V
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Clark



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1539	11.21	7.71	18.92	79.00	-60.08	QP
2	0.1539	11.21	3.25	14.46	66.00	-51.54	AVG
3	0.2940	11.14	0.59	11.73	79.00	-67.27	QP
4	0.2940	11.14	-2.71	8.43	66.00	-57.57	AVG
5	1.0020	10.94	-1.33	9.61	73.00	-63.39	QP
6	1.0020	10.94	-4.32	6.62	60.00	-53.38	AVG
7	3.5220	10.40	-0.76	9.64	73.00	-63.36	QP
8	3.5220	10.40	-5.40	5.00	60.00	-55.00	AVG
9	14.5460	10.24	-1.26	8.98	73.00	-64.02	QP
10	14.5460	10.24	-5.94	4.30	60.00	-55.70	AVG
11	25.7180	10.30	-0.82	9.48	73.00	-63.52	QP
12	25.7180	10.30	-5.39	4.91	60.00	-55.09	AVG

Note: Level=Reading+Factor. Margin= Limit-Level

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**5.2 Radiated disturbance (electric field)**

For test instruments and accessories used see section 6 part 6.1.

**5.2.1 Description of the test location**

Test location : Semi-Anechoic chamber

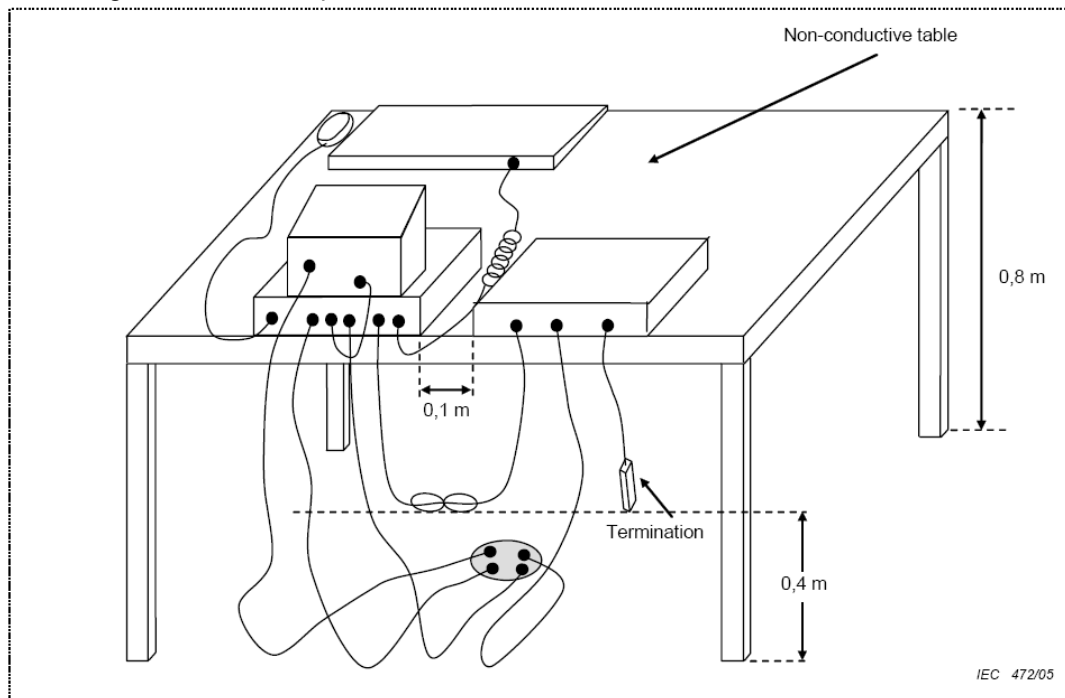
Test disturbance: 3 Meter

**5.2.2 Description of the test set-up**

**5.2.2.1 Operating Condition**

The EUT is normal during the test, and the results of the maximum emanation are recorded

**5.2.2.2 Block Diagram of Test Setup**



**5.2.3 Limits of disturbance**

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dBµV/m)
30 ~ 230	3	40
230 ~ 1000	3	47

- Note: (1) The tighter limit shall apply at the edge between two frequency bands.  
 (2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

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**5.2.4 Test result**

The requirements are	<b>Fulfilled</b>
Band width	120kHz
Frequency range	30 MHz - 1000 MHz
Min. limit margin	>15.13 dB at 30 - 1000 MHz

**Remarks:** The limits are kept. For detailed results, please see the following page(s).

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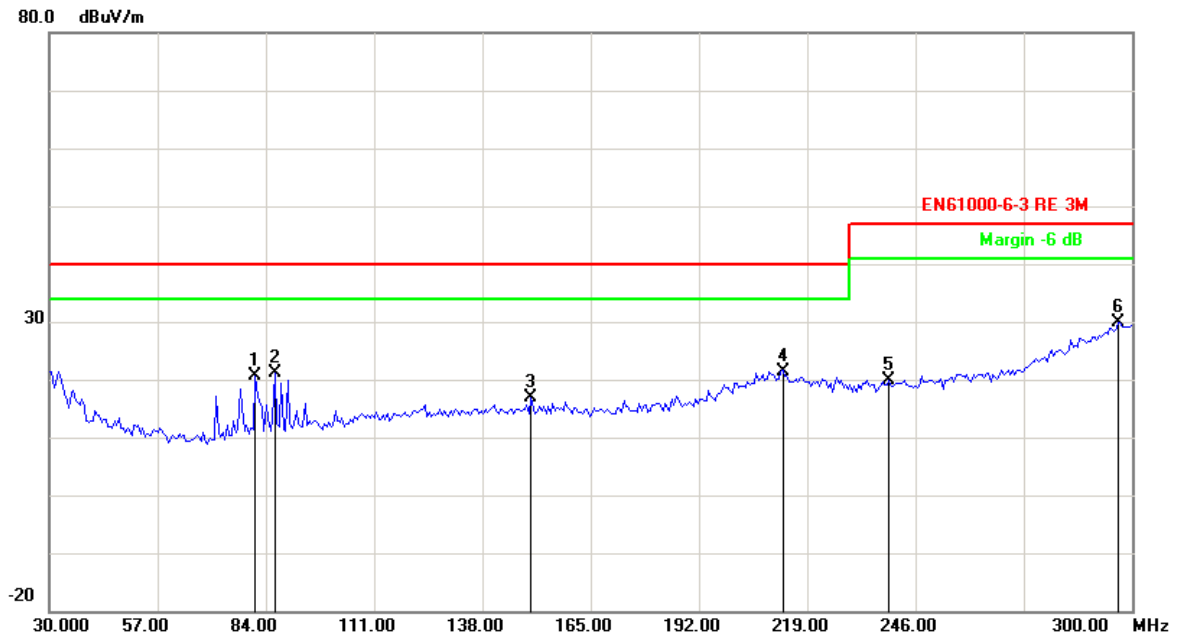
Complaint line: +86-20-85533471

E-mail: [cts@cts-lab.com.cn](mailto:cts@cts-lab.com.cn)

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5.2.5 Test protocol

Test point: Operation mode Remarks:	Horizontal Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
EUT	CAPACITIVE SWITCH		
Operating Condition	DC 24V		
Test Condition	Ambient Temperature: 24°C Humidity: 56%		
Operator	Clark		
MODEL NO.	CP19		



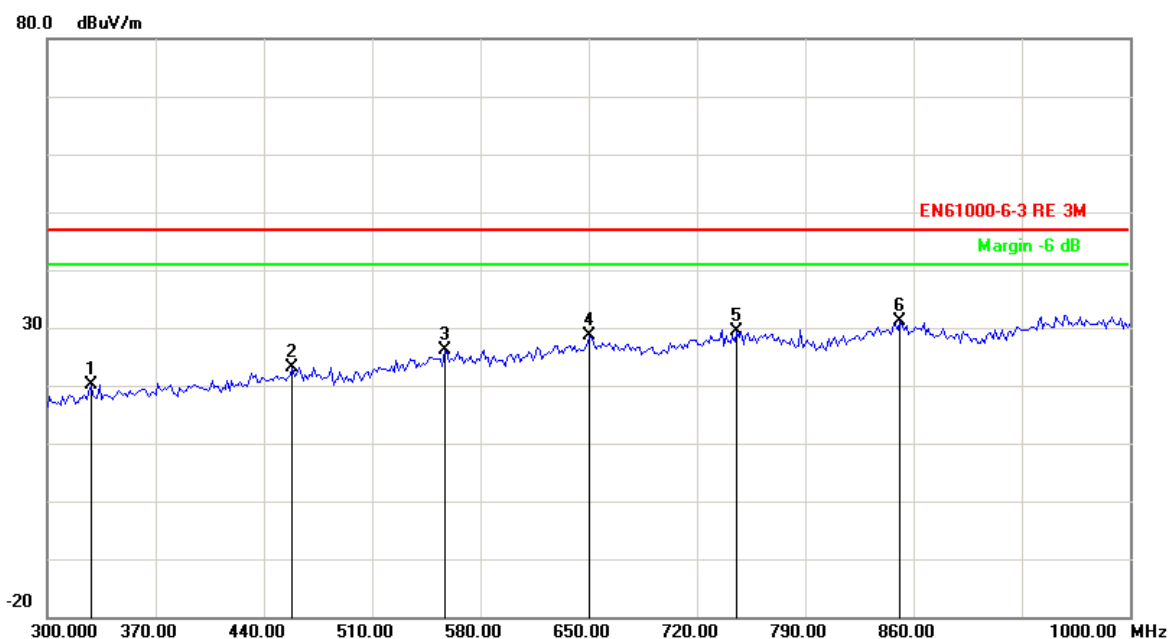
No.	Frequency (MHz)	Factor (dB)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	81.4028	-19.84	40.53	20.69	40.00	-19.31	QP
2	86.2725	-19.44	40.64	21.20	40.00	-18.80	QP
3	150.1202	-15.96	32.84	16.88	40.00	-23.12	QP
4	212.8858	-10.40	31.90	21.50	40.00	-18.50	QP
5	239.3988	-11.57	31.55	19.98	47.00	-27.02	QP
6	296.7535	-2.28	32.08	29.80	47.00	-17.20	QP

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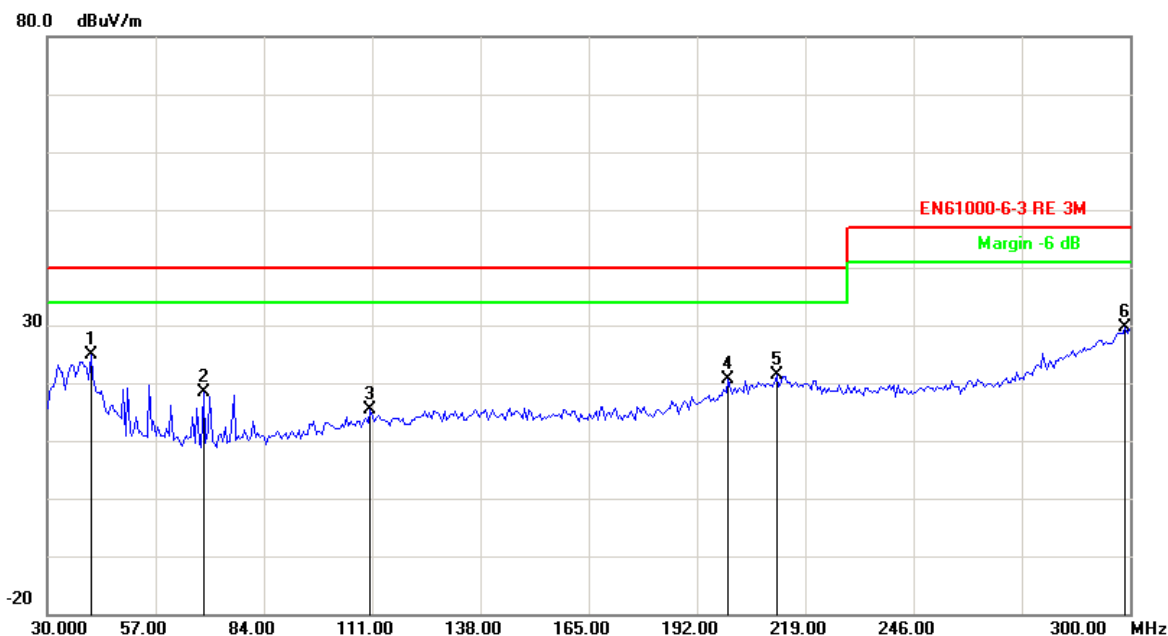
No.	Frequency (MHz)	Factor (dB)	Reading (dB $\mu$ V)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector
1	328.0561	-12.35	32.57	20.22	47.00	-26.78	QP
2	458.5170	-8.40	31.51	23.11	47.00	-23.89	QP
3	556.7134	-5.66	31.82	26.16	47.00	-20.84	QP
4	650.7014	-3.24	31.75	28.51	47.00	-18.49	QP
5	746.0921	-1.76	31.12	29.36	47.00	-17.64	QP
6	851.3026	-0.33	31.53	31.20	47.00	-15.80	QP

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Test point:	Vertical	Result:	<input checked="" type="checkbox"/> - passed
Operation mode	Normal		<input type="checkbox"/> - not passed
Remarks:			

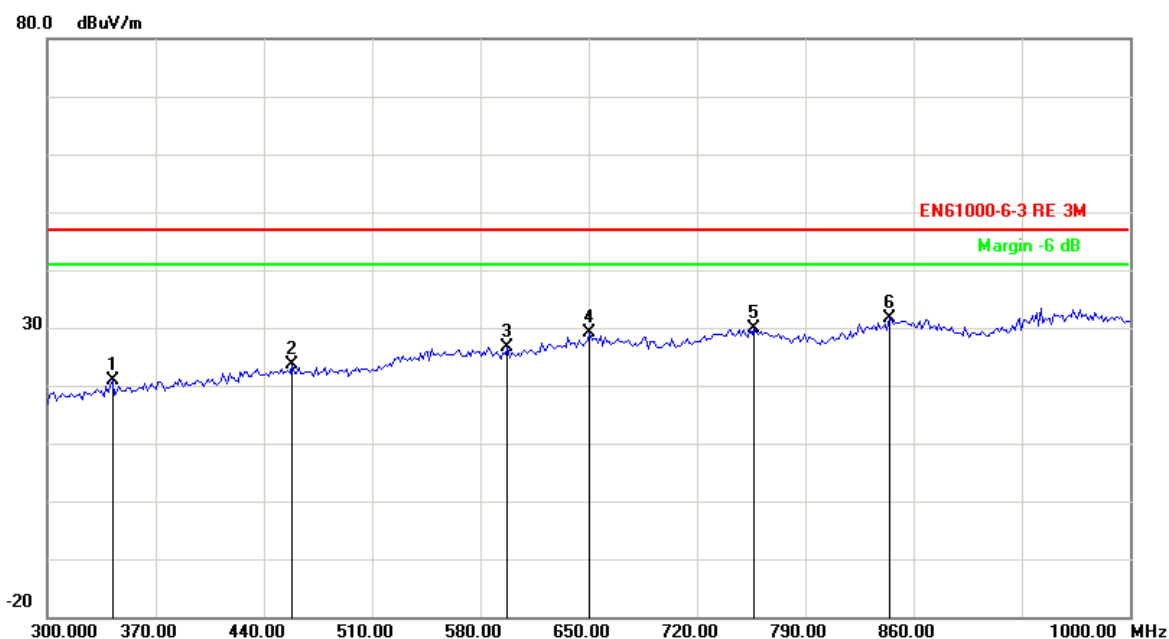


No.	Frequency (MHz)	Factor (dB)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	40.8216	-17.44	42.31	24.87	40.00	-15.13	QP
2	68.9579	-20.65	39.13	18.48	40.00	-21.52	QP
3	110.6212	-17.26	32.70	15.44	40.00	-24.56	QP
4	199.8997	-12.31	32.82	20.51	40.00	-19.49	QP
5	211.8036	-10.32	31.60	21.28	40.00	-18.72	QP
6	298.9178	-1.71	31.43	29.72	47.00	-17.28	QP

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No.	Frequency (MHz)	Factor (dB)	Reading (dB $\mu$ V)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector
1	342.0842	-11.71	32.61	20.90	47.00	-26.10	QP
2	458.5170	-8.40	31.96	23.56	47.00	-23.44	QP
3	597.3948	-5.56	32.30	26.74	47.00	-20.26	QP
4	650.7014	-3.24	32.29	29.05	47.00	-17.95	QP
5	757.3146	-1.84	31.66	29.82	47.00	-17.18	QP
6	844.2886	-0.63	32.31	31.68	47.00	-15.32	QP

Note: Level=Reading+Factor. Margin= Limit-Level

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### 5.3 Electrostatic discharge

For test instruments and accessories used see section 6 part 6.3.

#### 5.3.1 Description of the test location

Test location :	Test location no. 2
Power supply:	DC 24V
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	08~12 September 2016
Operator :	<b>Clark</b>

#### 5.3.2 Severity of levels electrostatic discharge

5.3.2.1 Severity level: Contact discharge at  $\pm 4KV$  air discharge at  $\pm 8KV$

Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

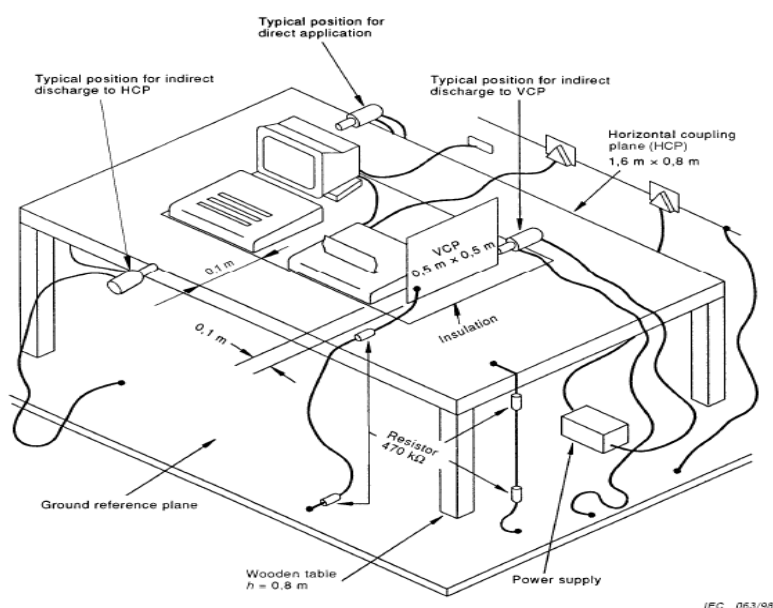
5.3.2.2 Performance criterion: B

#### 5.3.3 Description of the test set-up

##### 5.3.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

##### 5.3.3.2 Block Diagram of Test Setup



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#### 5.3.4 Test specification:

Contact discharge voltage:	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 4 kV	
Air discharge voltage:	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 4 kV	<input type="checkbox"/> 8 kV
Discharge impedance:	<input type="checkbox"/> 330 $\Omega$ / 150 pF		
Discharge factor:	<input type="checkbox"/> $\geq 1$ sec.		
Number of discharges:	<input type="checkbox"/> $\geq 10$		
Type of discharge:	Direct discharge	<input type="checkbox"/> Air discharge	
		<input type="checkbox"/> Contact discharge	
	Indirect discharge	<input type="checkbox"/> Contact discharge	
Polarity:	<input type="checkbox"/> Positive	<input type="checkbox"/> Negative	
Discharge location:	<input type="checkbox"/> see photo documentation of the test set-up		
	<input type="checkbox"/> all external locations accessible by hand		
	<input type="checkbox"/> horizontal plate (HCP)		
	<input type="checkbox"/> vertical coupling plate (VCP)		

#### 5.3.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

### 5.4 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 6 part 6.4.

#### 5.4.1 Description of the test location

Test location :	GTEM chamber
Power supply:	DC 24V
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	08~12 September 2016
Operator :	<b>Clark</b>

#### 5.4.2 Severity levels of radiated, Radio-frequency, electromagnetic field

5.4.2.1 Severity level: 3V/m and 1V/m

Level	Field strenght(V/m)
1	1
2	3
3	10
X	Special

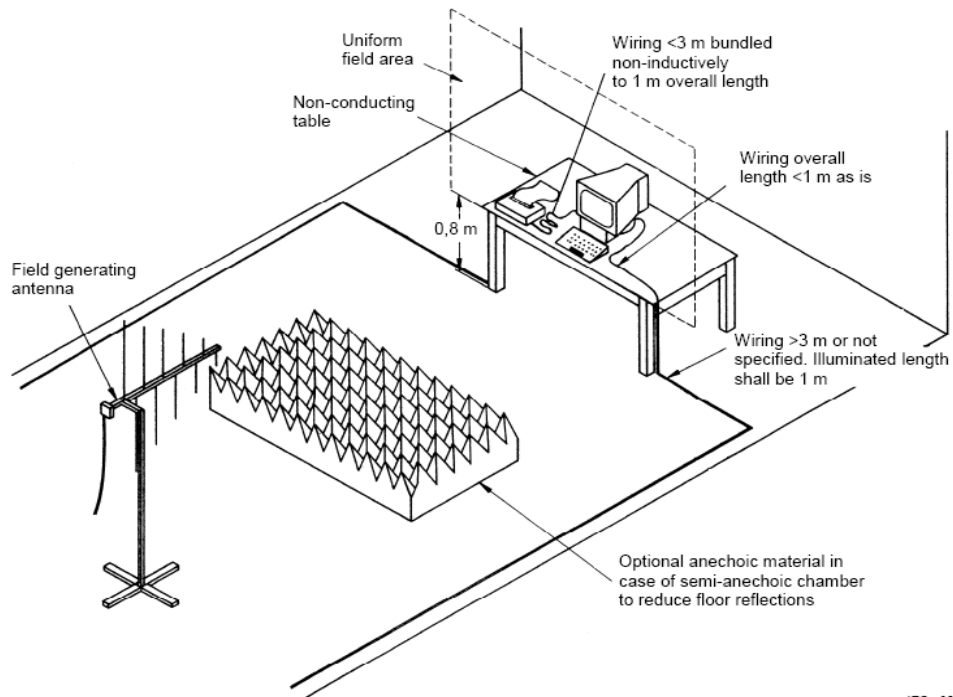
5.4.2.2 Performance criterion: A

#### 5.4.3 Description of the test set-up

5.4.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.4.3.2 Block Diagram of Test Setup



IEC 034/06

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## 5.4.4 Test specification:

Frequency range:	■ 80 MHz to 1000 MHz
Field strength:	■ 3 V/m
EUT - antenna separation:	■ 3 m
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time
Antenna polarisation:	■ horizontal      ■ vertical

Frequency range:	■ 1.4GHz to 2GHz
Field strength:	■ 3 V/m
EUT - antenna separation:	■ 3 m
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time
Antenna polarisation:	■ horizontal      ■ vertical

Frequency range:	■ 2GHz to 2.7GHz
Field strength:	■ 1 V/m
EUT - antenna separation:	■ 3 m
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time
Antenna polarisation:	■ horizontal      ■ vertical

## 5.4.5 Test result

The requirements are **Fulfilled**Performance Criterion: **A****Remarks:** During the test no deviation was detected to the selected operation mode(s).

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## 5.5 Electrical fast transients / Burst

For test instruments and accessories used see section 6 part 6.5.

### 5.5.1 Description of the test location

Test location :	Test location no. 2
Power supply:	DC 24V
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	08~12 September 2016
Operator :	Clark

### 5.5.2 Severity levels of electrical fast transients / Burst

5.5.2.1 Severity level:  $\pm 500V$  for DC power supply lines

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O signal, data and control ports	
	V peak (KV)	Repetition rate (KHz)	Voltage peak	Repetition rate (KHz)
1	0.5	5 or 100	0.25	5 or 100
2	1	5 or 100	0.5	5 or 100
3	2	5 or 100	1	5 or 100
4	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

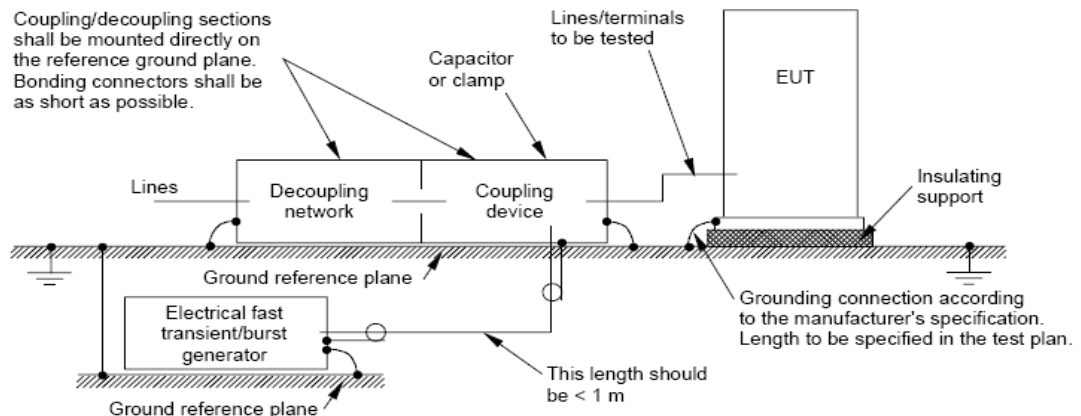
5.5.2.2 Performance criterion: B

### 5.5.3 Description of the test set-up

#### 5.5.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

#### 5.5.3.2 Block Diagram of Test Setup



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## 5.6 Surge

For test instruments and accessories used see section 6 part 6.6.

### 5.6.1 Description of the test location

Test location :	Test location no. 2
Power supply:	DC 24V
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	08~12 September 2016
Operator :	<b>Clark</b>

### 5.6.2 Severity levels of surge

5.6.2.1 Severity level: Line to line:  $\pm 0.5KV$

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
X	Special

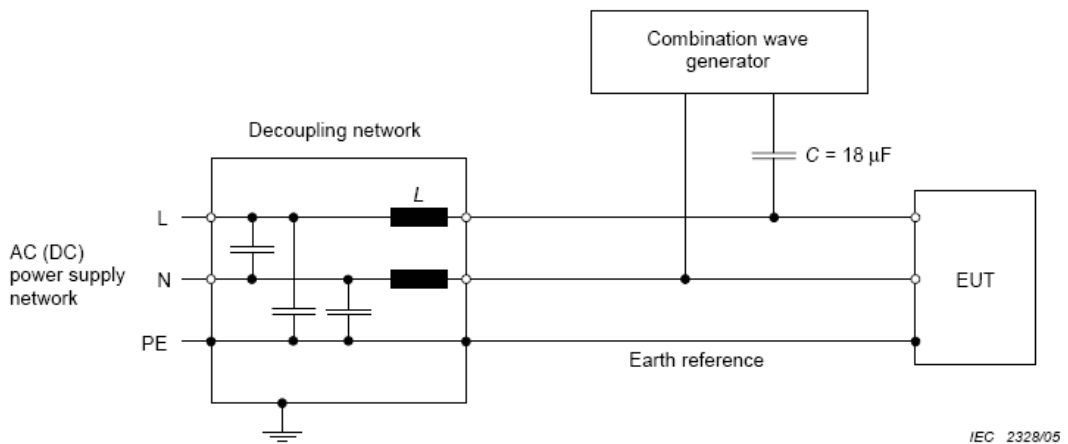
5.6.2.2 Performance Criterion: B

### 5.6.3 Description of the test set-up

5.6.3.1 Operating Condition

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5.6.3.2 Block Diagram of Test Setup



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#### 5.6.4 Test specification:

Pulse amplitude-Power line sym.: Source impedance: 2 $\Omega$ + 18 $\mu$ F	<input checked="" type="checkbox"/> 0.5 kV <input type="checkbox"/> 1 kV <input type="checkbox"/> 2 kV <input type="checkbox"/> 4 kV
Pulse amplitude-Power line unsym.: Source impedance: 12 $\Omega$ + 9 $\mu$ F	<input type="checkbox"/> 0.5 kV <input type="checkbox"/> 1 kV <input type="checkbox"/> 2 kV <input type="checkbox"/> 4 kV
Number of surges:	<input checked="" type="checkbox"/> 5 Surges/Phase angle
Phase angle:	<input type="checkbox"/> 0 ° <input type="checkbox"/> 90 ° <input type="checkbox"/> 180 ° <input type="checkbox"/> 270 °
Repetition rate:	<input checked="" type="checkbox"/> 60 s
Polarity:	<input checked="" type="checkbox"/> positive <input checked="" type="checkbox"/> negative

#### 5.6.5 Coupling points

Cable description:	DC power line: Positive + Negative
Screening:	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unscreened
Status:	<input type="checkbox"/> passive <input checked="" type="checkbox"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue <input type="checkbox"/> digital
Length:	<input checked="" type="checkbox"/> 1.5 m

#### 5.6.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

**Remarks:**      During the test no deviation was detected to the selected operation mode(s).

### 5.7 Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 6 part 6.7.

#### 5.7.1 Description of the test location

Test location :	Test location no. 2
Power supply:	DC 24V
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	08~12 September 2016
Operator :	<b>Clark</b>

#### 5.7.2 Severity levels of conducted disturbances induced by radio-frequency fields discharge

##### 5.7.2.1 Severity Level: 3V

Level	Field Strength (V)
1	1
2	3
3	10
X	Special

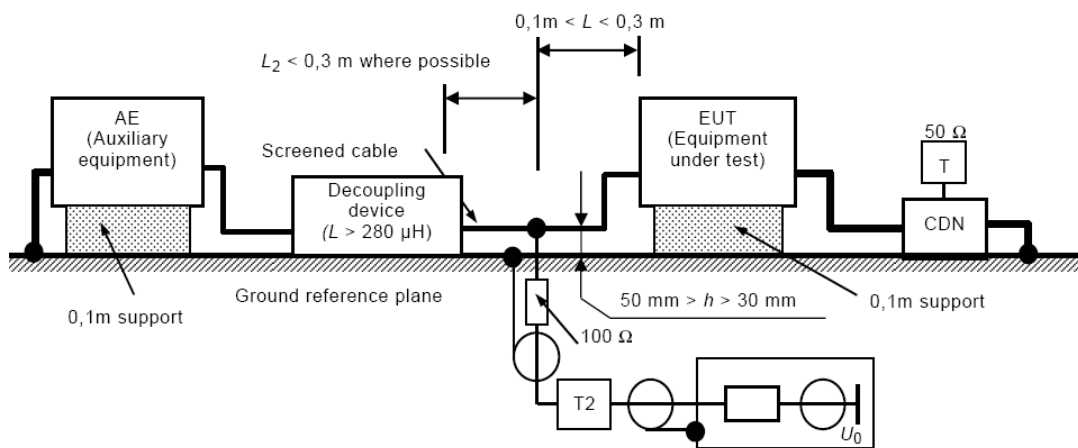
##### 5.7.2.2 Performance Criterion: A

#### 5.7.3 Description of the test set-up

##### 5.7.3.1 Operating Condition

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##### 5.7.3.2 Block Diagram of Test Setup



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**5.7.4 Test specification:**

Frequency range:	■ 0.15 MHz to 80 MHz
Test voltage:	■ 3 V
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time

**5.7.5 Coupling points**

Cable description (Port1):	DC power line: Positive + Negative
Screening:	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unshielded
Status:	<input type="checkbox"/> passive <input checked="" type="checkbox"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue <input type="checkbox"/> digital
Length:	■ 0.3 m

**5.7.6 Test result**The requirements are **Fulfilled**Performance Criterion: **A****Remarks:** During the test no deviation was detected to the selected operation mode(s).

### 5.8 Power frequency magnetic field

For test instruments and accessories used see section 6 part 6.8.

#### 5.8.1 Description of the test location

Test location :	Test location no. 2
Power supply:	DC 24V
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	08~12 September 2016
Operator :	Clark

#### 5.8.2 Severity levels of magnetic field immunity

##### 5.8.2.1 Severity Level: 3A/m

Level	Magnetic Field Strength (A/m)
1	1
2	3
3	10
4	30
5	100
X	Special

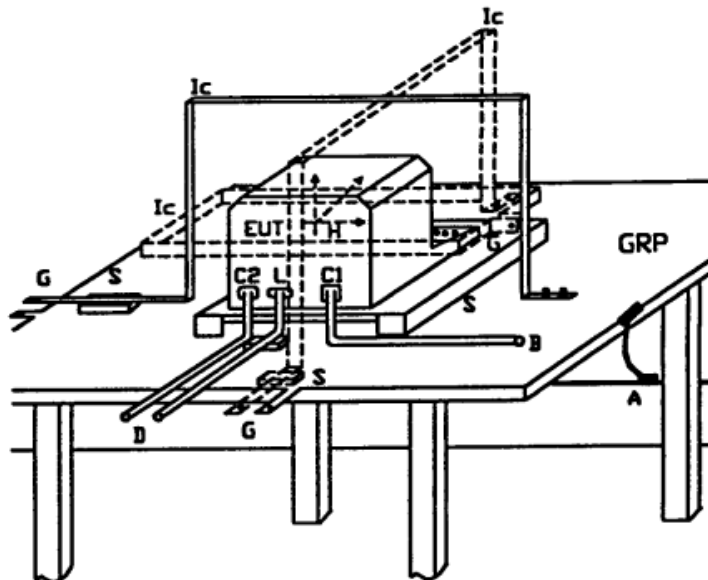
##### 5.8.2.2 Performance Criterion: A

#### 5.8.3 Description of the test set-up

##### 5.8.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

##### 5.8.3.2 Block Diagram of Test Setup



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#### 5.8.4 Test specification:

Test frequency:	■ 50 Hz		
Continuous field:	■ 3 A/m		
Duration (Continuous field):	■ 60 s each Axis		
Short duration (1-3s):	■ 3s		
Axis:	■ x-axis	■ y-axis	■ z-axis

#### 5.8.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

## 6 USED TEST EQUIPMENT

### 6.1

Radiated disturbance (electric field)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2016/03/24
2	EMI Test Receiver	ROHDE & SCHWARZ	ESVS 10	842885/001	2015/10/30
3	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2016/03/26
4	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2016/03/26
5	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2016/03/26
6	Pre-Amplifier	EMC	EMC330	980113	2016/03/24
7	Pre-Amplifier	EMC	EMC012645	980114	2016/03/24
8	EMI Test Software	Farad	EZ-EMC	N/A	N/A

### 6.2

Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100868	2015/10/30
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2015/10/30
3	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z6	100140	2015/10/30
4	Pulse Limiter	ROHDE & SCHWARZ	ESHS-Z2	100301	2015/10/30
5	EMI Test Software	Farad	EZ-EMC	N/A	N/A

### 6.3

Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	Schlöder	SESD 200	0302016	2016/03/28

### 6.4

RF Field Strength Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	ROHDE & SCHWARZ	SMY 01	843215/014	2015/10/30
2	Signal Generator	ROHDE & SCHWARZ	SML03	102986	2015/10/30
3	Amplifier	KALMUS	713FC	7385-1	2015/10/30
4	Power Meter	ROHDE & SCHWARZ	NRVS	842856/049	2015/10/30
5	Field Probe	ETS	HI-6005	00075047	2015/11/10
6	RS Test Software	Farad	EZ-RS	N/A	N/A

### 6.5

Electrical Fast Transient/Burst					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2015/10/30
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2015/10/30
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2015/10/30
4	Genecs Software	EMC Partner	N/A	N/A	N/A

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## 6.6

Surge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2015/10/30
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2015/10/30
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2015/11/05
4	Genecs Software	EMC Partner	N/A	N/A	N/A

## 6.7

Conducted Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	RF generator / amplifier	Schlöder	CDG 6000	HU906007	2015/10/30
2	CDN	Schlöder	CDN M3	A3003008	2015/10/30
3	CDN	Schlöde	CDN T2	A3010005	2015/10/30
4	Attenuator	Abschwächer	DC-500MHz	N/A	2015/10/30
5	EM injection clamp	Liithi	EM101	35670	2015/11/09
6	CDG-6000 Software	Schlöder	N/A	N/A	N/A

## 6.8

Power Frequency Magnetic Field Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Power frequency mag-field generator System	EM TEST	EMS61000-8K	409001	2015/10/30

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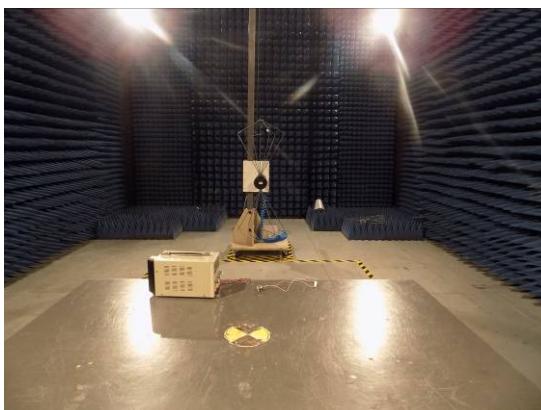
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## 7 TEST PHOTOGRAPHS

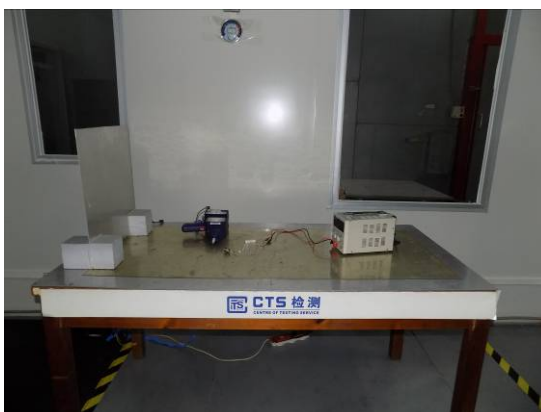
7.1. Photo of power line conducted emission measurement (C.E.)



7.2. Photo of radiated emission measurement (R.E. Electric field)



7.3. Photo of electrostatic discharge Immunity measurement (E.S.D.)



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**7.4. Photo of RF field strength Immunity measurement (R.S.)**



**7.5. Photo of EFT/surge immunity measurement (E.F.T./Surge.)**



**7.6. Photo of conducted disturbance Immunity measurement (C.S.)**

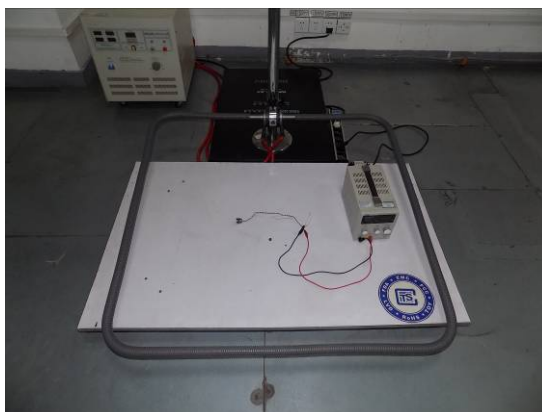


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## 7.7. Photo of PFM field immunity measurement (P.F.M.F.)

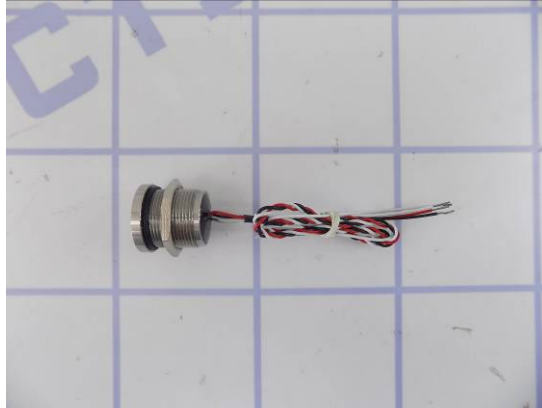


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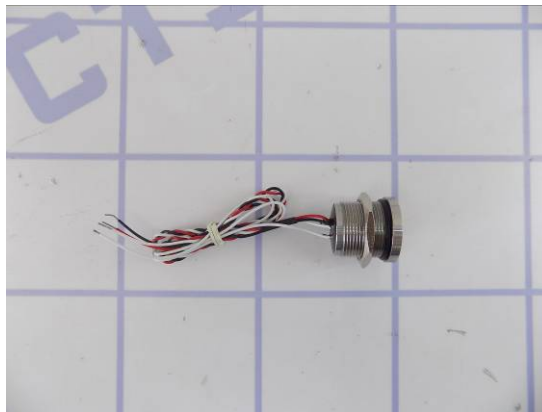
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## 8 External and Internal Photos of the EUT



External view 1



External view 2



External view 3

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External view 4

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## 9 Manufacturer/ Approval holder Declaration

The following identical model(s):

**CP16, CP22, CP25**

Belong to the tested device:

Product description: **CAPACITIVE SWITCH**  
Model name: **CP19**

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