



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

**OPERATE ACCORDING TO ISO/IEC 17025**

# **EMC TEST REPORT**

**TEST REPORT NUMBER : CGZ3180621-01339-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 55032:2015</b>	
Electromagnetic compatibility of multimedia equipment - Emission Requirements	
<b>EN 55035:2017</b>	
Electromagnetic compatibility of multimedia equipment - Immunity requirements	
<b>Report Reference No.</b> .....	CGZ3180621-01339-E
<b>Date of issue</b> .....	25 June 2018
<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> .....	Mun Ah Plastic Electronic Toys Co., Ltd.
<b>Address</b> .....	Flat G, 21/Floor, Kingsway Industrial Building, Phase 2, 173-175 Wo Yi Hop Road, Kwai Chung, N.T., Hong Kong
<b>Test specification:</b>	
<b>Standard</b> .....	<b>EN 55032:2015, EN 55035:2017, EN 61000-3-2:2014, EN 61000-3-3:2013</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> .....	USB Battery Charger
<b>Trade Mark</b> .....	KD PROPO
<b>Manufacturer</b> .....	Mun Ah Plastic Electronic Toys Co., Ltd.
<b>Model/Type reference</b> .....	MBC-24JST
<b>Ratings</b> .....	Battery 3.7V and DC 5V
<b>Result</b> .....	<b>PASSED</b>

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## EMC -- TEST REPORT

<b>Test Report No. :</b> CGZ3180621-01339-E	<u>25 June 2018</u> Date of issue
---	--------------------------------------

Type / Model.....	MBC-24JST
EUT.....	USB Battery Charger
<b>Applicant</b> .....	Mun Ah Plastic Electronic Toys Co., Ltd.
Address.....	Flat G, 21/Floor, Kingsway Industrial Building, Phase 2, 173-175 Wo Yi Hop Road, Kwai Chung, N.T., Hong Kong
Telephone.....	+86-2427 5831
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Contact.....	Ivan Cheung
<b>Manufacturer</b> .....	Mun Ah Plastic Electronic Toys Co., Ltd.
Address.....	Flat G, 21/Floor, Kingsway Industrial Building, Phase 2, 173-175 Wo Yi Hop Road, Kwai Chung, N.T., Hong Kong
Telephone.....	+86-2427 5831
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Contact.....	Ivan Cheung
<b>Factory</b> .....	Mun Ah Plastic Electronic Toys Co., Ltd.
Address.....	Flat G, 21/Floor, Kingsway Industrial Building, Phase 2, 173-175 Wo Yi Hop Road, Kwai Chung, N.T., Hong Kong
Telephone.....	+86-2427 5831
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Contact.....	Ivan Cheung

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 55032:2015 Electromagnetic compatibility of multimedia equipment - Emission Requirements.

EN 55035:2017 Electromagnetic compatibility of multimedia equipment - Immunity requirements.

EN 61000-3-2:2014 Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).

EN 61000-3-3:2013 Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current  $\leq$  16 A per phase and not subject to conditional connection.

## 2 SUMMARY

### 2.1 GENERAL REMARKS

Date of receipt of test sample	21 June 2018
Testing commenced on	21~25 June 2018
Testing concluded on	25 June 2018

### 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:  Battery 3.7V and DC 5V By Adapter  
 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 55032, searching for the highest disturbance.

Immunity tests .....: According to EN 55035, searching for the highest susceptibility.

Harmonic current..... : According to EN 61000-3-2, searching for the highest disturbance.

Voltage fluctuation.....: According to EN 61000-3-3, searching for the highest disturbance.

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### 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 :**

N/A

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### 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 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

### 4.3 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.

### 4.4 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.

### 4.5 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.

## 4.6 Test Description

### 4.6.1 Description of Standards and Results

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	EN 55032:2015	Class B	PASS
Conducted disturbance at telecommunication port	EN 55032:2015	Class B	N/A
Radiated disturbance	EN 55032:2015	Class B	PASS
Harmonic current emissions	EN 61000-3-2:2014	Class A	PASS
Voltage fluctuations & flicker	EN 61000-3-3:2013	-----	PASS
IMMUNITY (EN 55035:2017)			
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	PASS
Voltage dips, 30% reduction		C	PASS
Voltage interruptions		C	PASS
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

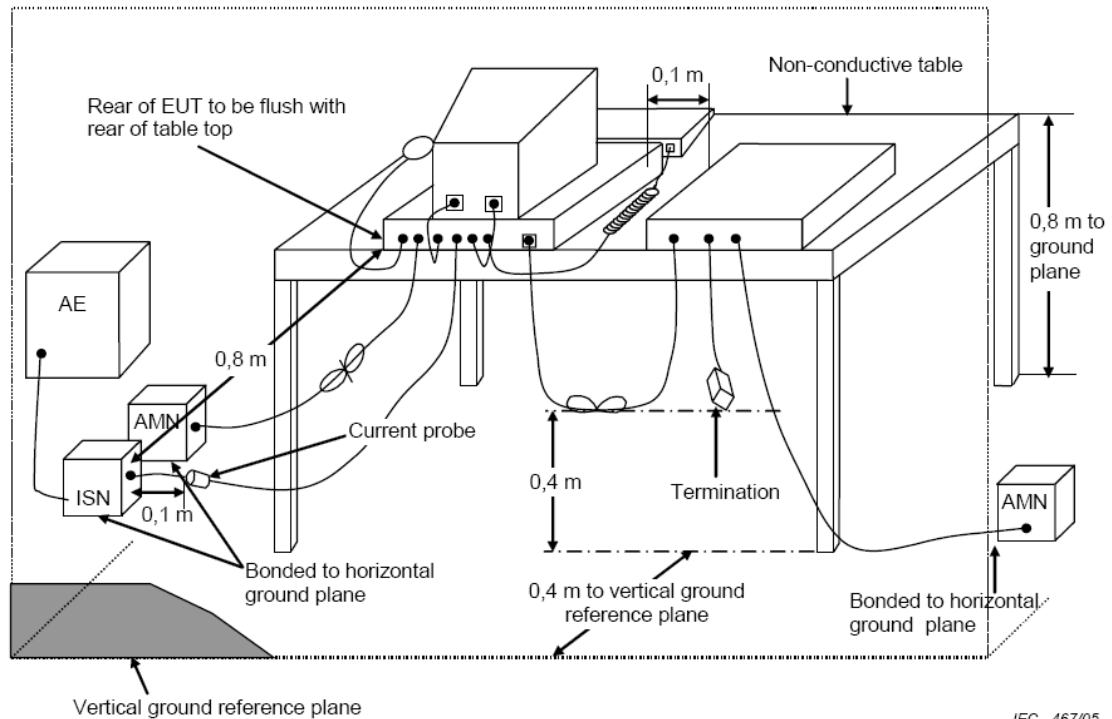
Test location: Shielded room

#### 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	66 ~ 56 *	56 ~ 46 *
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

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

**5.1.4 Test result**

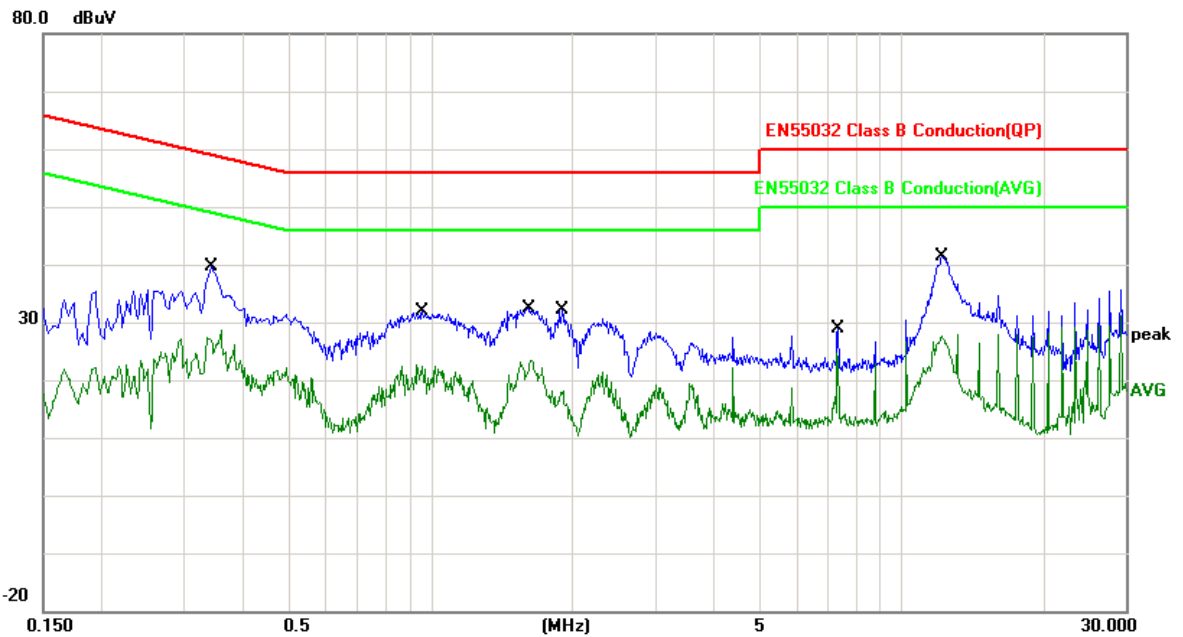
The requirements are	<b>Fulfilled</b>
Band width	9kHz
Frequency range	0.15 MHz - 30 MHz
Min. limit margin	>17.89 dB at 0.15 - 30 MHz

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

5.1.5 Test protocol

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

EUT	USB Battery Charger
MODEL NO.	MBC-24JST
Operating Condition	DC 5V By Adapter
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Eric



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.3420	10.20	26.69	36.89	59.15	-22.26	QP
2	0.3420	10.20	15.03	25.23	49.15	-23.92	AVG
3	0.9620	10.30	18.69	28.99	56.00	-27.01	QP
4	0.9620	10.30	8.00	18.30	46.00	-27.70	AVG
5	1.6180	10.38	19.36	29.74	56.00	-26.26	QP
6	1.6180	10.38	9.69	20.07	46.00	-25.93	AVG
7	1.9020	10.41	17.72	28.13	56.00	-27.87	QP
8	1.9020	10.41	6.40	16.81	46.00	-29.19	AVG
9	7.3300	10.98	15.89	26.87	60.00	-33.13	QP
10	7.3300	10.98	13.81	24.79	50.00	-25.21	AVG
11	12.2060	11.20	24.69	35.89	60.00	-24.11	QP
12	12.2060	11.20	15.01	26.21	50.00	-23.79	AVG

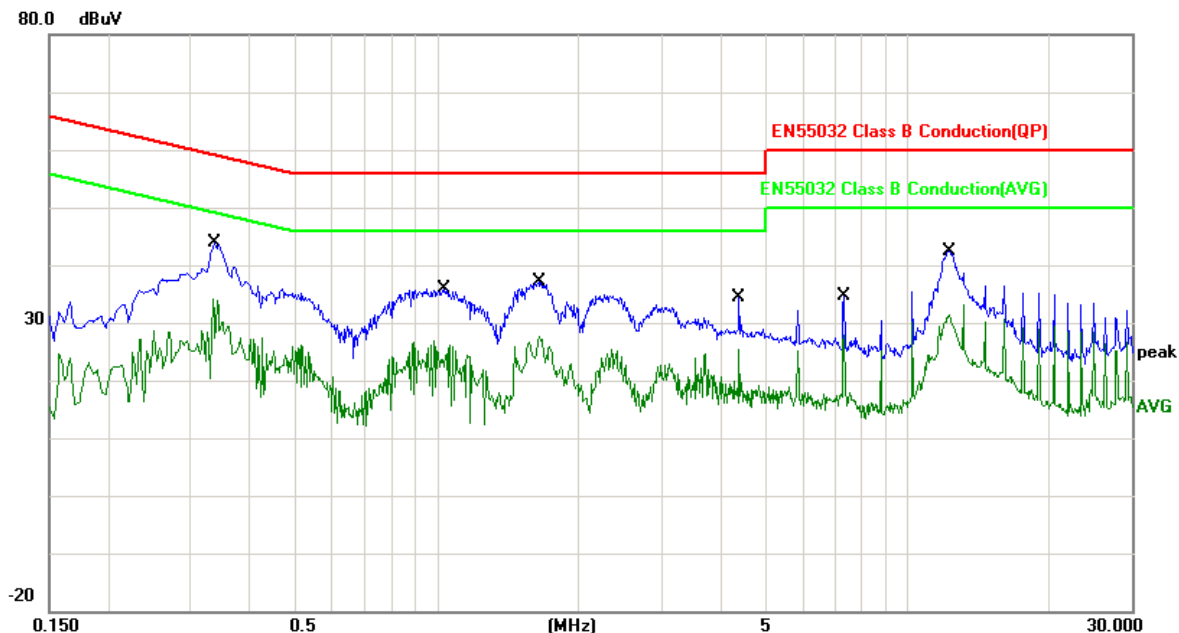
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Test point:	N	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.3380	10.31	30.61	40.92	59.25	-18.33	QP
2	0.3380	10.31	21.05	31.36	49.25	-17.89	AVG
3	1.0340	10.43	22.88	33.31	56.00	-22.69	QP
4	1.0340	10.43	12.32	22.75	46.00	-23.25	AVG
5	1.6500	10.49	24.17	34.66	56.00	-21.34	QP
6	1.6500	10.49	13.88	24.37	46.00	-21.63	AVG
7	4.3940	10.73	17.55	28.28	56.00	-27.72	QP
8	4.3940	10.73	10.65	21.38	46.00	-24.62	AVG
9	7.3300	10.98	21.36	32.34	60.00	-27.66	QP
10	7.3300	10.98	17.74	28.72	50.00	-21.28	AVG
11	12.3060	11.20	26.99	38.19	60.00	-21.81	QP
12	12.3060	11.20	18.62	29.82	50.00	-20.18	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

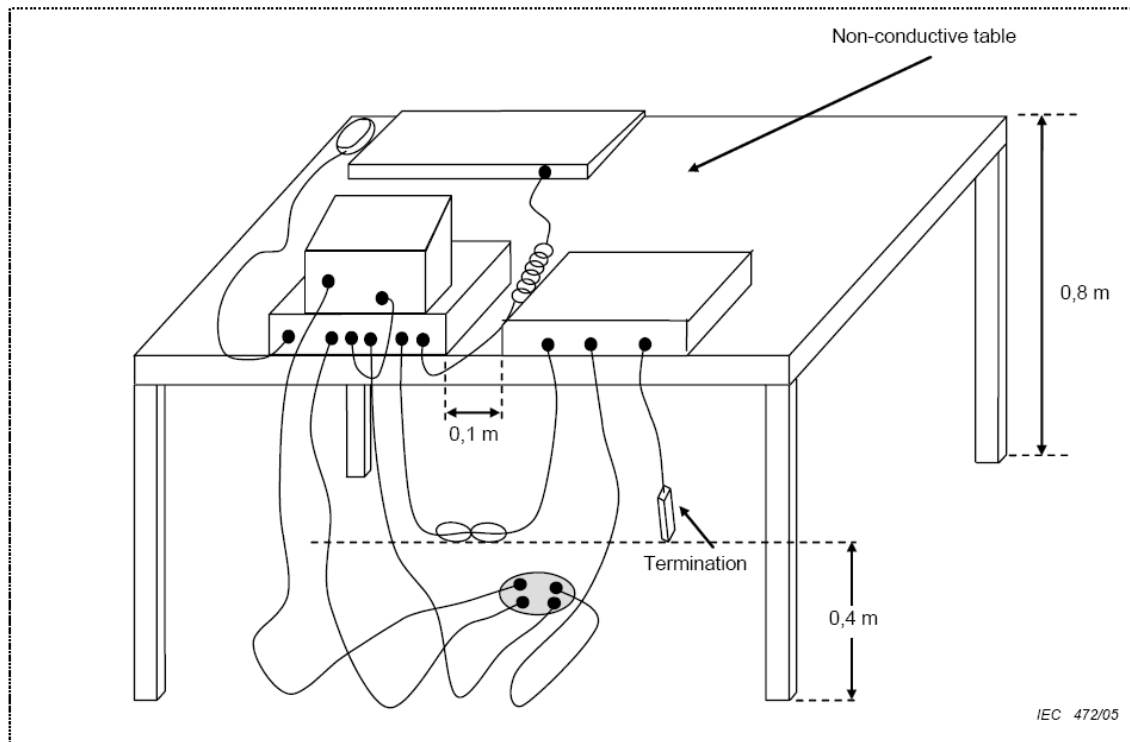
Test disturbance: 3 Meter

**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 (Class B)**

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	>2.14 dB at 30 - 1000 MHz

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

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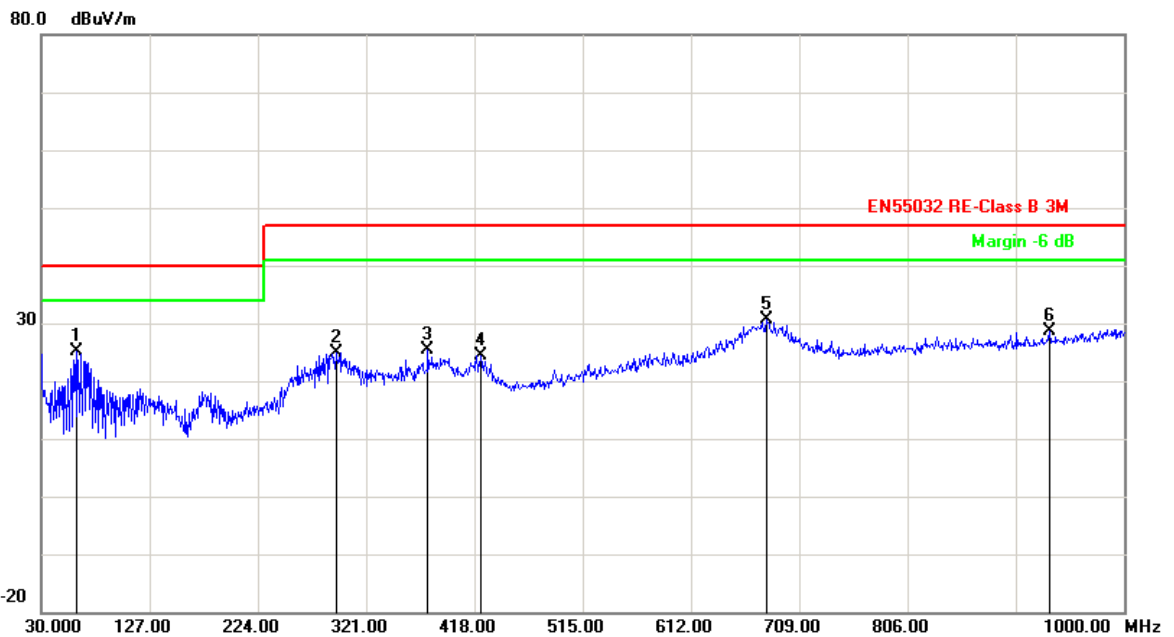
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E-mail: [cts@cts-lab.com.cn](mailto:cts@cts-lab.com.cn)

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5.2.5 Test protocol

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

EUT	USB Battery Charger
MODEL NO.	MBC-24JST
Operating Condition	DC 5V By Adapter
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Eric



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	62.0100	-20.53	45.68	25.15	40.00	-14.85	QP
2	293.8400	-12.64	37.58	24.94	47.00	-22.06	QP
3	376.2900	-10.52	35.78	25.26	47.00	-21.74	QP
4	423.8200	-9.32	33.78	24.46	47.00	-22.54	QP
5	679.9000	-3.91	34.47	30.56	47.00	-16.44	QP
6	933.0700	-0.47	29.00	28.53	47.00	-18.47	QP

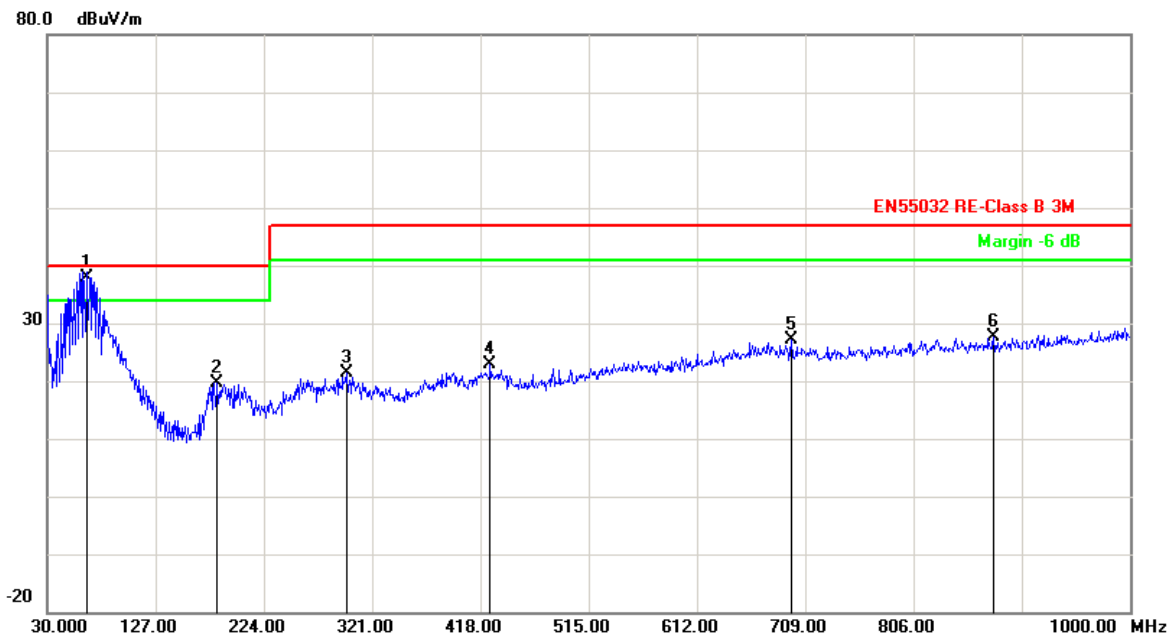
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Test point:	Vertical	Result:	<input checked="" type="checkbox"/> - passed
Operation mode:	Normal		<input type="checkbox"/> - not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	64.9200	-20.69	58.55	37.86	40.00	-2.14	QP
2	182.2899	-16.99	36.64	19.65	40.00	-20.35	QP
3	297.7200	-12.82	34.15	21.33	47.00	-25.67	QP
4	426.7300	-9.26	32.03	22.77	47.00	-24.23	QP
5	696.3900	-3.53	30.77	27.24	47.00	-19.76	QP
6	877.7800	-1.40	29.08	27.68	47.00	-19.32	QP

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

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### 5.3 Harmonic current

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. 1

#### 5.3.2 Limits of harmonic current

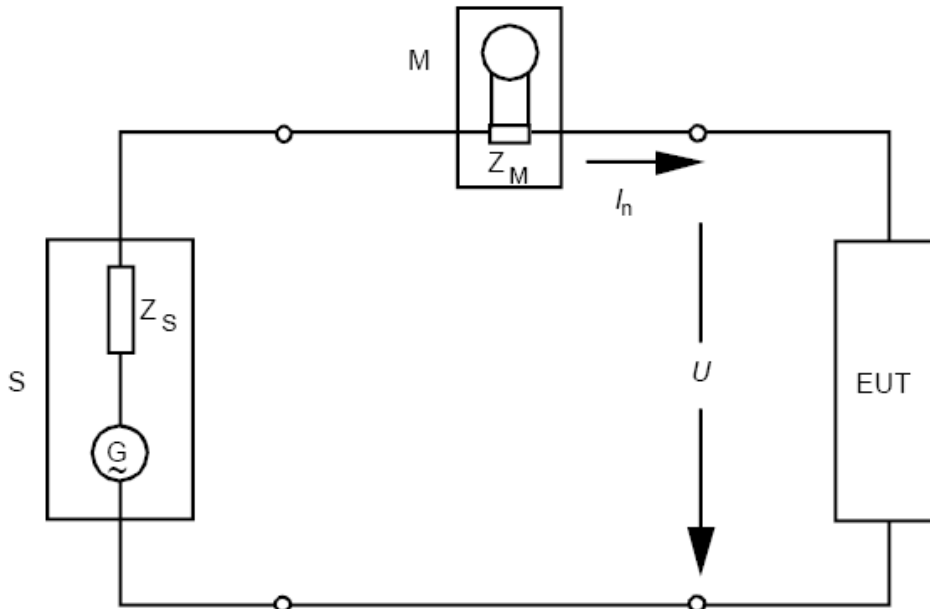
Test configuration and procedure see clause 7.1 of standard EN 61000-3-2:2014.

#### 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



#### 5.3.4 Test result

The requirements are **Fulfilled**

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

## 5.3.5 Test protocol

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

Standard used:	EN 61000-3-2 Quasi-Stationary – Equipment class A
Observation time:	5 min
Windows width:	10 periods – (EN/IEC 61000-4-7 Edition 2002)
Mains supply voltage:	DC 5V By Adapter
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86~106KPa
E. U. T.:	USB Battery Charger
M/N:	MBC-24JST
Date of test:	22 June 2018
Tester:	Eric

**Test result**

E. U. T.:	PASS
Power Source:	PASS

**Check harmonics 2..40 [exception odd 21..39]:**

Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 100%:	
Order (n):	None

**Check odd harmonics 21..39:**

<b>All Partial Odd Harmonics below partial limits.</b>
Harmonic(s) > 150%: Order (n): None
Harmonic(s) with average > 150%: Order (n): None

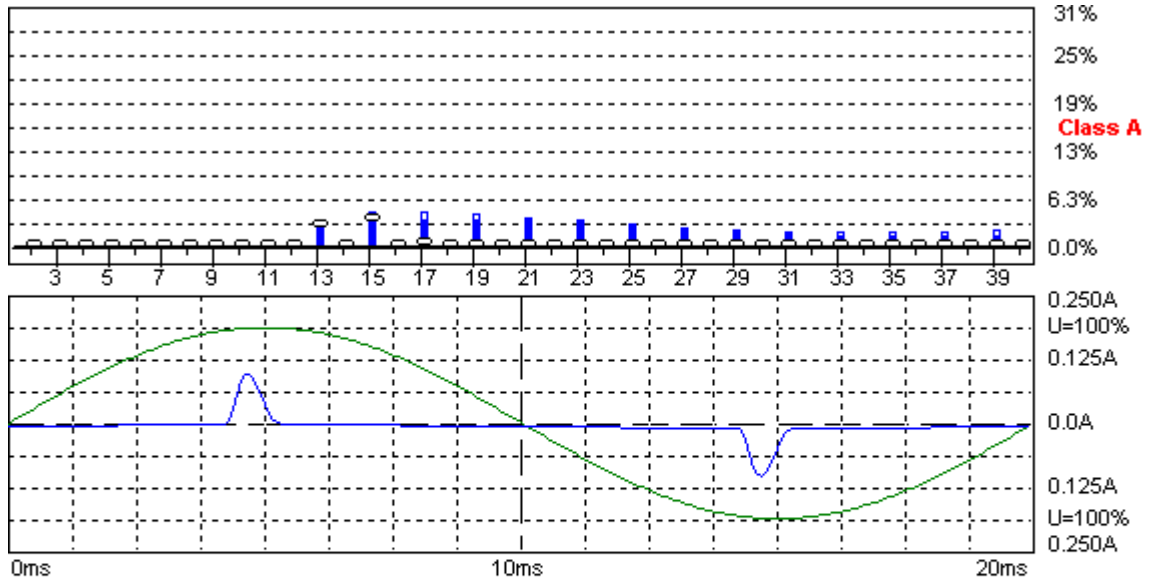
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**Harmonic Emission - IEC 61000-3-2, EN 61000-3-2, (EN60555-2)**

2018-6-22 15:37:35

Urms = 231.9 V    P = 2.203 W    THC = 0.019 A    Range: 0.25 A  
 Irms = 0.021 A    pf = 0.447    V-nom: 231 V    TestTime: 10 min (10)

**Test completed, Result: PASSED**

HAR-1000 EMC-Par

Order	Freq. [Hz]	Iavg [A]	Irms [A]	Imax [A]	Limit [A]	Remark
1	50	0.0099	0.0095	0.0121		
2	100	0.0000	0.0003	0.0003	1.0800	
3	150	0.0077	0.0072	0.0098	2.3000	
4	200	0.0000	0.0003	0.0003	0.4300	
5	250	0.0075	0.0071	0.0095	1.1400	
6	300	0.0000	0.0003	0.0003	0.3000	
7	350	0.0073	0.0068	0.0091	0.7700	
8	400	0.0000	0.0003	0.0003	0.2300	
9	450	0.0069	0.0065	0.0085	0.4000	
10	500	0.0000	0.0002	0.0003	0.1840	
11	550	0.0064	0.0061	0.0079	0.3300	
12	600	0.0000	0.0002	0.0003	0.1533	
13	650	0.0059	0.0056	0.0071	0.2100	
14	700	0.0000	0.0002	0.0002	0.1314	
15	750	0.0053	0.0051	0.0063	0.1500	
16	800	0.0000	0.0002	0.0002	0.1150	
17	850	0.0005	0.0045	0.0054	0.1324	
18	900	0.0000	0.0002	0.0002	0.1022	
19	950	0.0000	0.0040	0.0046	0.1184	
20	1000	0.0000	0.0002	0.0002	0.0920	
21	1050	0.0000	0.0034	0.0038	0.1071	
22	1100	0.0000	0.0002	0.0002	0.0836	

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23	1150	0.0000	0.0029	0.0030	0.0978	
24	1200	0.0000	0.0002	0.0002	0.0767	
25	1250	0.0000	0.0024	0.0024	0.0900	
26	1300	0.0000	0.0001	0.0002	0.0708	
27	1350	0.0000	0.0019	0.0019	0.0833	
28	1400	0.0000	0.0001	0.0001	0.0657	
29	1450	0.0000	0.0015	0.0015	0.0776	
30	1500	0.0000	0.0001	0.0001	0.0613	
31	1550	0.0000	0.0012	0.0012	0.0726	
32	1600	0.0000	0.0001	0.0001	0.0575	
33	1650	0.0000	0.0009	0.0011	0.0682	
34	1700	0.0000	0.0001	0.0001	0.0541	
35	1750	0.0000	0.0008	0.0011	0.0643	
36	1800	0.0000	0.0001	0.0001	0.0511	
37	1850	0.0000	0.0007	0.0011	0.0608	
38	1900	0.0000	0.0001	0.0001	0.0484	
39	1950	0.0000	0.0007	0.0010	0.0577	
40	2000	0.0000	0.0001	0.0001	0.0460	

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## 5.4 Voltage fluctuations and flicker

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

### 5.4.1 Description of the test location

Test location : Test location no. 1

### 5.4.2 Limits of voltage fluctuation and flicker

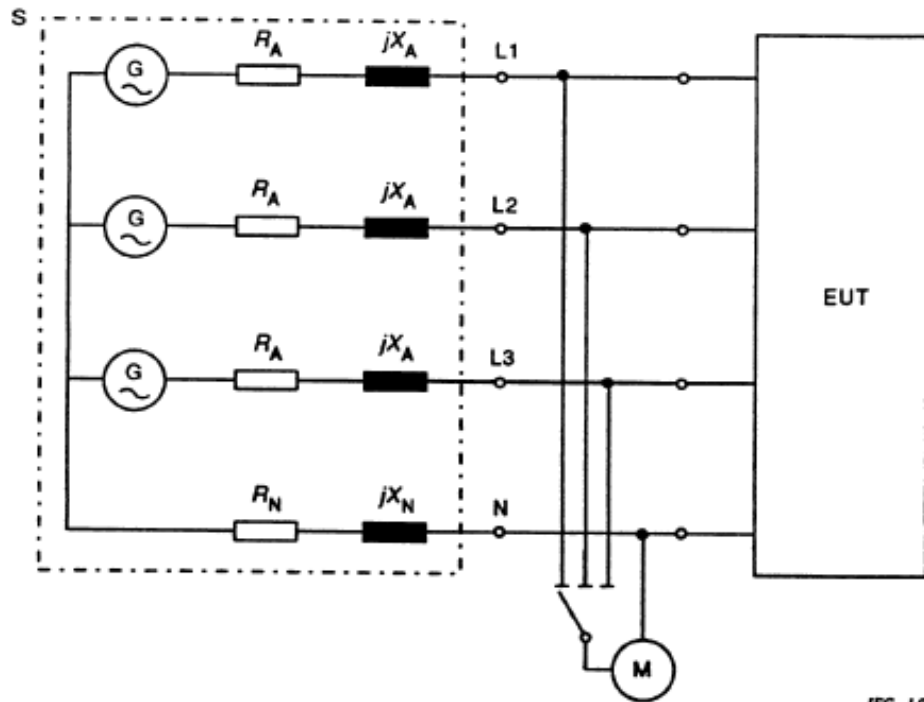
Test configuration and procedure see clause 5 of standard EN 61000-3-3:2013.

### 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 103594

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#### 5.4.4 Test result

The requirements are **Fulfilled**

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

#### 5.4.5 Test protocol

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

Standard used:	EN 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Flickermeter:	DC 5V By Adapter
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86~106KPa
E. U. T.:	USB Battery Charger
M/N:	MBC-24JST
Date of test:	22 June 2018
Tester:	Eric

#### Maximum Flicker results

	EUT values	Limit	Result
Pst	0.07	1.00	PASS
dc [%]	0.00	3.30	PASS
dmax [%]	0.00	4.00	PASS
dt [s]	0.00	0.50	PASS

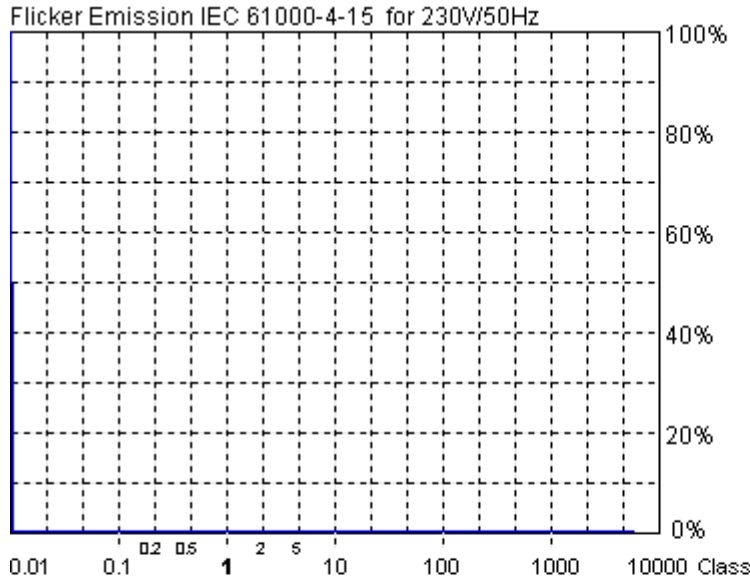
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<b>Actual Flicker (Fli):</b>	<b>0.00</b>
<b>Short-term Flicker (Pst):</b>	<b>0.07</b>
Limit (Pst):	1.00
<b>Long-term Flicker (Plt):</b>	<b>0.07</b>
Limit (Plt):	0.65
<b>Maximum Relative Volt. Change (dmax):</b>	<b>0.00%</b>
Limit (dmax):	4.00%
<b>Relative Steady-state Voltage Change (dc):</b>	<b>0.00%</b>
Limit (dc):	3.00%
<b>Tmax 3.00% (dt):</b>	<b>0.00ms</b>
Limit (dt>Lim):	200ms

**Flicker Emission - IEC 61000-3-3, EN 61000-3-3**

Urms = 231.9 V      P = 2.154 W  
 Irms = 0.021 A      pf = 0.445

2018-6-22 15:49:29

Range: 0.25 A  
 V-nom: 231 V  
 TestTime: 10 min (100%)

**Test completed, Result: PASSED**

HAR-1000 EMC-Partner

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### 5.5 Electrostatic discharge

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 5V By Adapter
Test condition:	Ambient Temperature: 24°C, Humidity:46%
Date of test :	21~25 June 2018
Operator :	<b>Eric</b>

#### 5.5.2 Severity of levels electrostatic discharge

5.5.2.1 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

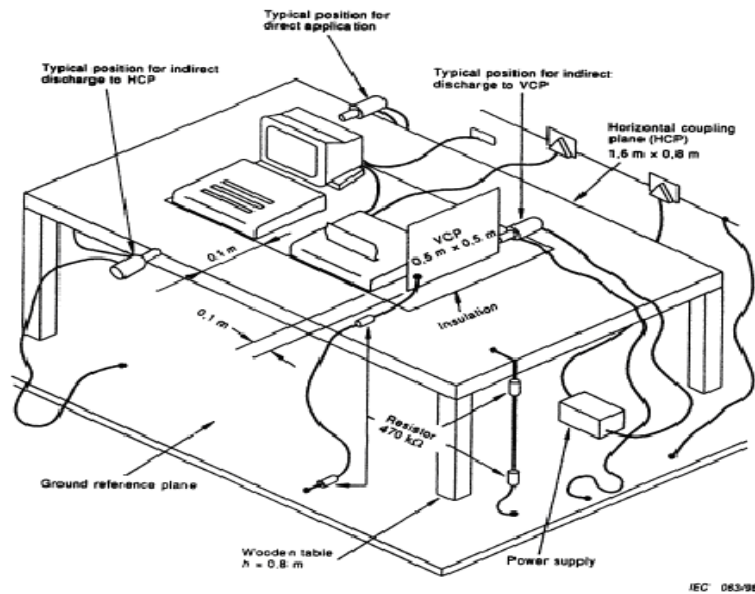
5.5.2.2 Performance criterion: B

#### 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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## 5.5.4 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)		

## 5.5.5 Test result

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

## 5.6 Radiated, radio-frequency, electromagnetic field

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

### 5.6.1 Description of the test location

Test location :	GTEM chamber
Power supply:	DC 5V By Adapter
Test condition:	Ambient Temperature: 24°C, Humidity:46%
Date of test :	21~25 June 2018
Operator :	<b>Eric</b>

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

#### 5.6.2.1 Severity level: 3V/m

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

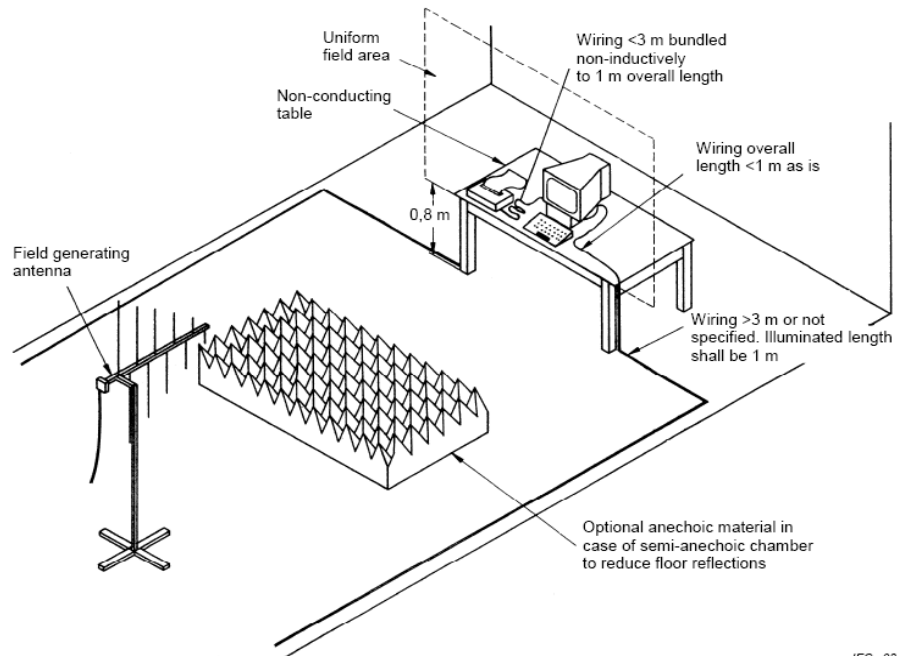
#### 5.6.2.2 Performance criterion: A

### 5.6.3 Description of the test set-up

#### 5.6.3.1 Operating Condition

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

#### 5.6.3.2 Block Diagram of Test Setup



IEC 034/06

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## 5.6.4 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:	■ 1800 MHz to 5000 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

## 5.6.5 Test result

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

### 5.7 Electrical fast transients / Burst

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 5V By Adapter
Test condition:	Ambient Temperature: 24°C, Humidity:46%
Date of test :	21~25 June 2018
Operator :	<b>Eric</b>

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

5.7.2.1 Severity level: ± 1000V for AC 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

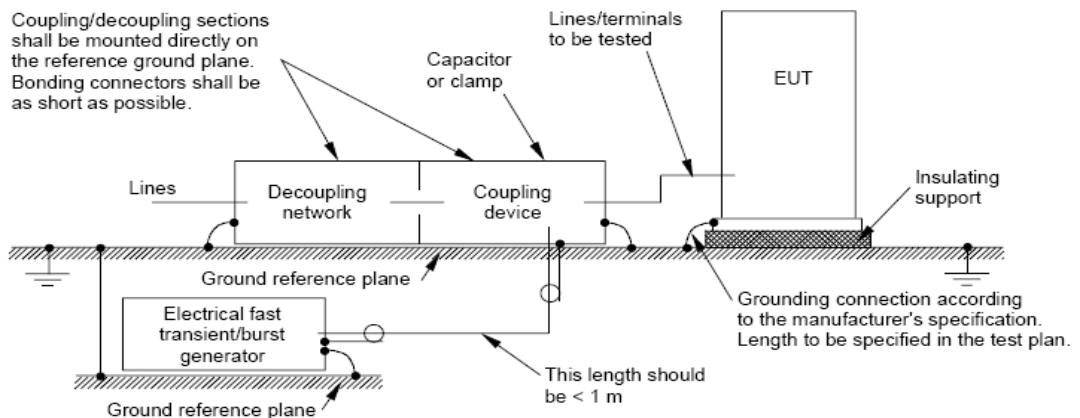
5.7.2.2 Performance criterion: B

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

##### 5.7.3.1 Operating Condition

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

##### 5.7.3.2 Block Diagram of Test Setup



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### 5.8 Surge

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 5V By Adapter
Test condition:	Ambient Temperature: 24°C, Humidity:46%
Date of test :	21~25 June 2018
Operator :	<b>Eric</b>

#### 5.8.2 Severity levels of surge

5.8.2.1 Severity level: Line to line: ±1KV Line to earth: ±2KV

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

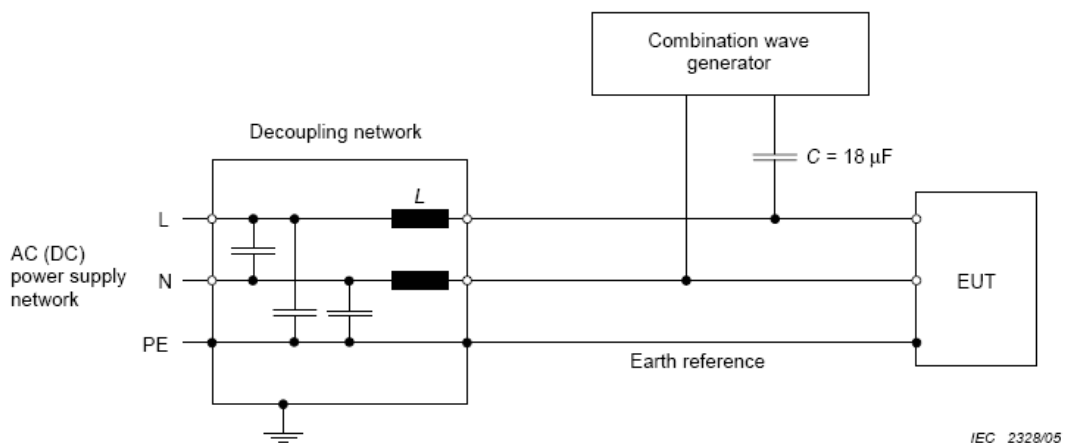
5.8.2.2 Performance Criterion: B

#### 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:

Pulse amplitude-Power line sym.: Source impedance: 2 $\Omega$ + 18 $\mu$ F	<input checked="" type="checkbox"/> 0.5 kV <input checked="" 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 checked="" type="checkbox"/> 0 ° <input checked="" type="checkbox"/> 90 ° <input checked="" type="checkbox"/> 180 ° <input checked="" type="checkbox"/> 270 °
Repetition rate:	<input checked="" type="checkbox"/> 60 s
Polarity:	<input checked="" type="checkbox"/> positive <input checked="" type="checkbox"/> negative

#### 5.8.5 Coupling points

Cable description:	AC power line: L+N
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

#### 5.8.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

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

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

For test instruments and accessories used see section 6 part 6.9.

#### 5.9.1 Description of the test location

Test location :	Test location no. 2
Power supply:	DC 5V By Adapter
Test condition:	Ambient Temperature: 24°C, Humidity:46%
Date of test :	21~25 June 2018
Operator :	Eric

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

##### 5.9.2.1 Severity Level: 3V

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

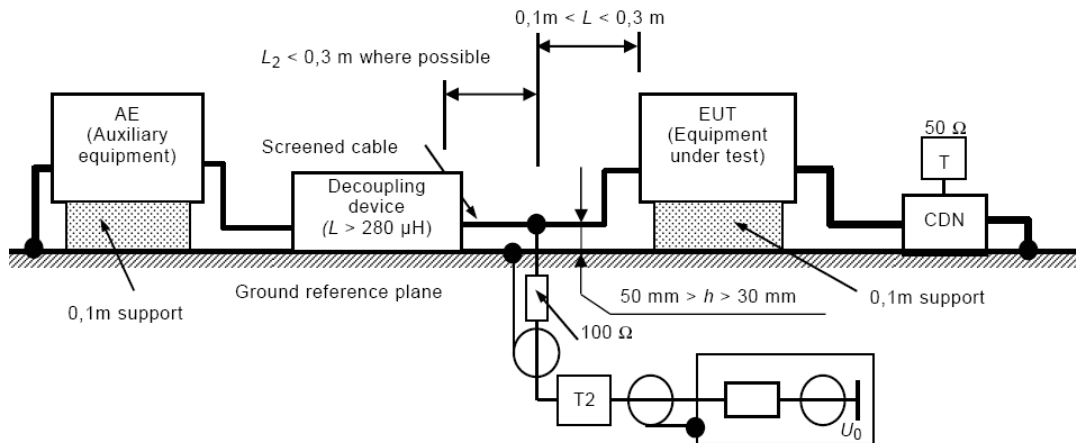
##### 5.9.2.2 Performance Criterion: A

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

##### 5.9.3.1 Operating Condition

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

##### 5.9.3.2 Block Diagram of Test Setup



IEC 1586/03

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#### 5.9.4 Test specification:

Frequency range:	■ 0.15 MHz to 10 MHz
Test voltage:	■ 3 V
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time

Frequency range:	■ 10 MHz to 30 MHz
Test voltage:	■ 3 V to 1V
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time

Frequency range:	■ 30 MHz to 80 MHz
Test voltage:	■ 1 V
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time

#### 5.9.5 Coupling points

Cable description (Port1):	AC power line: L+N
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

#### 5.9.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

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

### 5.10 Power frequency magnetic field

For test instruments and accessories used see section 6 part 6.10.

#### 5.10.1 Description of the test location

Test location :	Test location no. 2
Power supply:	DC 5V By Adapter
Test condition:	Ambient Temperature: 24°C, Humidity:46%
Date of test :	21~25 June 2018
Operator :	Eric

#### 5.10.2 Severity levels of magnetic field immunity

5.10.2.1 Severity Level: 1A/m

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

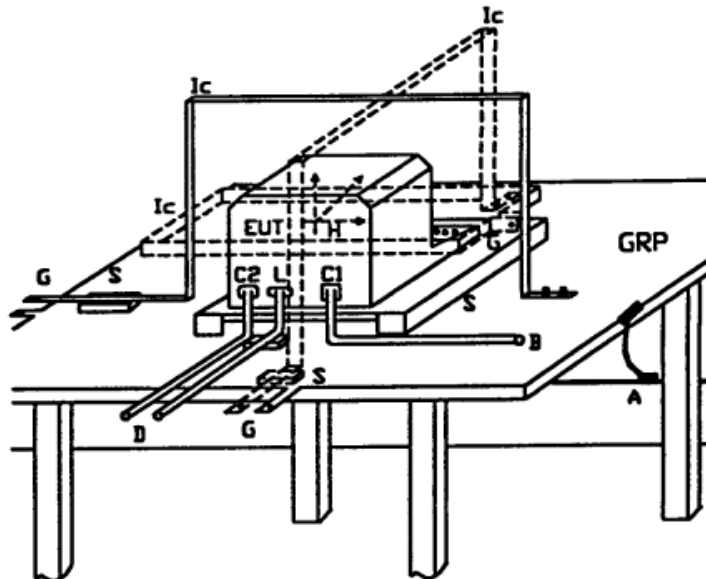
5.10.2.2 Performance Criterion: A

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

5.10.3.1 Operating Condition

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

5.10.3.2 Block Diagram of Test Setup



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#### 5.10.4 Test specification:

Test frequency:	<input checked="" type="checkbox"/> 50 Hz		
Continuous field:	<input checked="" type="checkbox"/> 1 A/m		
Duration (Continuous field):	<input checked="" type="checkbox"/> 60 s each Axis		
Short duration (1-3s):	<input checked="" type="checkbox"/> 3s		
Axis:	<input checked="" type="checkbox"/> x-axis	<input checked="" type="checkbox"/> y-axis	<input checked="" type="checkbox"/> z-axis

#### 5.10.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

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

### 5.11 Voltage dips

For test instruments and accessories used see section 6 part 6.11.

#### 5.11.1 Description of the test location

Test location :	Test location no. 2
Power supply:	DC 5V By Adapter
Test condition:	Ambient Temperature: 24°C, Humidity:46%
Date of test :	21~25 June 2018
Operator :	Eric

#### 5.11.2 Severity levels of voltage dips

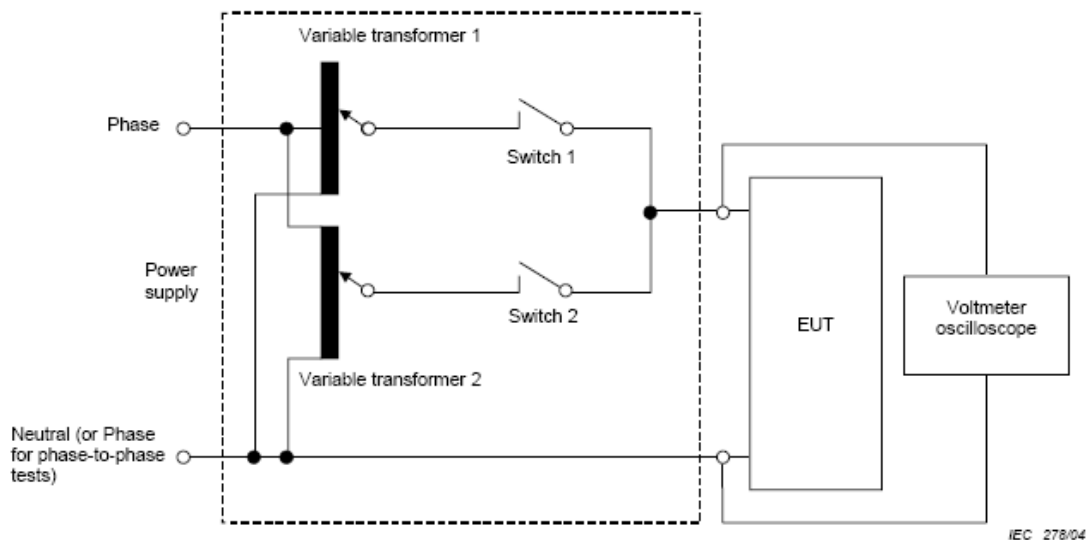
Test Level (%Ut)	Voltage Dips (%Ut)	Performance Criterion	Duration (in period)
0	100	B	0.5
70	30	C	25

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

##### 5.11.3.1 Operating Condition

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

##### 5.11.3.2 Block Diagram of Test Setup



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**5.11.4 Test specification:**

Nominal Mains Voltage ( $V_N$ ):	■ AC 230V
Number of voltage fluctuations:	■ 3
Level of reduction(dip) / duration:	■ 100 % / 20ms
Level of reduction(dip) / duration:	■ 30 % / 500ms

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



### 5.12 Voltage Short interruptions

For test instruments and accessories used see section 6 part 6.12.

#### 5.12.1 Description of the test location

Test location :	Test location no. 2
Power supply:	DC 5V By Adapter
Test condition:	Ambient Temperature: 24°C, Humidity:46%
Date of test :	21~25 June 2018
Operator :	Eric

#### 5.12.2 Severity levels of voltage short interruptions

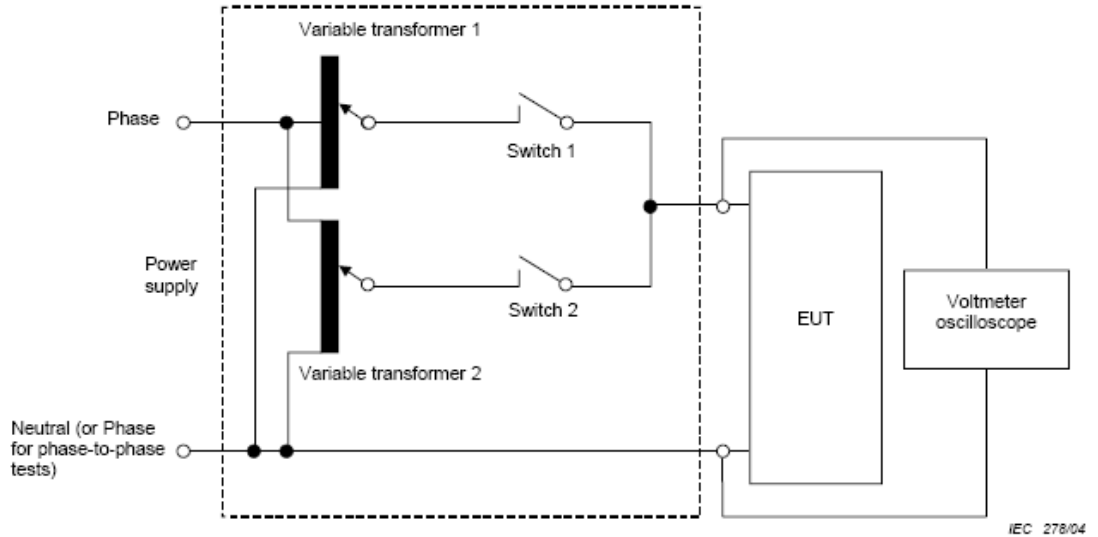
Test Level (%Ut)	Voltage Short Interruptions (%Ut)	Performance Criterion	Duration (in period)
0	100	C	250

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

##### 5.12.3.1 Operating Condition

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

##### 5.12.3.2 Block Diagram of Test Setup



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**5.12.4 Test specification:**

Nominal Mains Voltage ( $V_N$ ):	■ AC 230 V
Number of voltage fluctuations:	■ 3
Level of reduction(dip) / duration:	■ 5000 ms

**5.12.5 Test result**The requirements are **Fulfilled**Performance Criterion: **C****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	2018/03/20
2	EMI Test Receiver	ROHDE & SCHWARZ	ESVS 10	842885/001	2017/10/18
3	Log per Antenna	ETS	3142C	00060447	2018/03/20
4	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2018/03/20
5	Pre-Amplifier	EMC	EMC330	980113	2018/03/20
6	Pre-Amplifier	EMC	EMC012645	980114	2018/03/20
7	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	2017/10/18
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2017/10/18
3	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z6	100140	2017/10/18
4	Pulse Limiter	ROHDE & SCHWARZ	ESHS-Z2	100301	2017/10/18
5	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.3					
Harmonic Current					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	Harmonics1000-1P	103488	2017/10/18
2	Harmonics-1000	EMC Partner	N/A	N/A	N/A

6.4					
Voltage Fluctuation and Flicker					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	Harmonics1000-1P	103488	2017/10/18
2	Harmonics-1000	EMC Partner	N/A	N/A	N/A

6.5					
Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	Schlöder	SESD 230	106003	2018/03/20

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6.6					
RF Field Strength Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	ROHDE & SCHWARZ	SMY 01	843215/014	2017/10/18
2	Signal Generator	ROHDE & SCHWARZ	SML03	102986	2017/10/18
3	Amplifier	KALMUS	713FC	7385-1	2017/10/18
4	Power Meter	ROHDE & SCHWARZ	NRVS	842856/049	2017/10/18
5	Field Probe	ETS	HI-6005	00075047	2017/10/18
6	RS Test Software	Farad	EZ-RS	N/A	N/A

6.7					
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	2017/10/18
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2017/10/18
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2017/10/18
4	Genecs Software	EMC Partner	N/A	N/A	N/A

6.8					
Surge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2017/10/18
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2017/10/18
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2017/10/18
4	Genecs Software	EMC Partner	N/A	N/A	N/A

6.9					
Conducted Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	RF generator / amplifier	Schlöder	CDG 6000	HU906007	2017/10/18
2	CDN	Schlöder	CDN M3	A3003008	2017/10/18
3	CDN	Schlöde	CDN T2	A3010005	2017/10/18
4	Attenuator	Abschwächer	DC-500MHz	N/A	2017/10/18
5	EM injection clamp	Liithi	EM101	35670	2017/10/18
6	CDG-6000 Software	Schlöder	N/A	N/A	N/A

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## 6.10

## 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	2017/10/18

## 6.11

## Voltage Dips

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2017/10/18
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2017/10/18
3	GenecsSoftware	EMC Partner	N/A	N/A	N/A

## 6.12

## Voltage Short Interruptions

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2017/10/18
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2017/10/18
3	GenecsSoftware	EMC Partner	N/A	N/A	N/A

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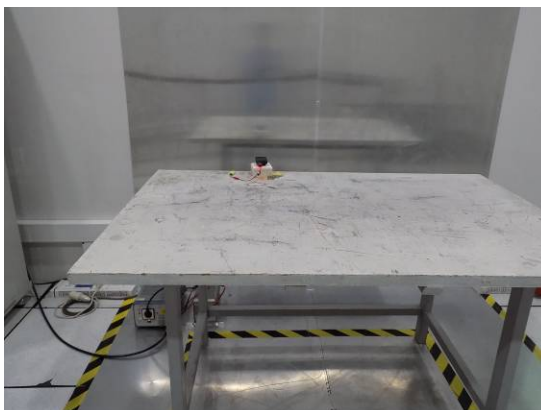
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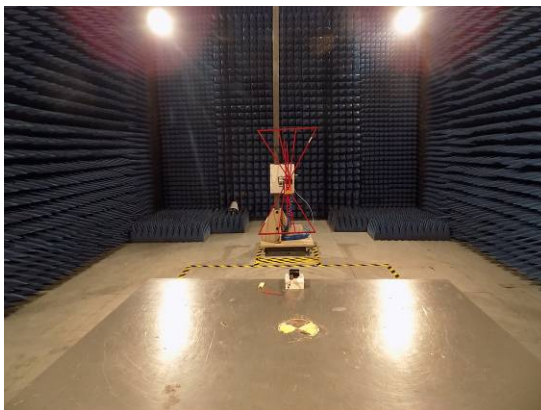
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## 7 TEST PHOTOGRAPHS

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 harmonic current and flicker emission measurement (H.&F.)



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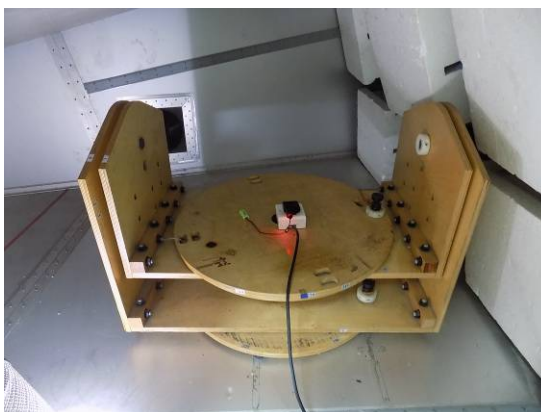
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**7.4. Photo of electrostatic discharge Immunity measurement (E.S.D.)**



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



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



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



**7.8. Photo of PFM field immunity measurement (P.F.M.F.)**



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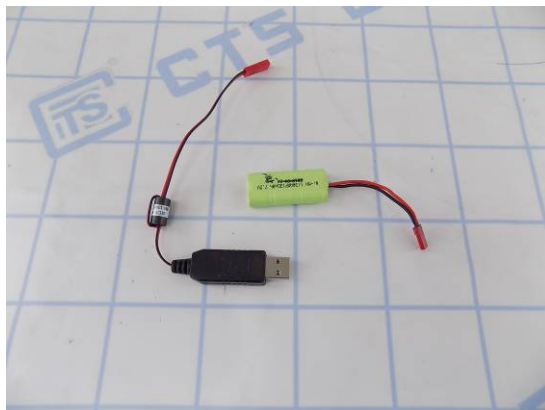
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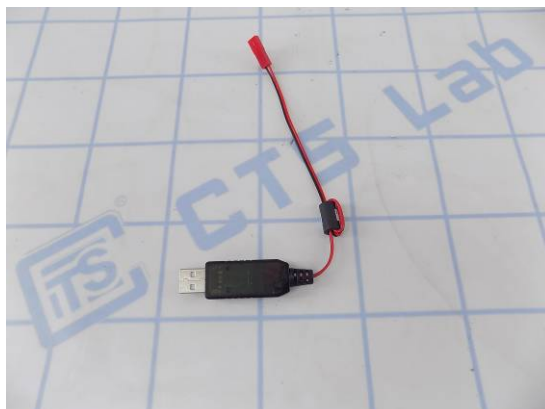
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## 8 EXTERNAL AND INTERNAL PHOTOS OF THE EUT



External view 1



External view 2



External view 3

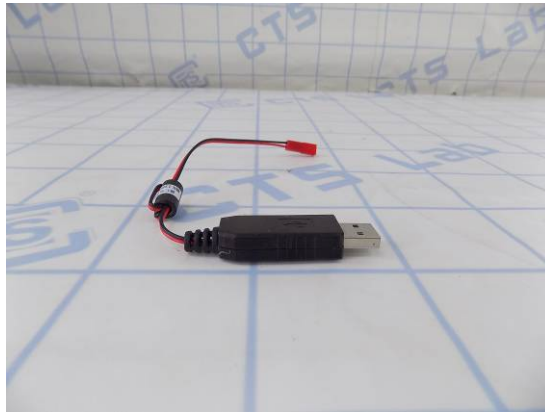
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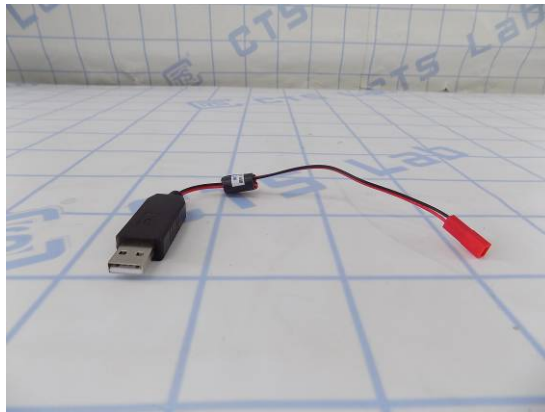
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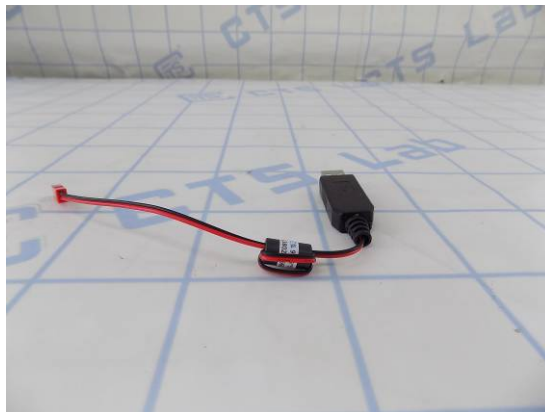
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External view 4



External view 5



External view 6

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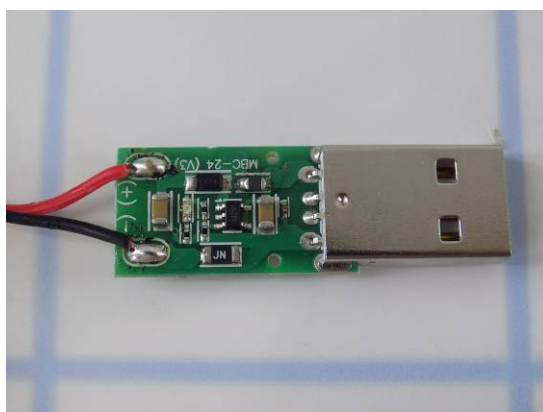
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**Battery**



**Internal view**



**PCB view 1**

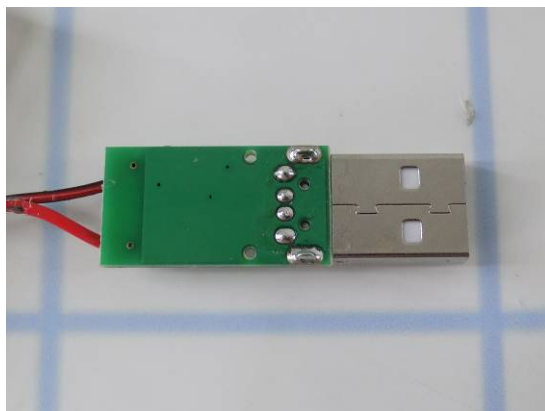
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PCB view 2

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## 9 Manufacturer/ Approval holder Declaration

The following identical model(s):

N/A

Belong to the tested device:

Product description: **USB Battery Charger**  
Model name: **MBC-24JST**

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