

# TECHNICAL REPORT



Report No.: EMC1811052

File reference No.: 2018-11-08

Applicant:

Product: Charging Cable

Brand Name: N/A

Model No.: MC23

Test Standards: EN 55032:2015  
EN61000-3-2:2014  
EN 55024: 2010+A1:2015  
EN 61000-3-3: 2013

Test result: The EMC testing has been performed on the submitted samples and found in compliance with council EMC Directive 2014/30/EU.

Approved By

Terry Tang  
Manager

Dated: November. 08, 2018

**Results appearing herein relate only to the sample tested**

**The technical reports is issued errors and omissions exempt and is subject to withdrawal at**

**SHENZHEN TIMEWAY TESTING LABORATORIES.**

**Room 512-519, 5/F., East Tower, Building 4, Anhua Industrial Zone,  
Futian District, Shenzhen, Guangdong China**

Tel (755) 83448688

Fax (755) 83442996

Email: info@timeway-lab.com



### **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

#### **CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

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## 1.0 General Details

### 1.1 Test Lab Details

SHENZHEN TIMEWAY TESTING LABORATORIES.

Room 512-519,5/F., East Tower,Building 4, Anhua Industrial Zone, Futian District,Shenzhen,  
Guangdong China

Tel(086) 755-83448688 Fax (086) 755-83442996

#### Test Location

**All tests were performed at:**

SHENZHEN TIMEWAY TESTING LABORATORIES.

Room 512-519,5/F., East Tower,Building 4, Anhua Industrial Zone, Futian District,Shenzhen,  
Guangdong China

Tel(086) 755-83448688 Fax (086) 755-83442996

No tests were sub-contracted.

### 1.2 Applicant Details

Applicant:

Address:

Telephone:

Fax: --

Manufacturer:

Address:

Telephone:

Fax: --

### 1.3 Description of EUT

Product: Charging Cable

Brand Name: N/A

Model Number: MC23

Adding Model Number: N/A

Rating: --

Remark: ---

### 1.4 Submitted Sample(s)

1 Sample

### 1.5 Test Duration

Date of Receipt of Test Item: November 05, 2018

Date of Test: November 05, 2018~ November 08, 2018

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1.6 Additional information of EUT

	Submitted	Not Available
User Manual	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Part List	<input type="checkbox"/>	<input type="checkbox"/>
Circuit Diagram	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Printed circuit board[PCB] Layout	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Block Diagram	<input type="checkbox"/>	<input type="checkbox"/>

1.7 Test Engineer

The sample(s) tested by

Print Name: Leo Lau/ Engineer



This test report is not valid without personnel's signatures of SHENZHEN TIMEWAY TESTING LABORATORIES

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## 2.0 List of Measurement Equipment

### 2.1 Conducted Emission Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EMI Test Receiver	ESH3	860905/006	RS	2018.06.11	1 Year
Spectrum Analyzer	ESA-L1500A	US37451154	HP	2018.06.11	1 Year
PULSE LIMITER	ESH3-Z2	100281	RS	2018.06.11	1 Year
LISN	ESH3-Z5	100294	RS	2018.06.11	1 Year
LISN	ESH3-Z5	100253	RS	2018.06.11	1 Year

### 2.2 Radiated Disturbance Test

Name	Model No	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EMI Test Receiver	ESVD	100008	RS	2018.06.11	1 Year
Coaxial Switch	MP59B	M70585	ANRITSU	N/A	N/A
Spectrum Analyzer	8595E	3441A00893	HP	2018.06.11	1 Year
Amplifier	8447D	2727A05017	HP	2018.06.11	1 Year
Bilog Antenna	VULB9163	9163/340	Schwarebeck	2018.06.11	1 Year

### 2.3 Harmonic & Flicker Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Harmonics Flicker Test System	PACS-1	72305	CI	2018.06.11	1 Year
5K VA AC Power Source	5001iX	56060	CI	2018.06.11	N/A

### 2.4 ESD Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
ESD Simulator	DITO	0404-24	EM TEST	2018.06.11	1 Year

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## 2.5 RF field Strength Susceptibility

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Signal Generator	SMT03	100059	RS	2018.06.11	1 Year
Power Meter	NRVS	---	RS	2018.06.11	1 Year
Voltage Probe	URV5-Z2	100012	RS	2018.06.11	1 Year
Voltage Probe	URV5-Z2	100013	RS	2018.06.11	1 Year
Power Amplifier	150W1000	300999	AR	2018.06.11	1 Year
Power Amplifier	25S1G4AM1	305993	AR	2018.06.11	1 Year
Field Probe	CBL6111C	2576	Holaday	2018.06.11	1 Year
Bilog Antenna	MCDC	---	Chase	2018.06.11	1 Year

## 2.6 Electrical Fast Transient/Burst (EFT/B) Immunity test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EFT Generator	UCS 500 M4	0304-42	EM TEST	2018.06.11	1 Year
Power Source	MV2616	0104-14	EM TEST	2018.06.11	1 Year

## 2.7 Surge Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Ultra Compact Simulator	UCS 500 M4	0304-42	EM TEST	2018.06.11	1 Year
Power Source	MV2616	0104-14	EM TEST	2018.06.11	1 Year

## 2.8 Conducted Immunity Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Continuous Wave Simulator	CWS 500C	0407-05	EM TEST	2018.06.11	1 Year

## 2.9 Power-frequency Magnetic Field

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Continuous Wave Simulator	UCS 500 M4	0304-42	EM TEST	2018.06.11	1 Year
Power Source Network	MV 2616	0104-14	EM TEST	2018.06.11	1 Year
Current Transformer	MC2630	--	EM TEST	2018.06.11	1 Year

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Magnetic Coil	MS100	0304-42	EM TEST	2018.06.11	1 Year
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#### 2.10 Voltage Dips/Interruption Immunity Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Ultra Compact Simulator	UCS 500 M4	0304-42	EM TEST	2018.06.11	1Year
Power Source	MV2616	0104-14	EM TEST	2018.06.11	1Year

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### 3.0 Technical Details

#### 3.1 Investigations Requested

Perform Electromagnetic Interference [EMI] & Electromagnetic Susceptibility[ EMS]  
tests for CE Marking

#### 3.2 Test Standards

Test Standards	
EN 55032:2015	Electromagnetic compatibility of multimedia equipment - Emission Requirements
EN61000-3-2:2014	Electromagnetic compatibility(EMC)- Part 3-2:Limits-Limits for harmonic current emissions(equipment input current $\leq 16A$ 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 $\leq 16A$ per phase and not subject to conditional connection
EN 55024:2010+A1:2015	Information technology equipment — Immunity characteristics — Limits and methods of measurement
	EN 61000-4-2:2009
	Electrostatic discharge
	EN 61000-4-3:2006
	RF field strength susceptibility
	EN 61000-4-4:2012
	Electrical Fast transients
	EN 61000-4-5:2014
	Surge
	EN 61000-4-6:2009
	Conducted susceptibility
	EN 61000-4-8:2010
	Power-frequency Magnetic Field
	EN 61000-4-11:2004
	Dips/Voltage Interruption Variation

#### 3.3 Performance Criteria

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

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### 3.4 Test standards and Results Summary Tables

Test Condition	Test Requirement	Test Method	Test Result
<b>EMISSION Results Summary</b>			
Conducted Emission on AC Mains, 150kHz to 30MHz	EN 55032:2015	EN 55032:2015	Pass
Conducted Emission on at telecommunication ports, 150KHz to 30MHz	EN 55032:2015	EN 55032:2015	N/A
Radiated Emissions, 30MHz to 1GHz	EN 55032:2015	EN 55032:2015	Pass
Harmonic Emissions on AC supply	EN61000-3-2:2014	EN61000-3-2:2014	N/A
Voltage fluctuations on AC supply	EN 61000-3-3: 2013	EN 61000-3-3: 2013	N/A
<b>IMMUNITY Results Summary</b>			
Electrostatic Discharge	EN 55024: 2010+A1:2015	EN 61000-4-2: 2009	Pass
Electrical Fast transients /Burst Immunity	EN 55024: 2010+A1:2015	EN 61000-4-4: 2012	Pass
RF field strength susceptibility	EN 55024: 2010+A1:2015	EN 61000-4-3: 2006	Pass
Surge	EN 55024: 2010+A1:2015	EN 61000-4-5: 2014	Pass
Conducted susceptibility	EN 55024: 2010+A1:2015	EN 61000-4-6: 2009	Pass
Power-frequency Magnetic Field	EN 55024: 2010+A1:2015	EN61000-4-8: 2010	N/A
Dips/Voltage Interruption Variation	EN 55024: 2010+A1:2015	EN 61000-4-11: 2004	Pass

**Note: N/A-Not applicable**

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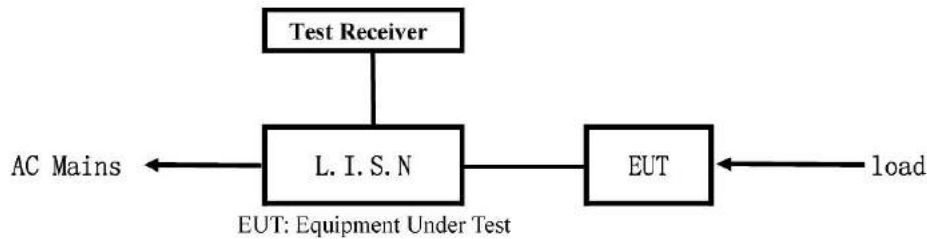
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4.0 Electromagnetic Interference Test results

4.1 Power line Conducted Emission Test

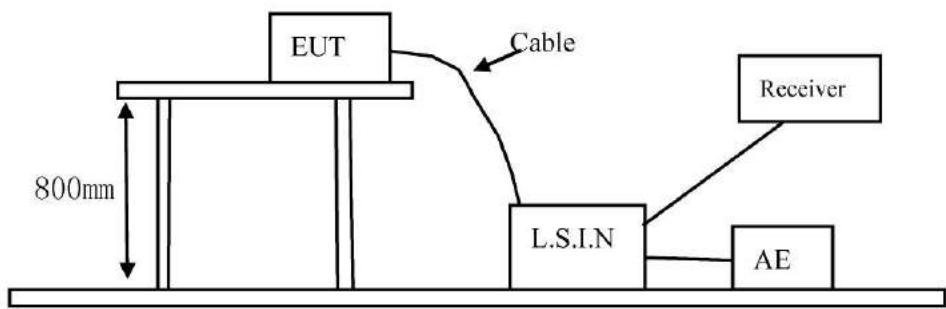
4.1.1 Schematics of the test



4.1.2 Test Method:

The test was performed in accordance with EN 55032:2015

Block diagram of Test setup



4.1.3 Power line conducted Emission Limit

Frequency(MHz)	Limits dB( $\mu$ V)			
	Class A Equipment		Class B Equipment	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

- Notes:
- 1. \*decreasing linearly with logarithm of frequency.
  - 2. The lower limit shall apply at the transition frequencies

4.1.4 Test Results

Limits for Conducted Emission test, Please refer to limit line (Quasi-peak)and Average in the following diagram labelled as (QP)&AV

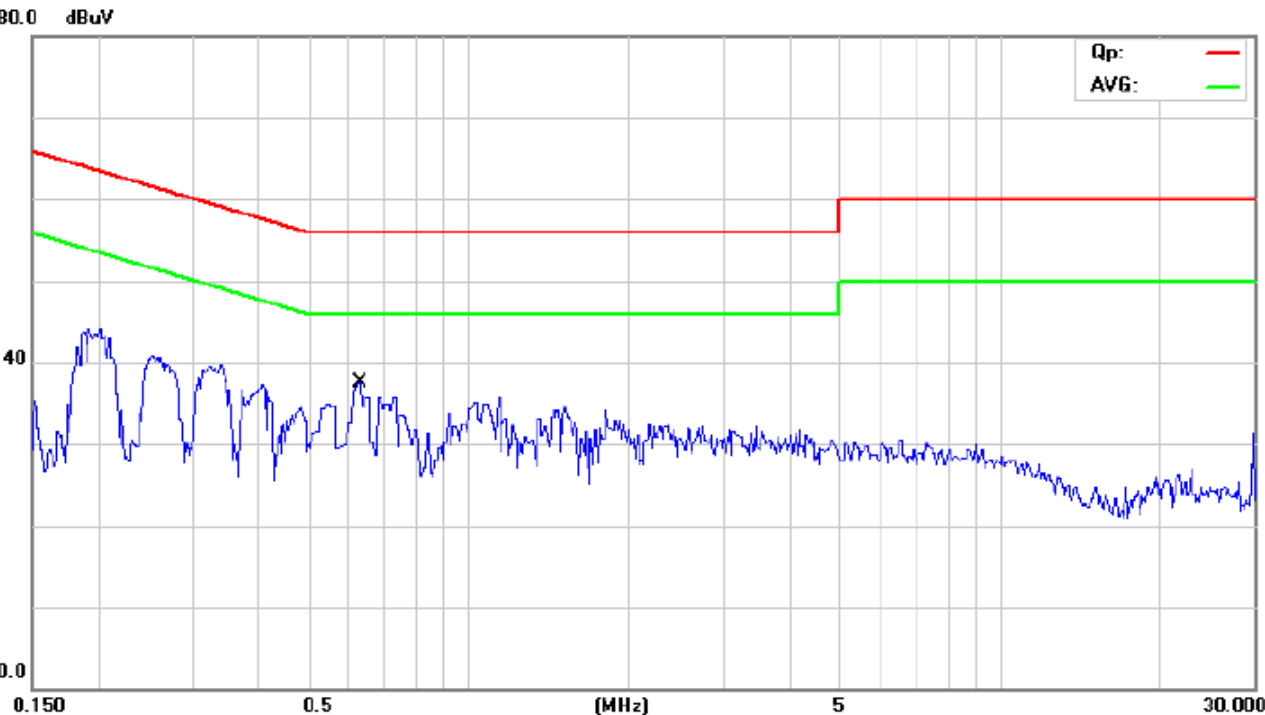
Remark:

Calculated measurement uncertainty=3.6dB

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**A: Conducted Emission on Live Terminal (150kHz to 30MHz)**  
**EUT Operating Environment**  
Temperature: 26℃      Humidity: 65%RH      Atmospheric Pressure: 101 kPa  
**EUT set Condition: Charging**  
**Equipment Level: Class B**  
**Results: Pass**  
Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.6240	22.40	10.43	32.83	56.00	-23.17	QP	
2		0.6240	-1.90	10.43	8.53	46.00	-37.47	AVG	

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**B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

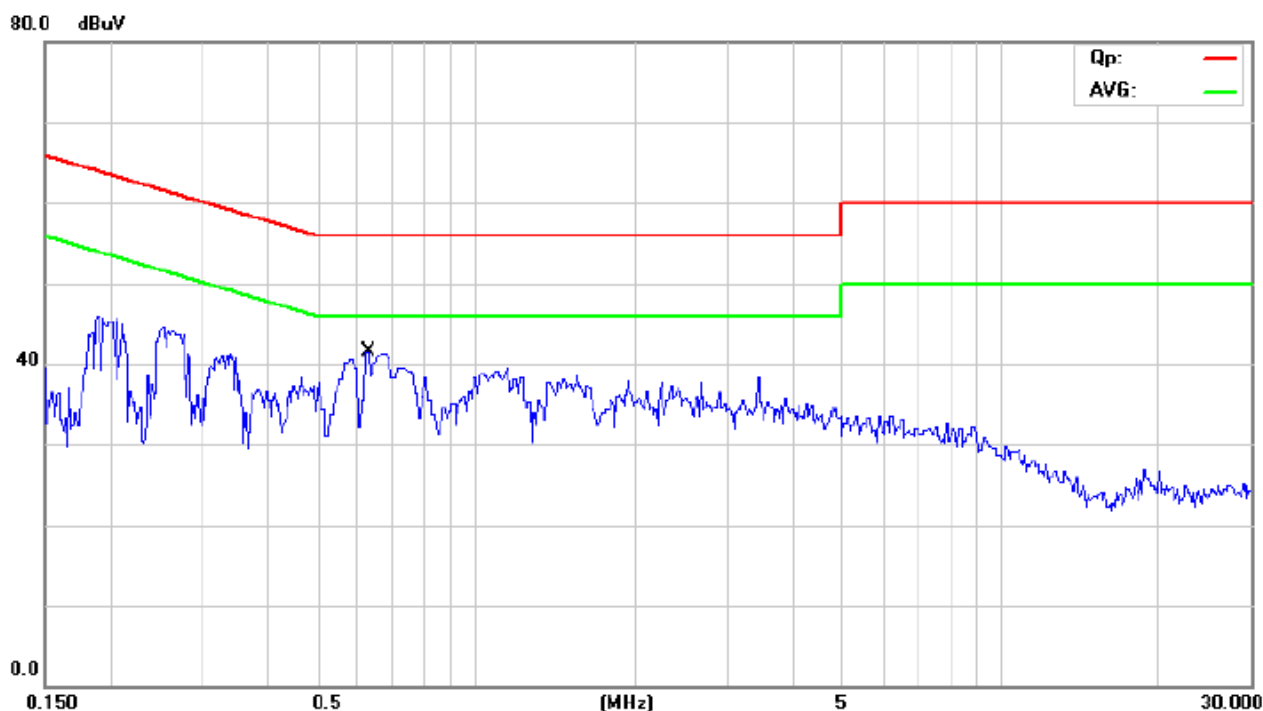
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

**EUT set Condition: Charging**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.6251	27.40	10.43	37.83	56.00	-18.17	QP	
2		0.6251	1.40	10.43	11.83	46.00	-34.17	AVG	

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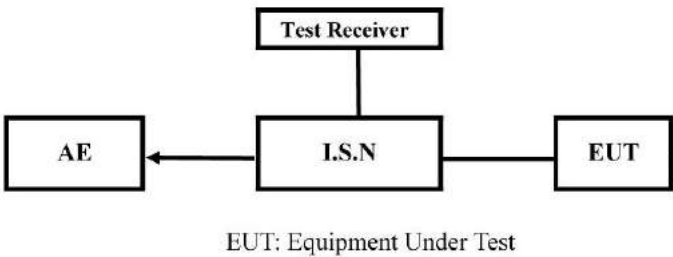
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4.2 Telecommunication ports Conducted Emission Test

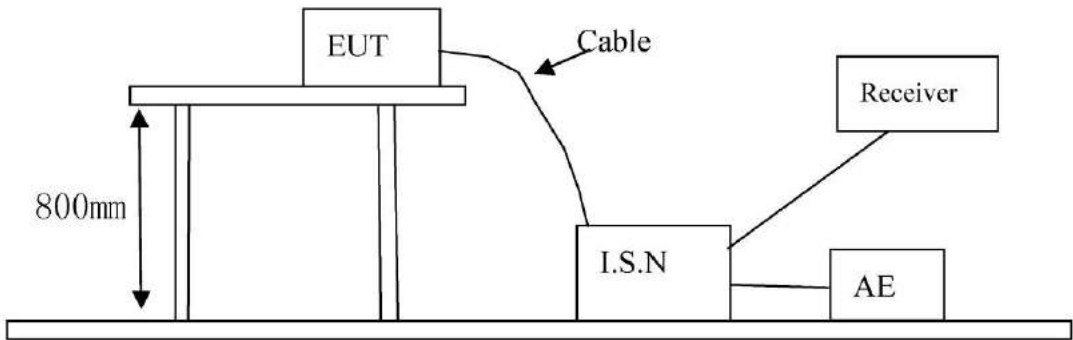
4.2.1 Schematics of the test



4.2.2 Test Method:

The test was performed in accordance with EN 55032:2015

Block diagram of Test setup



4.2.3 Telecommunication ports conducted Emission Limit

Frequency(MHz)	Class A Limits				Class B Limits			
	Quasi-peak Level		Average Level		Quasi-peak Level		Average Level	
	Voltage dB(uV)	Current dB(uA)	Voltage dB(uV)	Current dB(uA)	Voltage dB(uV)	Current dB(uA)	Voltage dB(uV)	Current dB(uA)
0.15 ~ 0.50	97 to 87	53 to 43	84 to 74	40 to 30	84 to 74	40 to 30	74 to 64	30 to 20
0.50 ~ 30.00	87	43	74	30	74	30	64	20

- Notes: 1. \*decreasing linearly with logarithm of frequency.  
2. The tighter limit shall apply at the transition frequencies

4.2.4 Test Results

Limits for Conducted Emission test, Please refer to limit line (Quasi-peak)and Average in the following diagram labelled as (QP)&AV

Remark:

Calculated measurement uncertainty=1.9dB

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Report No.: EMC1811052  
Date: 2018-11-08



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**A: Conducted Emission on Telecommunication port (150kHz to 30MHz)**

**EUT Operating Environment**

Temperature: 25°C      Humidity: 75 %RH      Atmospheric Pressure: 101 kPa

**EUT set Condition: Normal operation mode**

**Equipment Level: Class B**

**Results: N/A**

Please refer to following diagram for individual

Frequency (MHz)	Port	Reading(dBμV)		Limit(dBμV)	
		Quasi-peak	Average	Quasi-peak	Average
--	LAN	--	--	--	--
--	LAN	--	--	--	--

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**B: Conducted Emission on Telecommunication port (150kHz to 30MHz)**

**EUT Operating Environment**

Temperature: 25°C      Humidity: 75 %RH      Atmospheric Pressure: 101 kPa

**EUT set Condition: Normal operation mode**

**Equipment Level: ClassB**

**Results: N/A**

Please refer to following diagram for individual

Frequency (MHz)	Port	Reading(dBμA)		Limit(dBμA)	
		Quasi-peak	Average	Quasi-peak	Average
--	LAN	--	--	--	--

Note: No such port, not applicable.

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#### 4.3 Radiated Disturbance Test

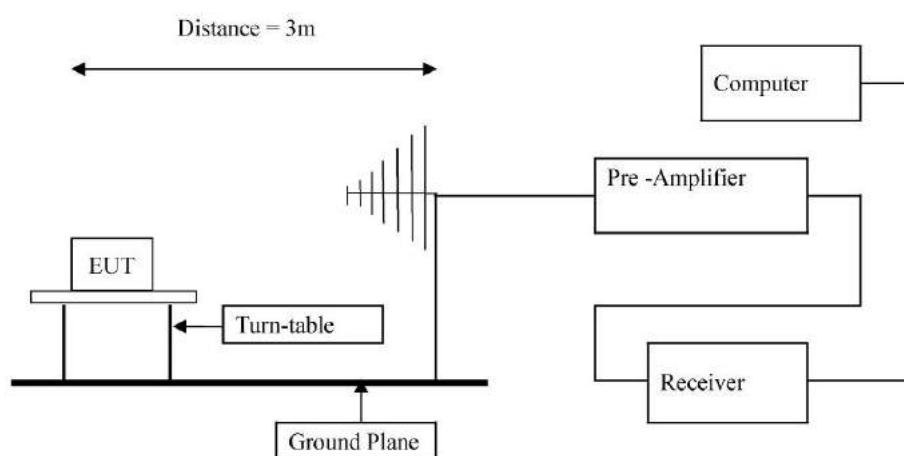
##### 4.3.1 Schematics of the test



##### 4.3.2 Test Method:

The test was performed in accordance with EN 55032:2015

##### Block diagram of Test setup



##### 4.3.3 Radiated Disturbance Test Limit

Frequency Range (MHz)	Quasi-Peak limits (dB $\mu$ V/m)	
	Class A Limits	Class B Limits
30-230	50.00	40.00
230-1000	57.00	47.00

Note: The lower limit shall apply at the transition frequencies

##### 4.3.4 Test result

Limits for Radiated Disturbance test, Please refer to limit line (Quasi-peak) in the following diagram labelled as (QP)

##### Remark:

Calculated measurement uncertainty=4.7dB

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**A: Radiated Disturbance (30MHz----1000MHz)**

**EUT Operating Environment**

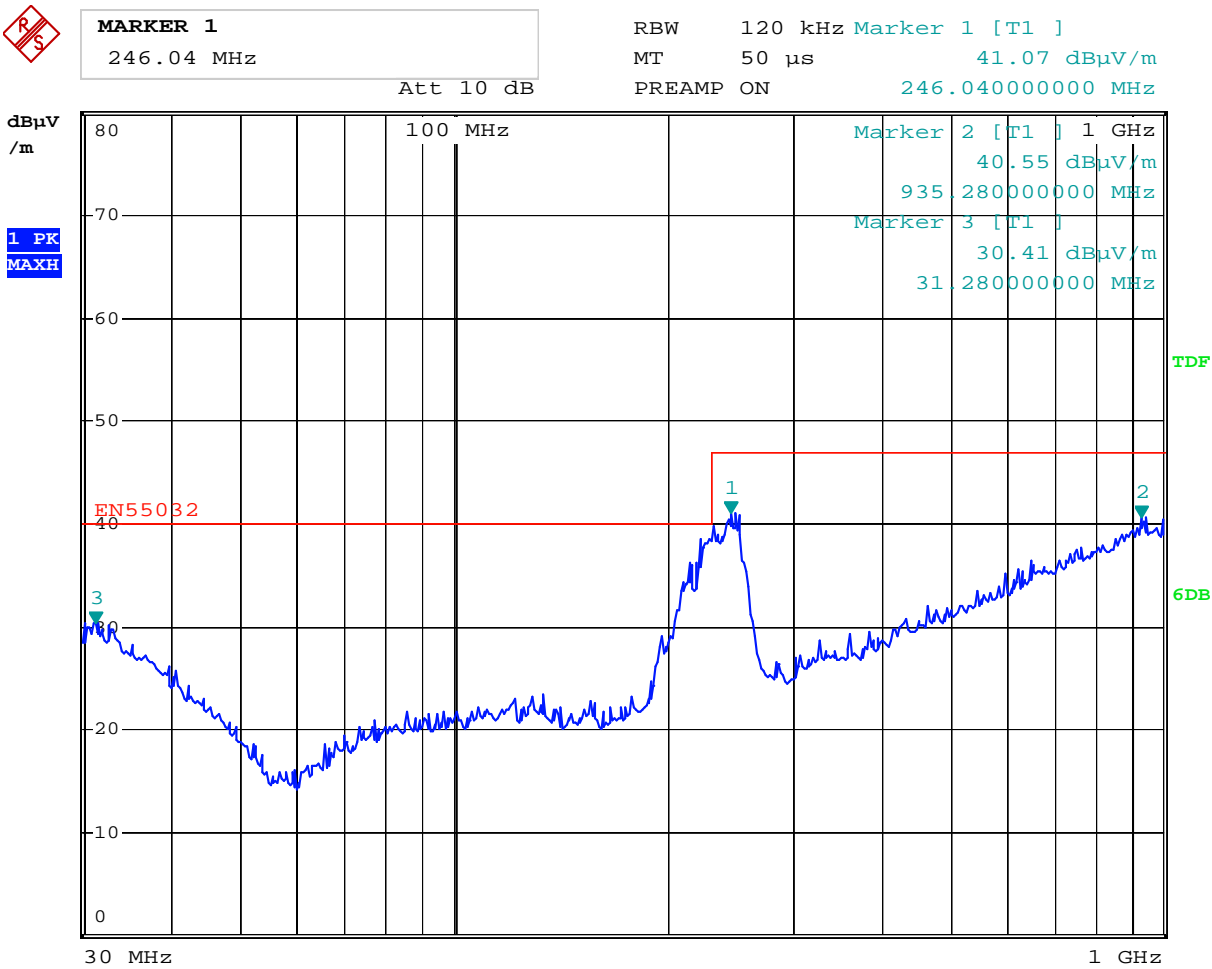
Temperature: 25℃      Humidity: 55%RH      Atmospheric Pressure: 101 kPa

**EUT set Condition: Charging**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



Date: 07.Nov.2018 15:06:36

Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
246.040	41.07	H	47.00
935.280	40.55	H	47.00
31.280	30.41	H	40.00

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**B: Radiated Disturbance (30MHz----1000MHz)**

**EUT Operating Environment**

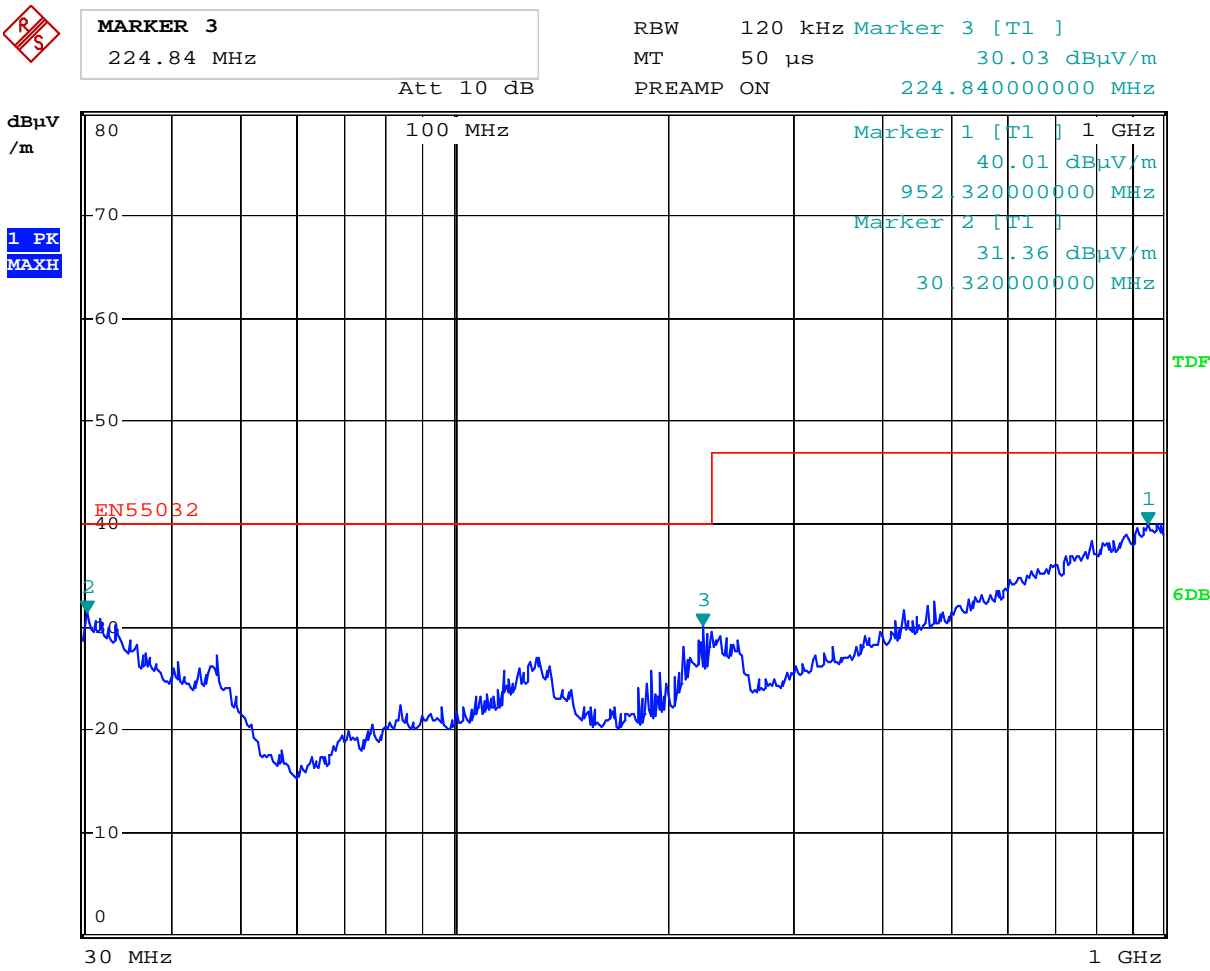
Temperature: 25℃      Humidity: 55%RH      Atmospheric Pressure: 101 kPa

**EUT set Condition: Charging**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



Date: 07.Nov.2018 15:09:23

Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
224.840	30.03	V	40.00
952.320	40.01	V	47.00
30.320	31.36	V	40.00

Note: Pre-scanning with PK detector and final measurement with QP detector

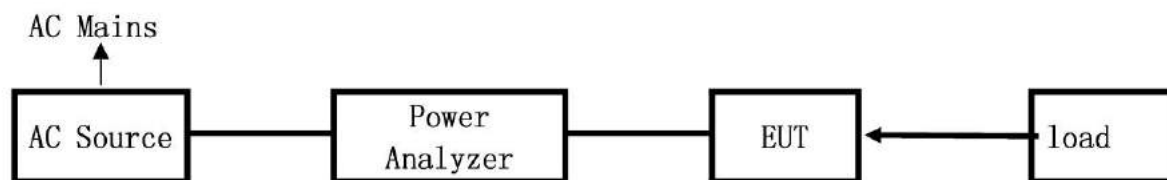
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#### 4.4 Harmonic Current Emission Test

##### 4.4.1 Schematic of the test



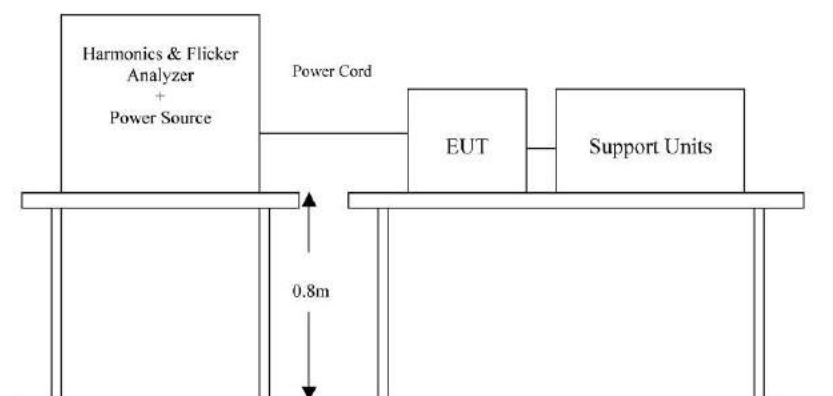
EUT: Equipment Under Test

##### 4.4.2 Test Method:

The test was performed in accordance with EN61000-3-2:2014

\*: The Level of the product is : CLASS D

##### Block diagram of Test setup



##### 4.4.3 Limits of Harmonic Current Emission For Class A

Harmonic order n	Maximum permissible harmonic current A
<b>Odd harmonics</b>	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
<b>Even harmonics</b>	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

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#### 4.4.4 Test Results

Please refer to the following pages

##### Harmonic Current Emission Test

##### EUT Operating Environment

Temperature: 25°C      Humidity: 53%RH      Atmospheric Pressure: 101 Kpa

##### EUT set Condition:

Results: N/A

Please refer to following diagram for individual

Harmonic results as a% of the limits

No	(Test result/Limit)%	No	(Test result/Limit)%	No	(Test result/Limit)%	No	(Test result/Limit)%
1		11		21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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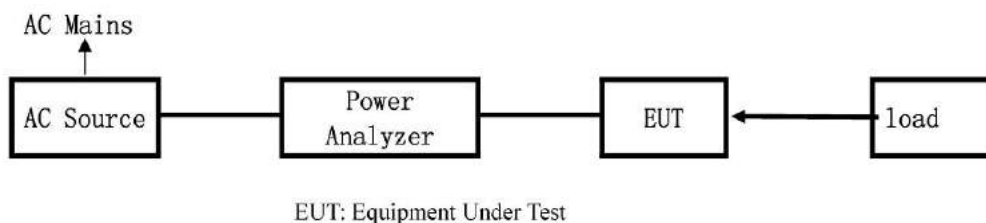
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#### 4.5 Voltage Fluctuations & Flicker Test

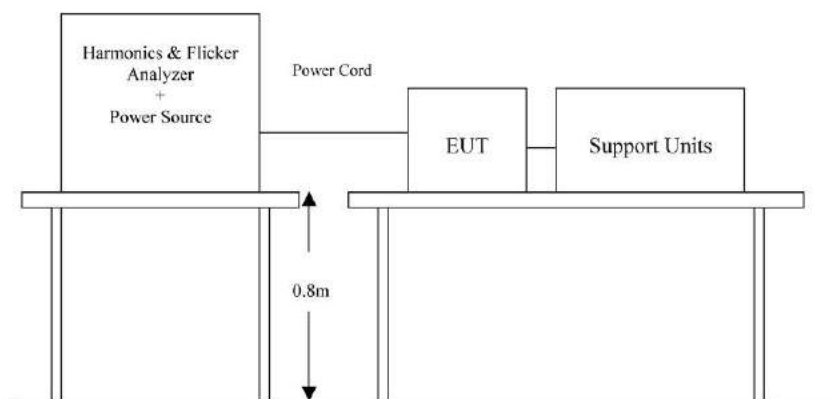
##### 4.5.1 Schematic of the test



##### 4.5.2 Test Method:

The test was performed in accordance with EN 61000-3-3:2013

##### Block diagram of Test setup



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#### 4.5.3 Test Results

Result: N/A

Please refer to following diagram for individual

Maximum Occurring Levels:

Ut: 230.1 (EUT Test RMS Voltage)

Pst:	Limit=	1.0	(The Highest short Term Flicker Value)
Plt:	Limit=	0.65	(The Highest Long Term Flicker Value)
dt(%):	Limit=	3.3%	(The Highest instantaneous Voltage Change (10ms))
dc(%):	Limit=	3.3%	(The highest Relative steady state voltage change (1sec))
dmax:	Limit=	4%	(The highest Max Relative voltage change)
Tdt:	Limit=	500ms	( The Max Time(in milli-sec) that dt exceeds 3%)

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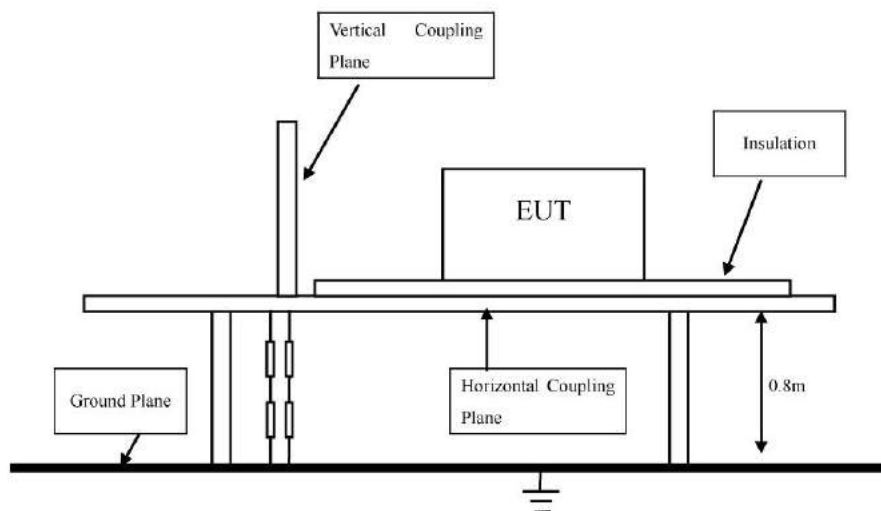
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## 5.0 Immunity Test

### 5.1 Electrostatic Discharge

#### 5.1.1 Schematic of the test



#### 5.1.2 Test method

The test was performed in accordance with EN 61000-4-2: 2009

#### 5.1.3 Test severity

$\pm 4\text{Kv}$  for direct & in-direct Contact Discharge

$\pm 8\text{Kv}$  for air Discharge

Performance Criterion Require: **B** (Please see following table)

#### 5.1.4 Susceptibility performance Criteria and Severity level

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

#### Severity Level

Level	Test Voltage Direct & in-direct contact Discharge (Kv)	Test Voltage Air discharge(Kv)
1	$\pm 2\text{Kv}$	$\pm 2\text{Kv}$
2	$\pm 4\text{Kv}$	$\pm 4\text{Kv}$
3	$\pm 6\text{Kv}$	$\pm 8\text{Kv}$
4	$\pm 8\text{Kv}$	$\pm 15\text{Kv}$

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### 5.1.5 Test Result

#### EUT Operating Environment

Temperature: 25°C      Humidity: 53%RH      Atmospheric Pressure: 101 Kpa

Please refer to the following table for individual results.

Location	Discharge Method	Test Voltage	Results
HCP	In-Direct	$\pm 2\text{kV}, \pm 4\text{kV}$	Pass
VCP	In-Direct	$\pm 2\text{kV}, \pm 4\text{kV}$	Pass
Screw	Contact Discharge	$\pm 2\text{kV}, \pm 4\text{kV}$	Pass
Function key	Air Discharge	$\pm 2\text{kV}, \pm 4\text{kV}, \pm 8\text{kV}$	Pass
Gap	Air Discharge	$\pm 2\text{kV}, \pm 4\text{kV}, \pm 8\text{kV}$	Pass
Enclosure	Air Discharge	$\pm 2\text{kV}, \pm 4\text{kV}, \pm 8\text{kV}$	Pass
Cable	Air Discharge	$\pm 2\text{kV}, \pm 4\text{kV}, \pm 8\text{kV}$	Pass
Near USB port	Air Discharge	$\pm 2\text{kV}, \pm 4\text{kV}, \pm 8\text{kV}$	Pass

**Remark:** Calculated measurement uncertainty= 0.2kV

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## 5.2 RF field strength susceptibility (80MHz----- 1000MHz)

### 5.2.1 Schematics of the test



### 5.2.2 Test Method:

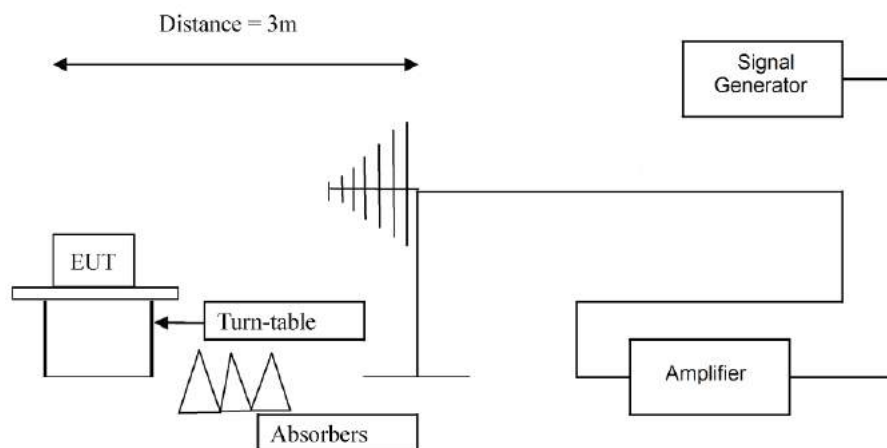
The test was performed in accordance with EN 61000-4-3:2006

Severity: Level 2 (3V/m)

Modulation: 80% AM

Performance Criterion Require: A (Please see following table)

#### Block diagram of Test setup



### 5.2.3 Susceptibility performance Criteria and severity Level

#### Susceptibility performance Criteria

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

#### Severity Level

Level	Field Strength (V/m)
1	1
2	3
3	10

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#### 5.2.4 Test Result:

##### EUT Operating Environment

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 kPa

Please refer to the following table for individual results.

Frequency (MHz)	Face	Polarity	Level (V/m)	Dwell Time(s)	Sweep Rate (%)	Results
80-1000	0°	Horizontal	3	1	1	Pass
80-1000	90°	Horizontal	3	1	1	Pass
80-1000	180°	Horizontal	3	1	1	Pass
80-1000	270°	Horizontal	3	1	1	Pass
80-1000	0°	Vertical	3	1	1	Pass
80-1000	90°	Vertical	3	1	1	Pass
80-1000	180°	Vertical	3	1	1	Pass
80-1000	270°	Vertical	3	1	1	Pass

**Remark:** Calculated measurement uncertainty= 80MHz to 1000MHz (+3.7/ -1.3) V/m

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### 5.3 Electrical Fast Transient/Burst (EFT/B) immunity test

#### 5.3.1 Schematics of the test



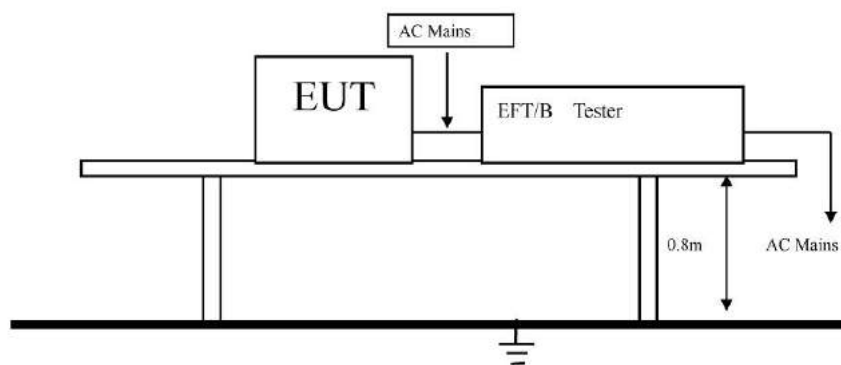
#### 5.3.2 Test Method

The test was performed in accordance with EN 61000-4-4:2012

Severity: Level 2 (1kV)

Performance Criterion Require: **B** (Please see following table)

#### Block diagram of Test setup



#### 5.3.3 Susceptibility performance Criteria and Severity Level

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

#### Severity Level

Open Circuit output Test Voltage $\pm 10\%$		
Level	On power Supply Lines	On I/O (Input/output) Signal data and control lines
1	0.5kV	0.5kV
2	1kV	1kV
3	2kV	2kV
4	4kV	4kV
X	Special	Special

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#### 5.3.4 Test Results

##### EUT Operating Environment

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 kPa

Please refer to following page.

Inject location: AC mains

Inject Line	Voltage kV	Inject Times (s)	Method	Results
L	$\pm 1$	120	Direct	Pass
N	$\pm 1$	120	Direct	Pass
L-N	$\pm 1$	120	Direct	Pass

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5.4 Surge test

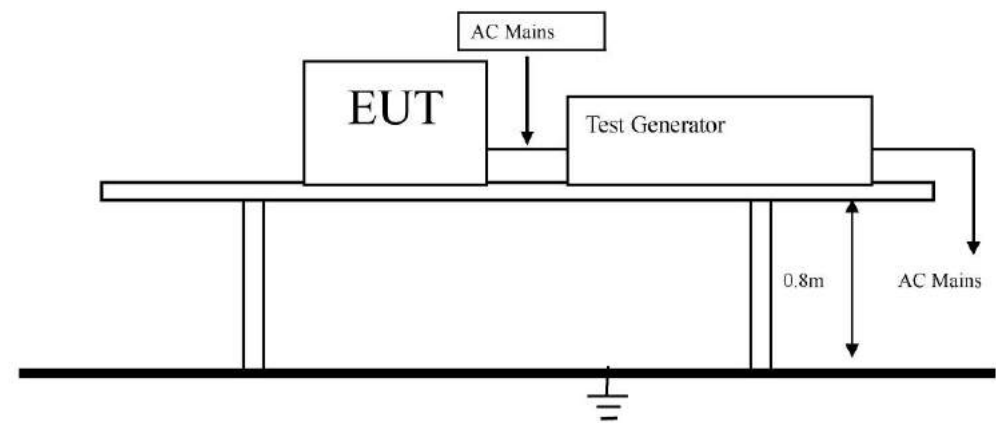
5.4.1 Schematics of the test



5.4.2 Test Method:

The test was performed in accordance with EN 61000-4-5:2014  
Severity: Level 2 (Line to Neutral at 1kV)  
Performance Criterion Require: B (Please see following table)

Block diagram of Test setup



5.4.3 Susceptibility performance Criteria and Severity Level

Susceptibility performance Criteria

Criterion	Description
A	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
B	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
C	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

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#### Severity Level

Severity Level	Open-Circuit Test Voltage kV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

#### 5.4.4 Test Results

##### EUT Operating Environment

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 kPa

Please refer to following page.

Test location:

Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage(kV)	Results
L-N	±	0	5	1.0	Pass
	±	90	5	1.0	Pass
	±	180	5	1.0	Pass
	±	270	5	1.0	Pass

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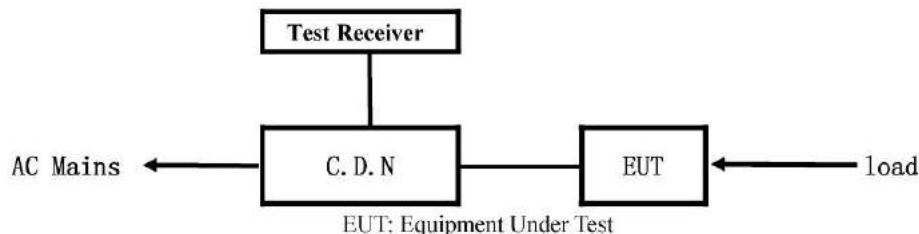
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## 5.5 Conducted Immunity test

### 5.5.1 Schematics of the test



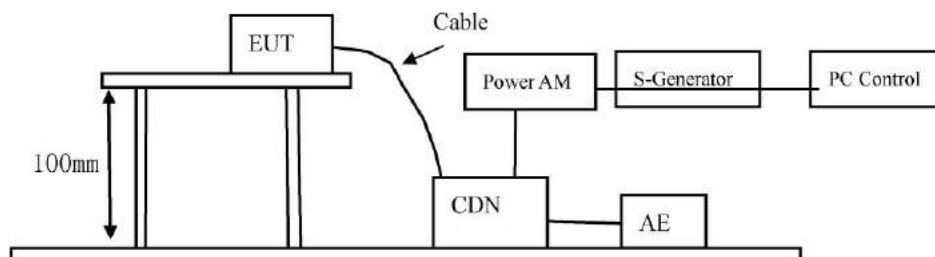
### 5.5.2 Test Method

The test was performed in accordance with EN 61000-4-6:2009

Severity: Level 2 (3 V rms), 0.15MHz—80MHz

Performance Criterion Require: A (Please see following table)

#### Block diagram of Test setup



### 5.5.3 Susceptibility performance Criteria and Severity Level

#### Susceptibility performance Criteria

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

#### Severity Level

Severity Level	Voltage Level (e.m.f) V
1	1
2	3
3	10
*	Special

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#### 5.5.4 Test Results:

##### EUT Operating Environment

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 kPa

Please refer to the following page

Frequency Range (MHz)	Injected Position	Strength	Criterion	Observation	Result
0.15 - 20	AC Line	3V (rms) Unmodulated	A	A	Pass
20 - 80	AC Line	3V (rms) Unmodulated	A	A	Pass

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## 5.6 Power-Frequency magnetic field test

### 5.6.1 Schematics of the test



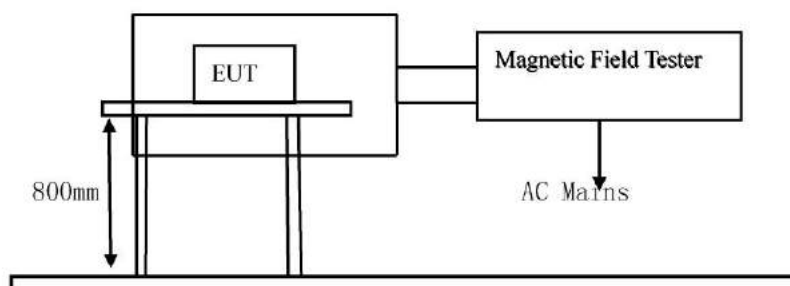
### 5.6.2 Test Method

The test was performed in accordance with EN 61000-4-8:2010

Severity: Level 1 (1A/m),

Performance Criterion Require: A (Please see following table)

#### Block diagram of Test setup



### 5.6.3 Susceptibility performance Criteria and Severity Level

#### Susceptibility performance Criteria

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

#### Severity Level

Severity Level	Magnetic Field Strength A/m
1	1
2	3
3	10
4	30
5	100
*	Special

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#### 5.6.4 Test Results:

##### EUT Operating Environment

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 kPa

Please refer to the following page

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

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5.7 Voltage Dips/Interruptions immunity test

5.7.1 Schematics of the test

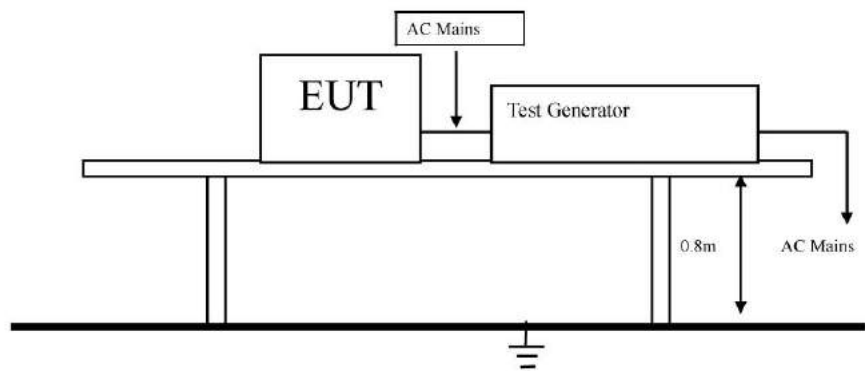


5.7.2 Test Method:

The test was performed in accordance with EN 61000-4-11:2004

Performance Criterion Require: C&B (Please see following table)

Block diagram of Test setup



5.7.3 Susceptibility performance Criteria and Severity Level

Susceptibility performance Criteria

Criterion	Description
A	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
B	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
C	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

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#### Severity Level

Voltage Dip	Test Level %Ut	Reduction	Duration (Periods)	Performance Criteria
	<5	>95	0.5	B
	70	30	25	C
Voltage Interceptions	Test Level %Ut	Reduction	Duration (Periods)	Performance Criteria
	<5	>95	250	C

#### 5.7.4 Test Result:

##### EUT Operating Environment

Temperature: 25°C Humidity: 75%RH Atmospheric Pressure: 101 kPa

Please refer to the following page

Voltage Dip:

Test Level % Ut	Reduction	Duration (periods)	Phase Angle	Meet Criterion	Result
0	100	0.5	0° - 360°	A	Pass
70	30	25	0° - 360°	A	Pass

Voltage Interceptions:

Test Level % Ut	Reduction	Duration (periods)	Phase Angle	Meet Criterion	Result
0	100	250	0° - 360°	B	Pass

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## 6.0 Product Labelling

### 6.1 CE Mark label specification

Text of the mark is black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.



### 6.2 Mark Location: Rear enclosure

The report refers only to the sample tested and does not apply to the bulk.

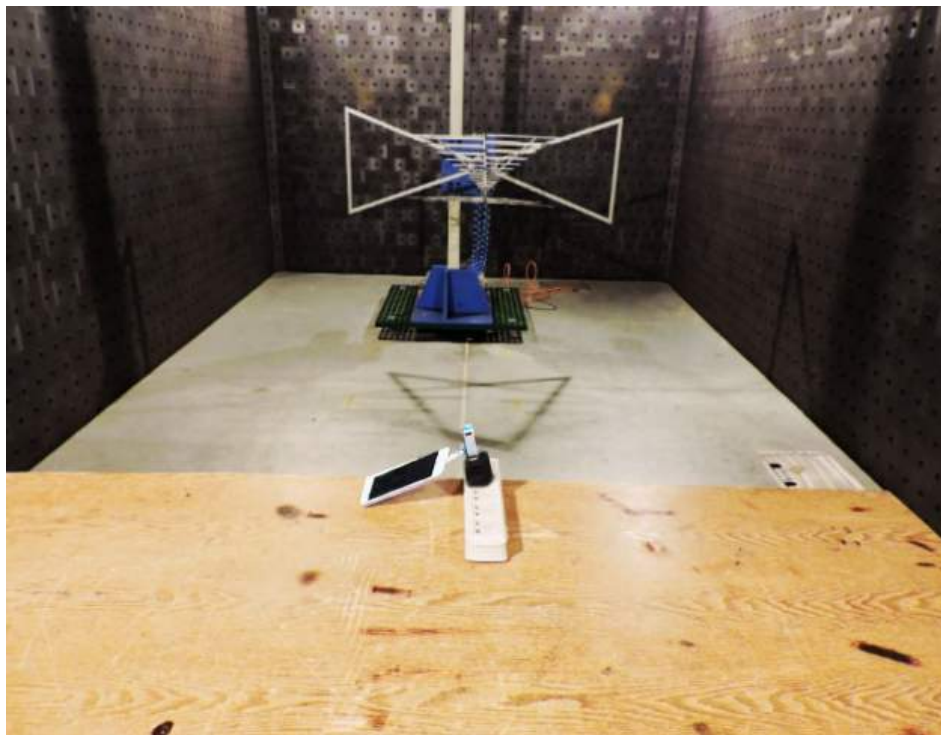
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## 7.0 Photo of testing



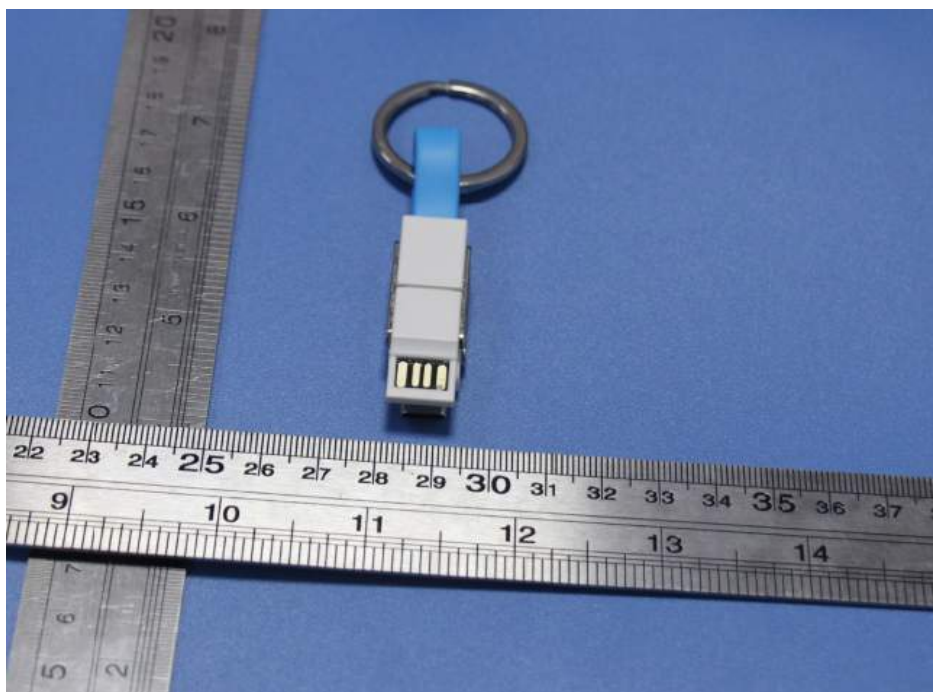
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Photo for the EUT



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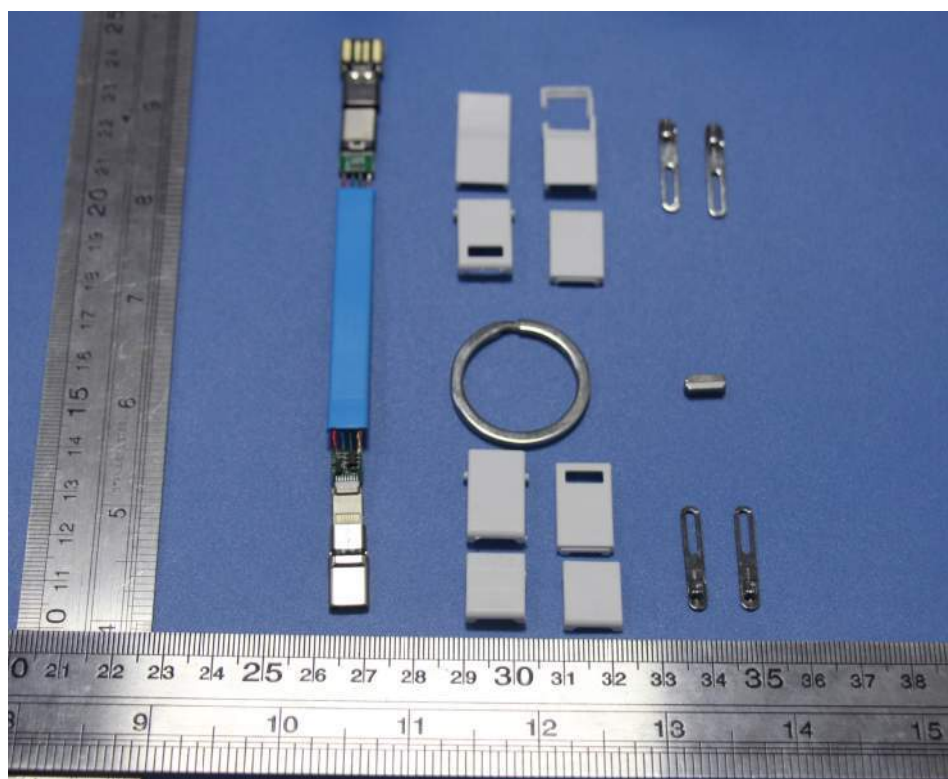
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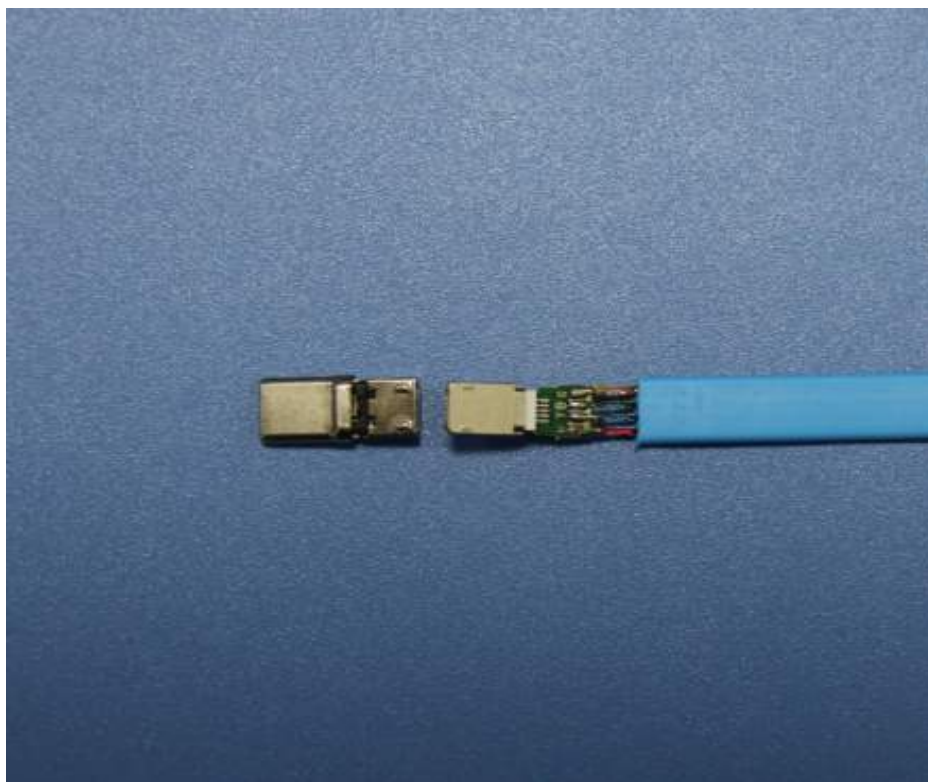
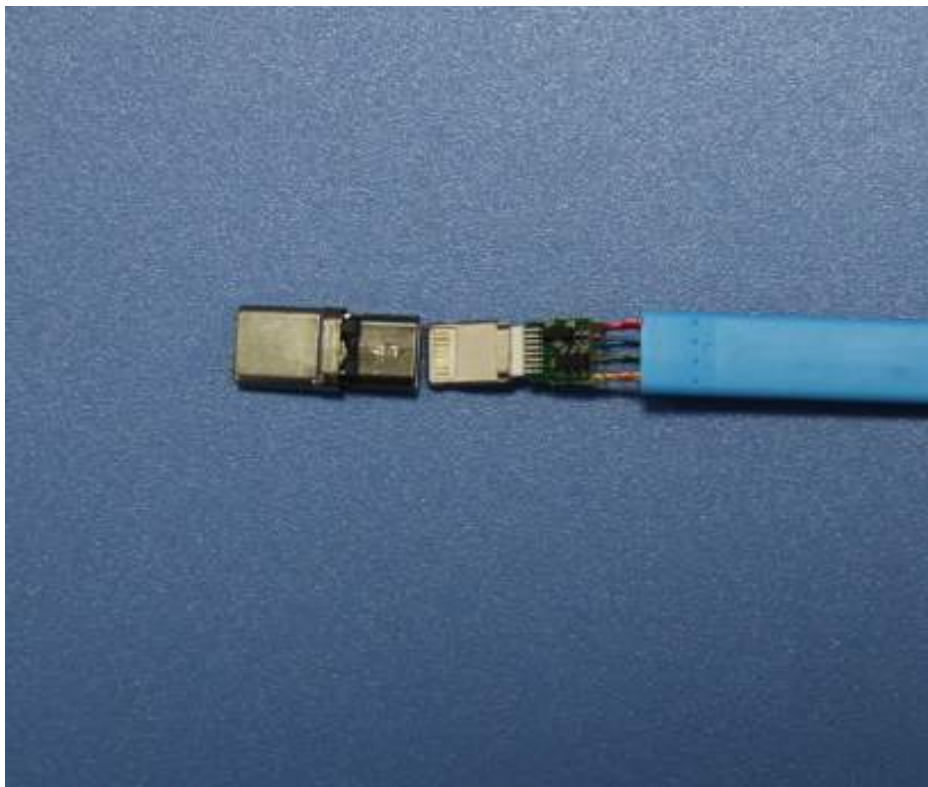
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**-End of the report-**

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