EMC Test Report

Report No.: AGC00201180901EV01

APPLICANT	:	Ampire Electronics GmbH&Co.KG
ADDRESS	:	Langwadener Strasse 60,D-41516 Grevenbroich, Germany
PRODUCT DESIGNATION	:	car charger
MODEL NAME	:	ZBU032
NUMBER OF TEST SAMPLES	:	1 pcs
SAMPLE RECEIVED DATE	:	Sep. 19, 2018
DATE OF TEST	:	Sep. 19, 2018- Sep. 26, 2018
STANDARD(S)	:	EN 50498: 2010
TEST RESULTS	:	Pass

Prepared By	Tom Yin	
	Tom Yin(Yin pan)	Sep. 28, 2018
Reviewed By	Saky.Guo	
	Saky Guo(Guo Yanchao)	Sep. 28, 2018
Approved By	Mark.Yang	
	Mark Yang(Yang Qian) Authorized Officer	Sep. 28, 2018

New Energy Inspection (Shenzhen) Co., Ltd

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NEW ENERGY INSPECTION

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Report Revise Record

Report version	Revise time	Issued date	Valid version	Notes
V1.0	/	Sep. 28, 2018	valid	Original Report

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1. VERIFICATION OF CONFORMITY

Applicant	Ampire Electronics GmbH&Co.KG
Address	Langwadener Strasse 60,D-41516 Grevenbroich, Germany
Manufacturer	AVS Ningbo Industrial Co. Ltd.
Address	7TH BUILDING, NO.59 CHANUG FU ROAD, XIAO GANG INDUSTRIAL ZONE, NINGBO 315800, CHINA
Product Designation	car charger
Test Model	ZBU032
Brand Name	N/A
Series Models	CUSB21U-8, ALR234, MAU 201, CDUSB-11
Declaration of Difference	All the same except for the model name
Sample serial number	180919006
Sample submitting way	■Provided by customer □Sampling
Sample grounding method	Remote ground
Deviation	None
Condition of Test Sample	Normal

The above equipment was tested by New Energy Inspection (Shenzhen) Co., Ltd.For compliance with the requirements setforth in the Technical Standards mentioned above. This said equipment in the configuration described in this report showsthe maximumemission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

2. TEST RESULT SUMMARY

Test item	Test Standard	Result
RADIATED EMISSION	EN 50498: 2010	Pass
TRANSIENT EMISSION	EN 50498: 2010	Pass
TRANSIENT IMMUNITY	EN 50498: 2010	Pass

3. TEST MODE

Mode	Model description
Mode 1	Full load for DC 12V
Mode 2	Full load for DC 24V

4. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by ISO.

- Uncertainty of Radiated Emission, Uc = ±3.73dB

5. PRODUCT INFORMATION

Housing Type	Plastic and metal
EUT Input Rating	DC 6V-30V
EUT Output Rating	5V 1A, 5V 2.1A

6. SUPPORT EQUIPMENT

Cable of Product:

No.	Cable Type	Quantity	Provider	Length(m)	specification	Note
1	Power line	1	NEI	1.7	Unshielded	/

Support Equipments:

No.	Device Type	Brand	Model	Vendor	Serial No.	Power Cord
1	Load	/	/	/	/	/
2	Multimeter	LNI-T	UT33A+	C180307660	/	/

7. TEST FACILITY AND LABORATORY

Site	New Energy Inspection (Shenzhen) Co., Ltd
Location	West,1/F., Building D, Qinyu Technical Industrial Park, Sanwei, Nanchang community, Bao'an Road, Xixiang, Shenzhen, Guangdong, China
Description	Test Method according to ISO 7637-2:2004+A1:2008& CISPR 25(second edition 2002 and corrigendum 2004) & ISO 11452-2:2004&ISO 11452-4:2005+A1:2009

8. EQUIPMENT LIST

8.1 TEST EQUIPMENT LIST

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Chamber1#	ETS-Lindgren	/	CT001566-1317	2016.12.29	2019.12.28
Test Receiver	KEYSIGHT	N9038A	MY57290101	2018.05.30	2019.05.29
Biconical Antenna	Schwarzbeck	VHBB 9124	9124-769	2018.06.08	2020.06.07
Wideband Frequency Antenna	ETS-Lindgren	3148B	00213123	2018.05.30	2020.05.29
V-network	Schwarzbeck	NNBM 8124-200	05092	2018.05.30	2019.05.29
V-network	Schwarzbeck	NNBM 8124-200	05094	2018.05.30	2019.05.29

TEST EQUIPMENT OF TRANSIENT EMISSION

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
V-network	Schwarzbeck	NNHV 8123	00091	2018.05.30	2019.05.29
Switch Simulator	Schaffner	NSG417	130	2018.05.30	2019.05.29
Digital Oscilloscope	YOKOGAWA	DL9140	91G821905	2018.05.30	2019.05.29

TEST EQUIPMENT OF TRANSIENT IMMUNITY TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Voltage DropSimulator	EM Test	VDS 200	1199-06	2018.05.30	2019.05.29
Electrical FastTransient Generator	EM Test	EFT 200	0503-03	2018.05.30	2019.05.29
Micropulse Generator	EM Test	MPG 200	0503-06	2018.05.30	2019.05.29

9. RADIATED EMISSION TEST (TEST METHOD ACCORDING TO CISPR 25:2008)

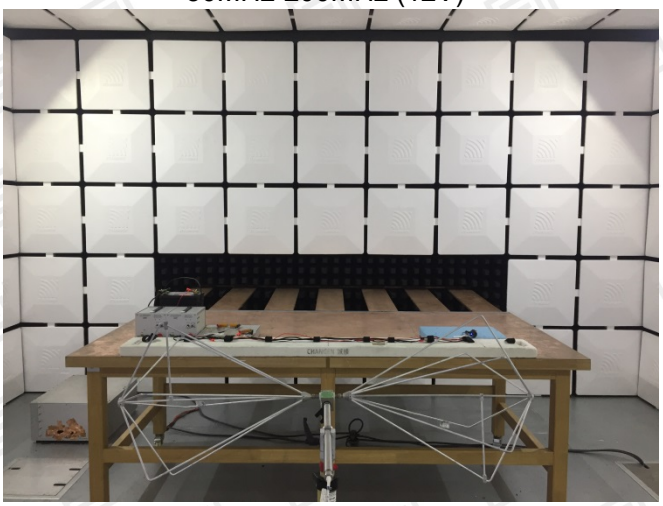
9.1 DESCRIPTION OF THE TEST LOCATION

Test location: Semi-anechoic Chamber

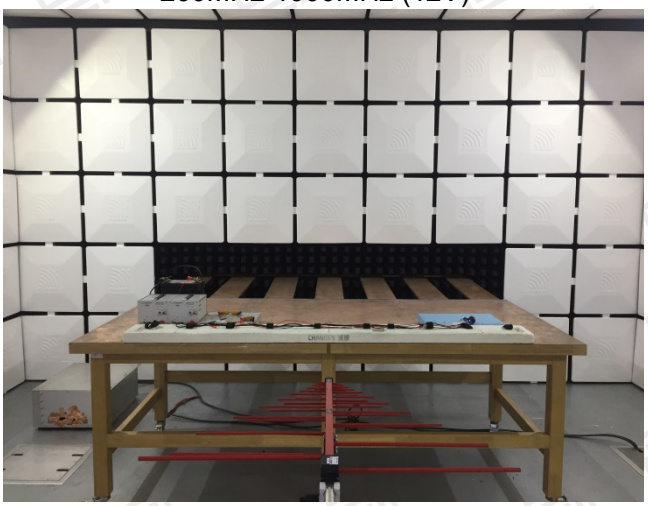
Test distance: 1 meter

9.2 PHOTO DOCUMENTATION OF THE TEST SET-UP

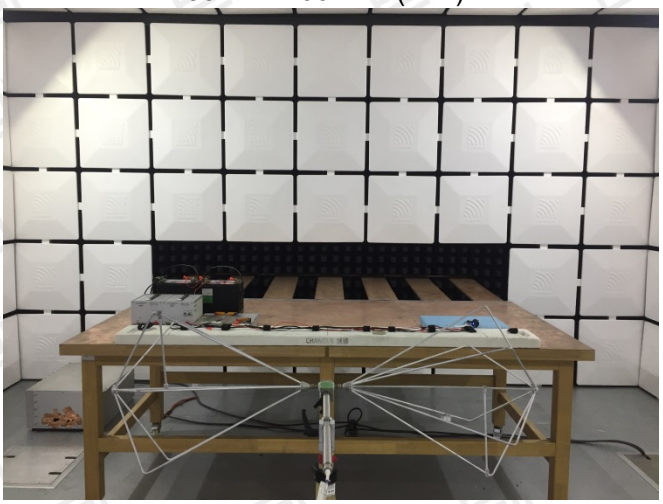
30MHz-200MHz (12V)



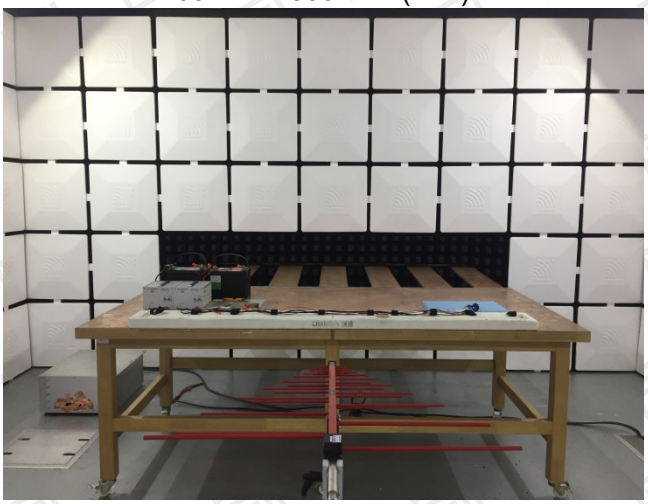
200MHz-1000MHz (12V)



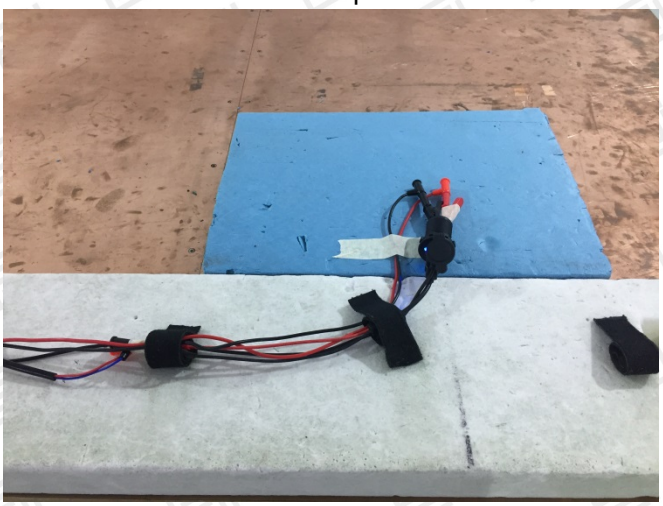
30MHz-200MHz (24V)



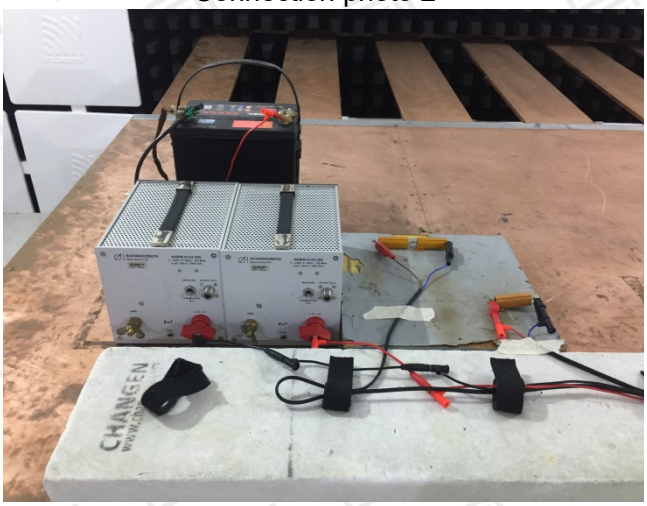
200MHz-1000MHz (24V)



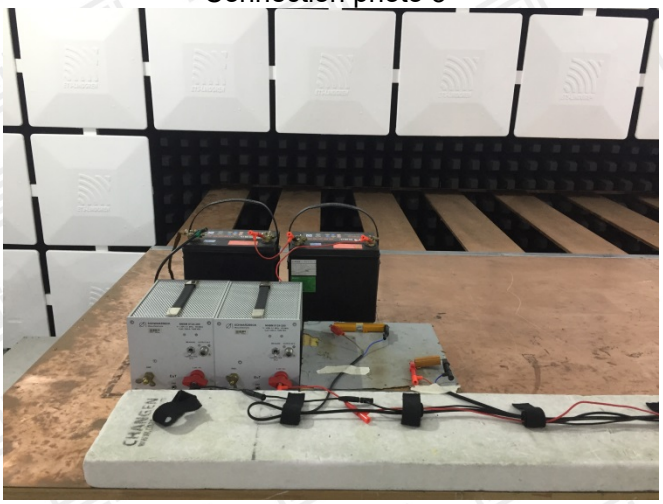
Connection photo 1



Connection photo 2



Connection photo 3



Note: (1) The ESA was placed in a height of 5 cm, isolated to the ground plane. There was no connection to the ground plane. The ESA has to be installed isolated from the vehicle ground.

(2) Cables which are longer than 2m have been bundled to a length of 2 m.

9.3 TEST SPECIFICATION

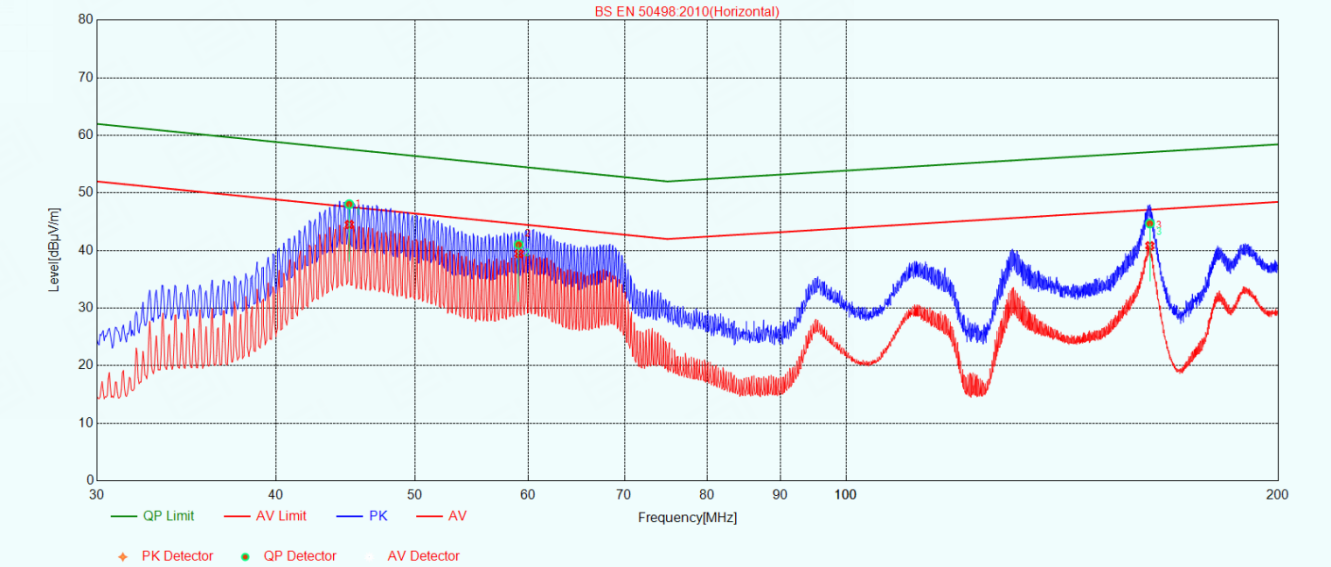
Frequency range: 30MHz – 1000MHz

The test was carried out in the following operation mode(s):

- Normal for $12V_{DC}$
- Normal for $24V_{DC}$

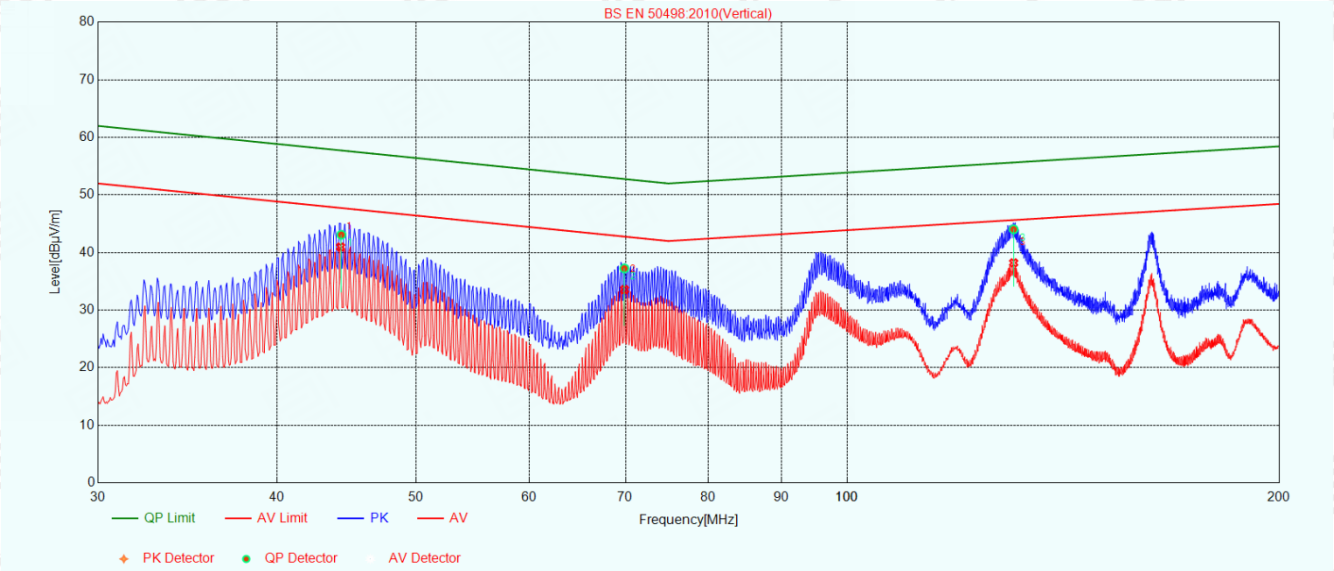
9.4 TEST RESULT

10 Product name:	car charger		
Test model:	ZBU032	Supply voltage:	DC 13.5V
Environmental conditions:	22.2°C 55%RH	Sample direction:	Front
Operation mode:	Mode 1	Antenna polarisation:	Horizontal
Frequency range:	30MHz-200MHz	Test result:	Pass



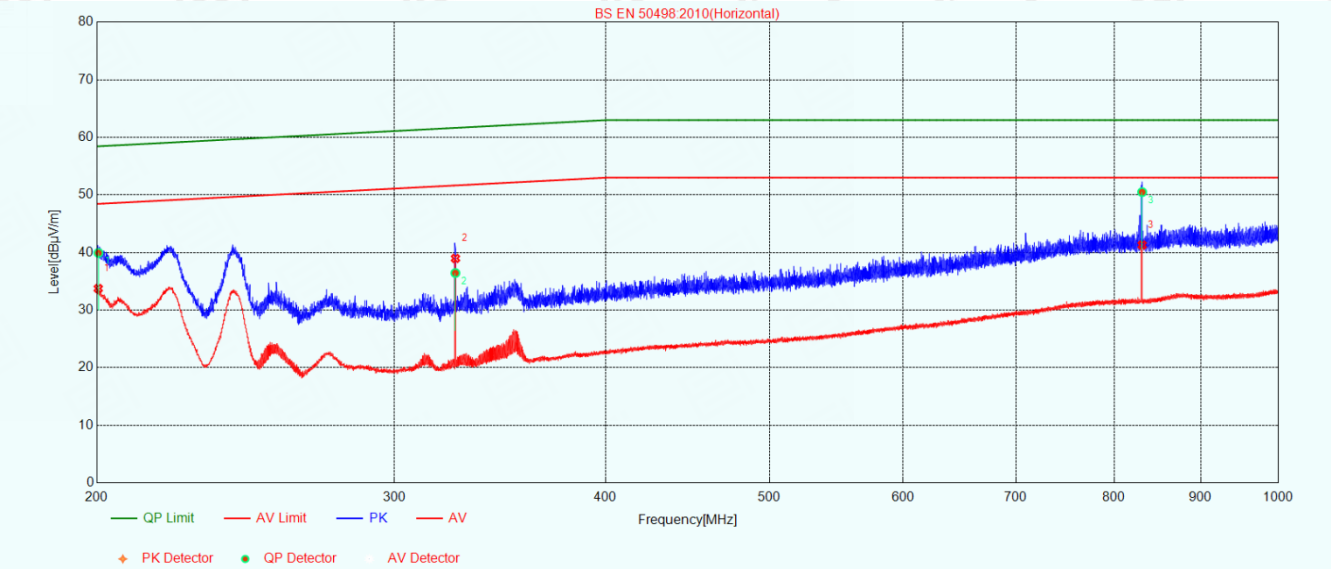
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Detector	Verdict
1	45.000000	44.51	13.10	47.57	3.06	AV	PASS
2	59.100000	39.46	12.39	44.60	5.14	AV	PASS
3	162.800000	40.83	14.94	47.09	6.26	AV	PASS
1	44.9847	48.05	13.10	57.58	9.53	QP	PASS
2	59.0619	41.03	12.39	54.61	13.58	QP	PASS
3	162.7901	44.70	14.94	57.09	12.39	QP	PASS

Product name:	car charger		
Test model:	ZBU032	Supply voltage:	DC 13.5V
Environmental conditions:	22.2°C 55%RH	Sample direction:	Front
Operation mode:	Mode 1	Antenna polarisation:	Vertical
Frequency range:	30MHz-200MHz	Test result:	Pass



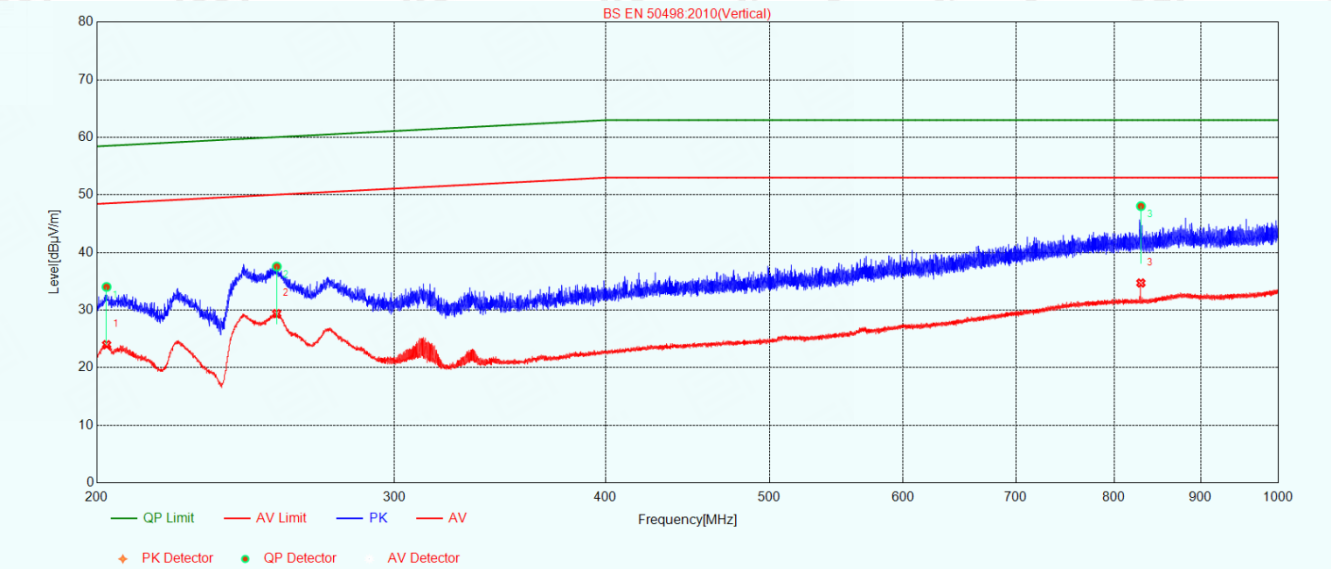
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Detector	Verdict
1	44.300000	40.96	13.11	47.75	6.79	AV	PASS
2	69.900000	33.56	12.47	42.77	9.21	AV	PASS
3	130.600000	38.21	14.24	45.64	7.43	AV	PASS
1	44.3477	43.09	13.11	57.73	14.64	QP	PASS
2	69.8757	37.24	12.47	52.77	15.53	QP	PASS
3	130.5751	44.03	14.23	55.64	11.61	QP	PASS

Product name:	car charger		
Test model:	ZBU032	Supply voltage:	DC 13.5V
Environmental conditions:	22.2°C 55%RH	Sample direction:	Front
Operation mode:	Mode 1	Antenna polarisation:	Horizontal
Frequency range:	200MHz-1000MHz	Test result:	Pass



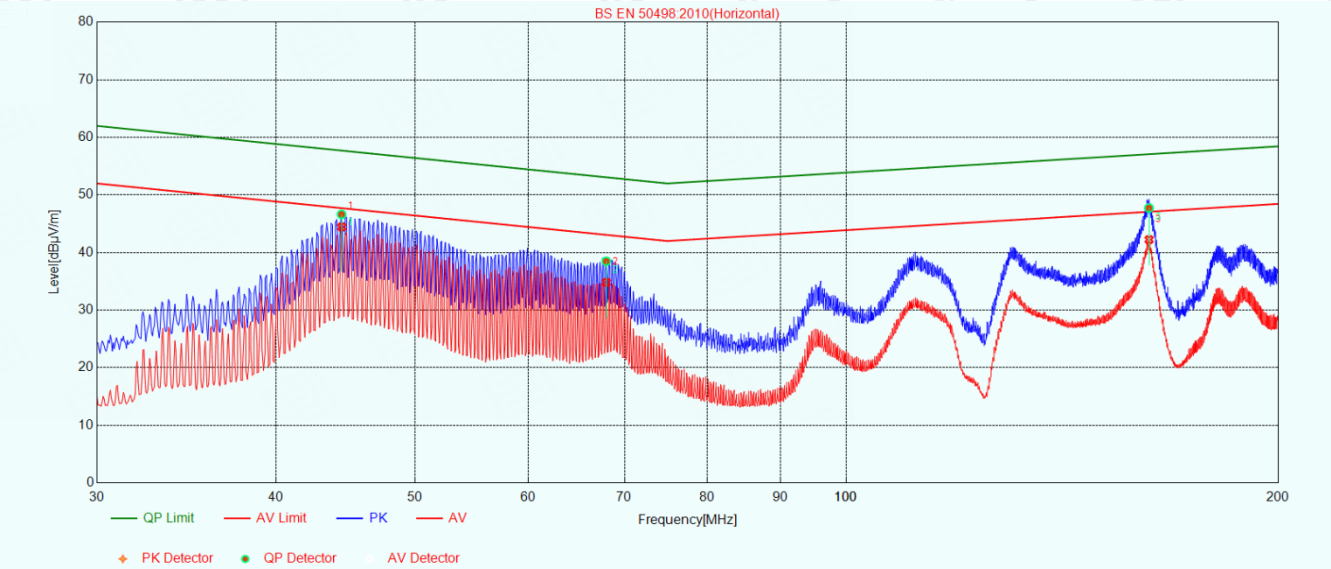
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Detector	Verdict
1	200.350000	33.75	14.72	48.46	14.71	AV	PASS
2	326.000000	38.98	19.00	51.66	12.68	AV	PASS
3	831.050000	41.30	29.06	53.00	11.70	AV	PASS
1	200.393	39.94	14.72	58.46	18.52	QP	PASS
2	325.9518	36.44	19.00	61.65	25.21	QP	PASS
3	831.0061	50.50	29.07	63.00	12.50	QP	PASS

Product name:	car charger		
Test model:	ZBU032	Supply voltage:	DC 13.5V
Environmental conditions:	22.2°C 55%RH	Sample direction:	Front
Operation mode:	Mode 1	Antenna polarisation:	Vertical
Frequency range:	200MHz-1000MHz	Test result:	Pass



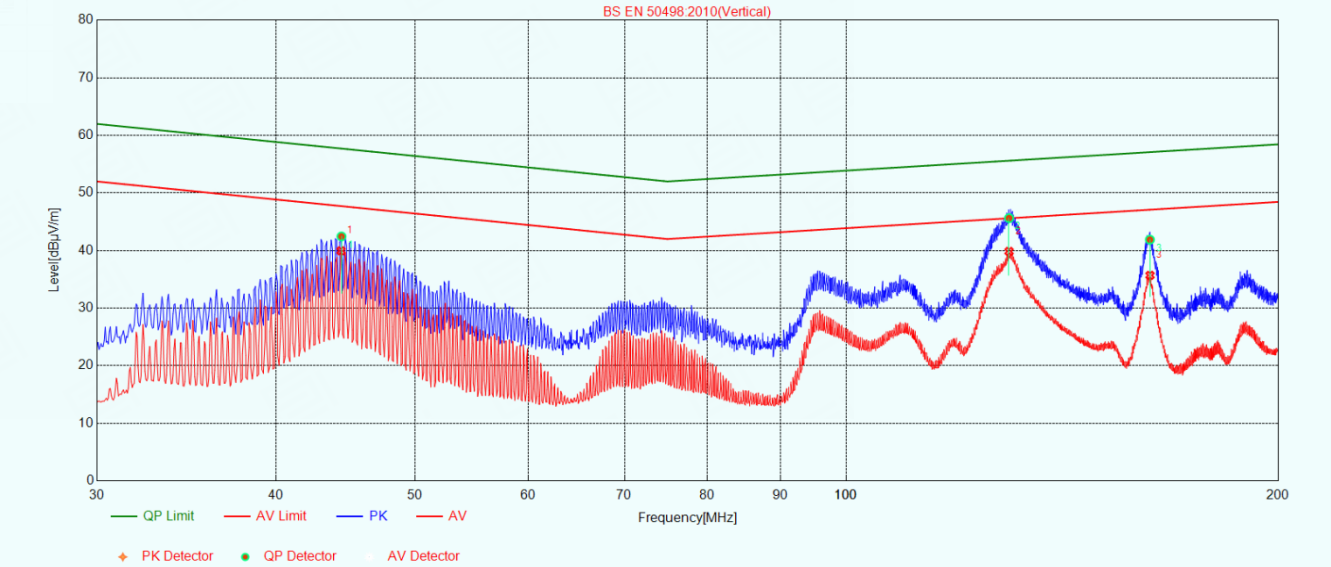
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Detector	Verdict
1	202.650000	23.99	14.79	48.53	24.54	AV	PASS
2	255.500000	29.39	16.78	50.05	20.66	AV	PASS
3	829.600000	34.71	29.05	53.00	18.29	AV	PASS
1	202.621	34.03	14.79	58.53	24.50	QP	PASS
2	255.5437	37.56	16.79	60.06	22.50	QP	PASS
3	829.6276	48.06	29.05	63.00	14.94	QP	PASS

Product name:	car charger		
Test model:	ZBU032	Supply voltage:	DC 27.0V
Environmental conditions:	22.2°C 55%RH	Sample direction:	Front
Operation mode:	Mode 2	Antenna polarisation:	Horizontal
Frequency range:	30MHz-200MHz	Test result:	Pass



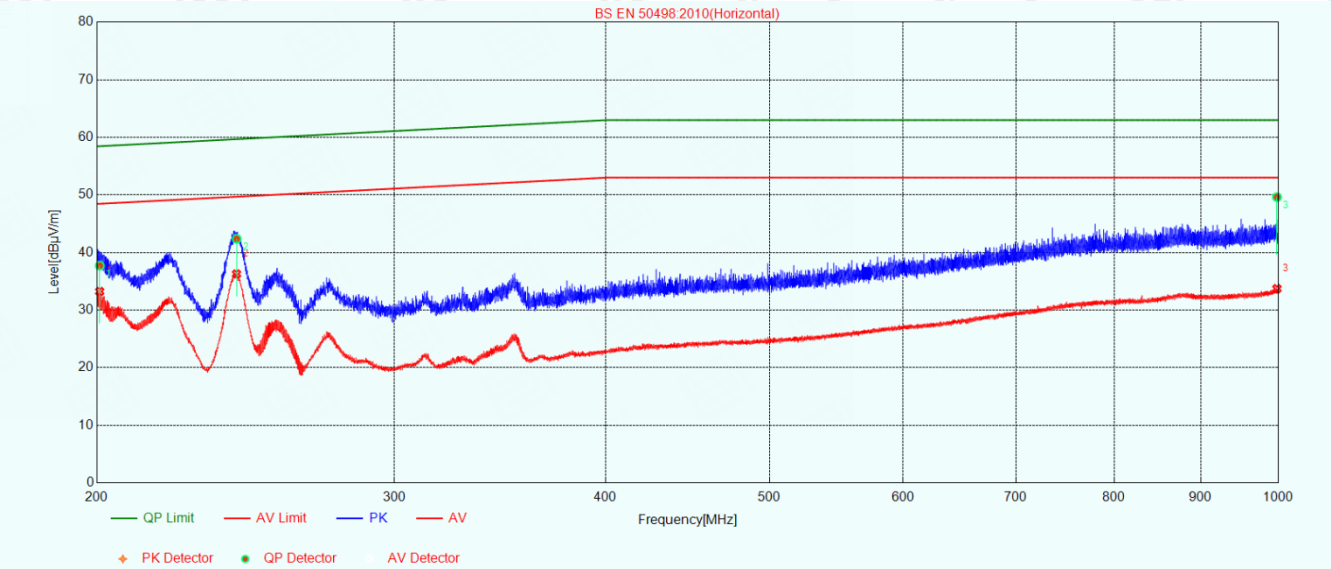
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Detector	Verdict
1	44.450000	44.45	13.11	47.71	3.26	AV	PASS
2	68.000000	34.81	12.41	43.07	8.26	AV	PASS
3	162.600000	42.24	14.93	47.08	4.84	AV	PASS
1	44.4339	46.63	13.11	57.71	11.08	QP	PASS
2	67.9868	38.48	12.41	53.07	14.59	QP	PASS
3	162.5566	47.73	14.93	57.08	9.35	QP	PASS

Product name:	car charger		
Test model:	ZBU032	Supply voltage:	DC 27.0V
Environmental conditions:	22.2°C 55%RH	Sample direction:	Front
Operation mode:	Mode 2	Antenna polarisation:	Vertical
Frequency range:	30MHz-200MHz	Test result:	Pass



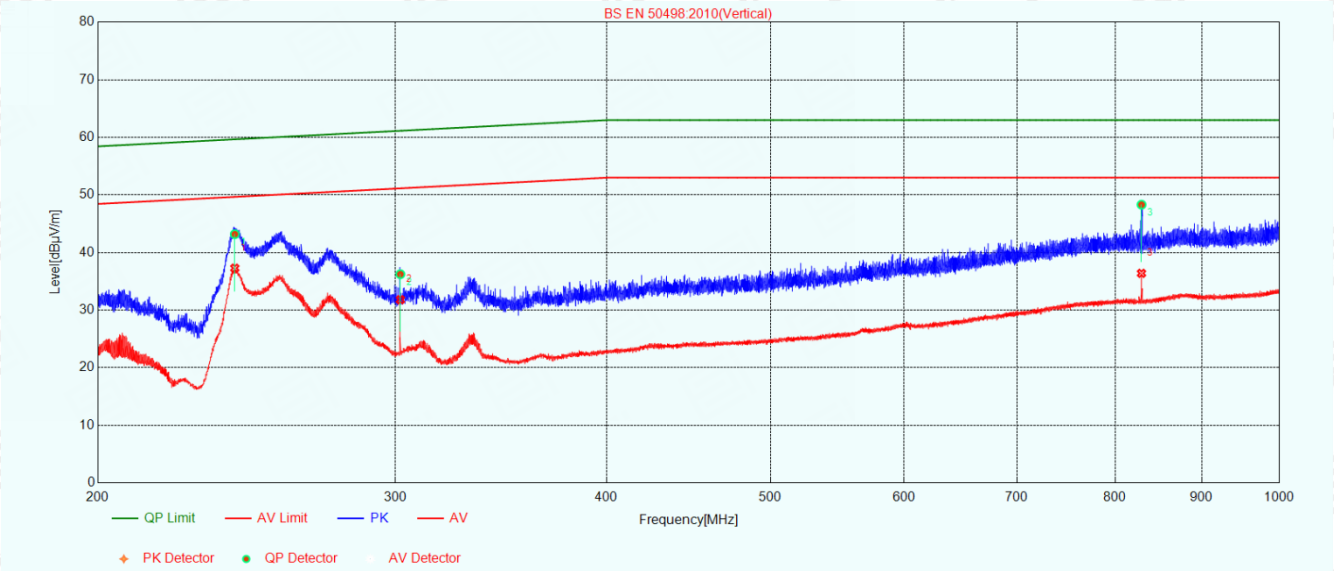
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Detector	Verdict
1	44.400000	39.95	13.11	47.72	7.77	AV	PASS
2	129.850000	39.85	14.14	45.61	5.76	AV	PASS
3	162.850000	35.69	14.94	47.09	11.40	AV	PASS
1	44.4275	42.45	13.11	57.71	15.26	QP	PASS
2	129.8358	45.63	14.14	55.61	9.98	QP	PASS
3	162.8021	41.89	14.94	57.09	15.20	QP	PASS

Product name:	car charger		
Test model:	ZBU032	Supply voltage:	DC 27.0V
Environmental conditions:	22.2°C 55%RH	Sample direction:	Front
Operation mode:	Mode 2	Antenna polarisation:	Horizontal
Frequency range:	200MHz-1000MHz	Test result:	Pass



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Detector	Verdict
1	200.750000	33.23	14.73	48.47	15.24	AV	PASS
2	241.900000	36.28	16.24	49.70	13.42	AV	PASS
3	998.600000	33.73	30.79	53.00	19.27	AV	PASS
1	200.7478	37.72	14.74	58.47	20.75	QP	PASS
2	241.9182	42.38	16.24	59.70	17.32	QP	PASS
3	998.5955	49.63	30.79	63.00	13.37	QP	PASS

Product name:	car charger		
Test model:	ZBU032	Supply voltage:	DC 27.0V
Environmental conditions:	22.2°C 55%RH	Sample direction:	Front
Operation mode:	Mode 2	Antenna polarisation:	Vertical
Frequency range:	200MHz-1000MHz	Test result:	Pass



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Detector	Verdict
1	241.000000	37.29	16.20	49.67	12.38	AV	PASS
2	302.000000	31.80	18.30	51.15	19.35	AV	PASS
3	829.150000	36.39	29.04	53.00	16.61	AV	PASS
1	241.0034	43.19	16.20	59.67	16.48	QP	PASS
2	301.9746	36.24	18.30	61.15	24.91	QP	PASS
3	829.1402	48.32	29.04	63.00	14.68	QP	PASS

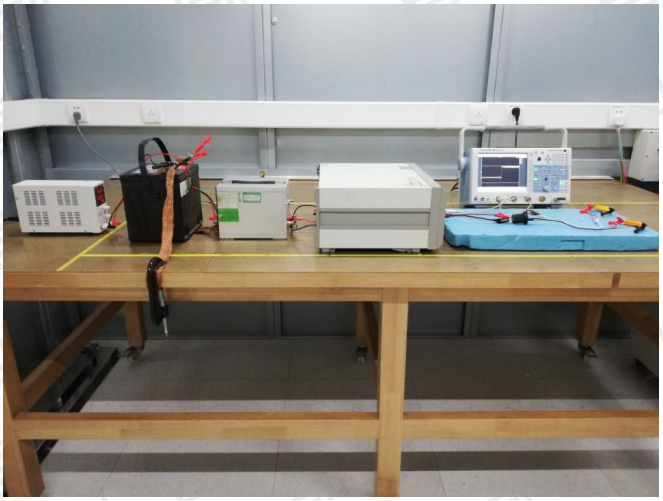
10. TRANSIENT EMISSION TEST (TEST METHOD ACCORDING TO ISO 7637-2:2004)

10.1 DESCRIPTION OF THE TEST LOCATION

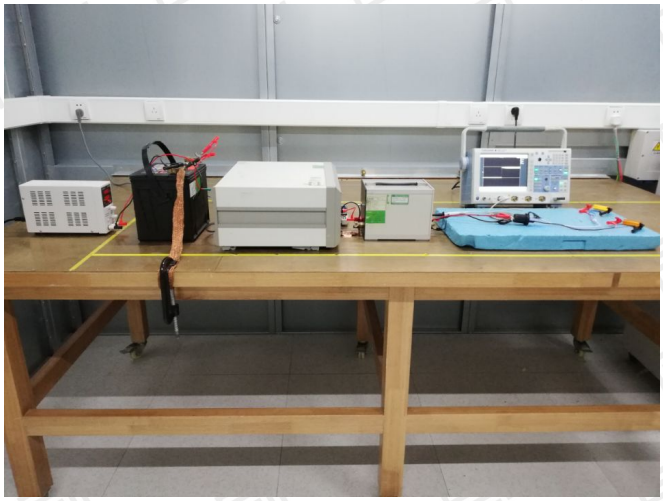
Test location: Shielded room

10.2 PHOTO DOCUMENTATION OF THE TEST SET-UP

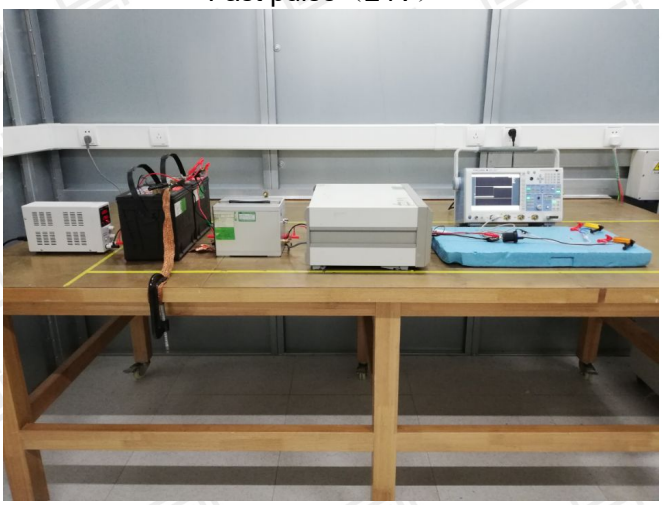
Fast pulse（12V）



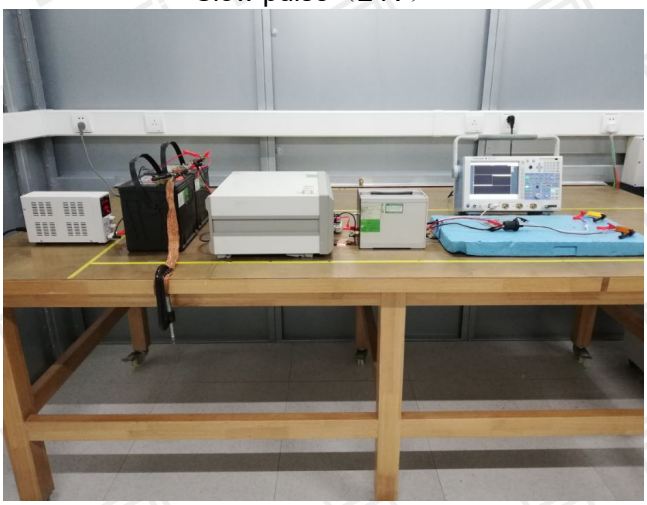
Slow pulse（12V）



Fast pulse（24V）



Slow pulse（24V）



10.3 TEST SPECIFICATION

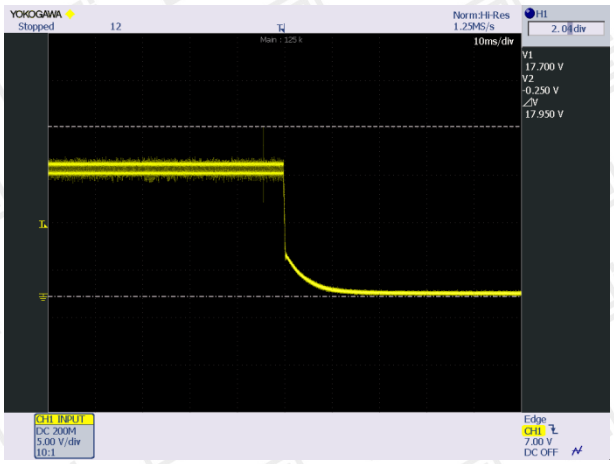
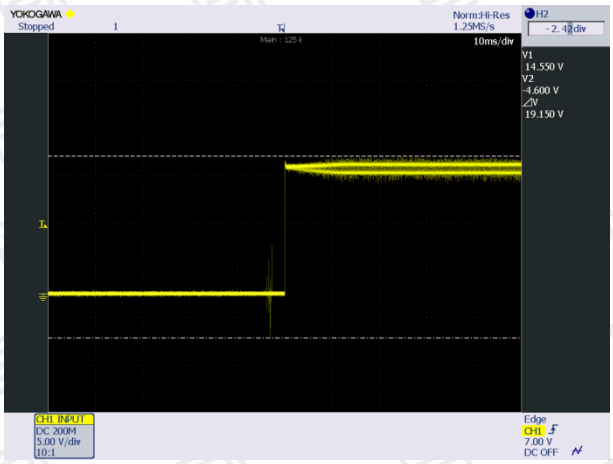
The test was carried out in the following operation mode(s):

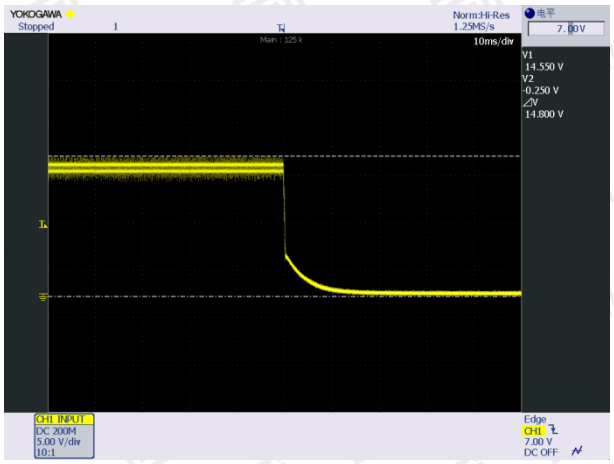
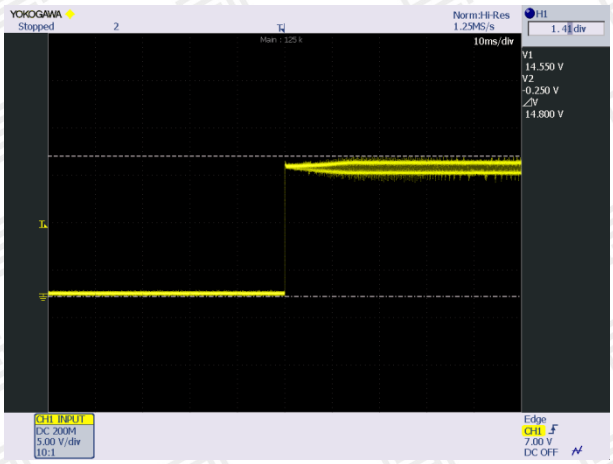
-Full load for $12V_{DC}$

-Full load for $24V_{DC}$

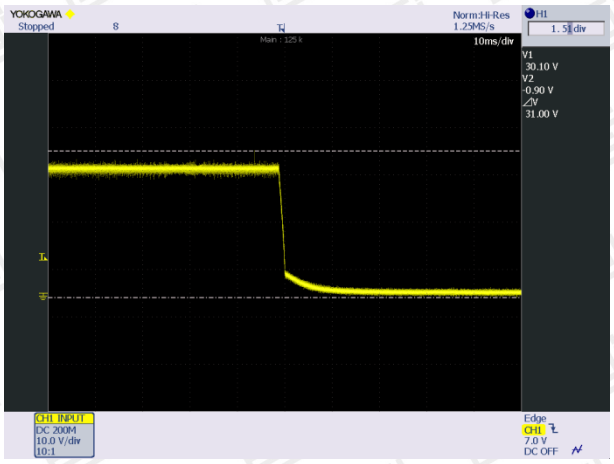
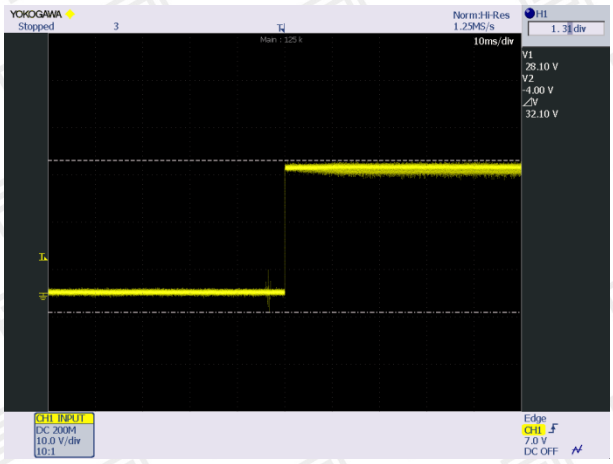
10.4TEST RESULT

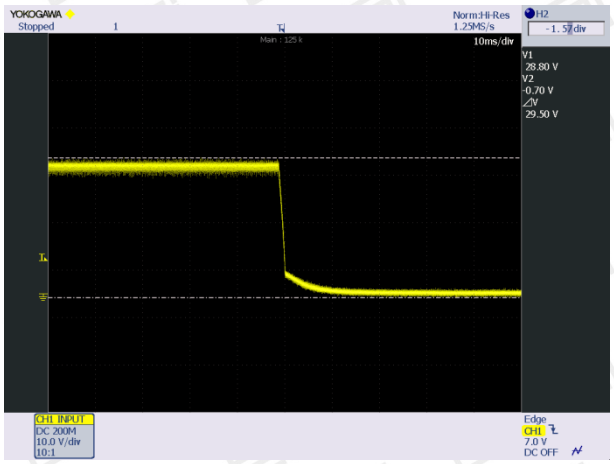
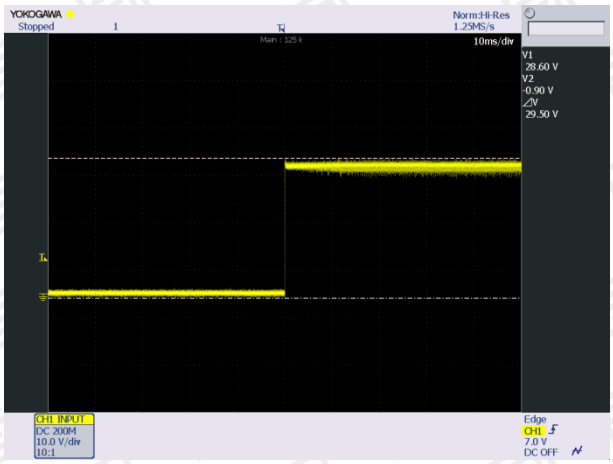
Product name:	car charger		
Test model:	ZBU032	Supply voltage:	DC 13.5V
Temperature:	25.5°C	Humidity:	52%RH
Operation mode:	Mode 1	Test result:	Pass

Fast pulse			
Switch status: On->Off		**Switch status:** Off->On	
Max. Positive:	17.70V-13.50V=4.20V	**Max. Positive:**	14.55V-13.50V=1.05V
Max. Negative:	-0.25V-13.50V=-13.75V	**Max. Negative:**	-4.60V-13.50V=-18.10V
			

Slow pulse			
Switch status: On->Off		**Switch status:** Off->On	
Max. Positive:	14.55V-13.50V=1.05V	**Max. Positive:**	14.55V-13.50V=1.05V
Max. Negative:	-0.25V-13.50V=-13.75V	**Max. Negative:**	-0.25V-13.50V=-13.75V
			

Product name:	car charger		
Test model:	ZBU032	Supply voltage:	DC 27.0V
Temperature:	25.5°C	Humidity:	52%RH
Operation mode:	Mode 2	Test result:	Pass

Fast pulse			
Switch status: On->Off		**Switch status:** Off->On	
Max. Positive:	30.10V-27.00V=3.10V	**Max. Positive:**	28.10V-27.00V=1.10V
Max. Negative:	-0.90V-27.00V=-27.90V	**Max. Negative:**	-4.00V-27.00V=-31.00V
			

Slow pulse			
Switch status: On->Off		**Switch status:** Off->On	
Max. Positive:	28.80V-27.00V=1.80V	**Max. Positive:**	28.60V-27.00V=1.60V
Max. Negative:	-0.70V-27.00V=-27.70V	**Max. Negative:**	-0.90V-27.00V=-27.90V
			

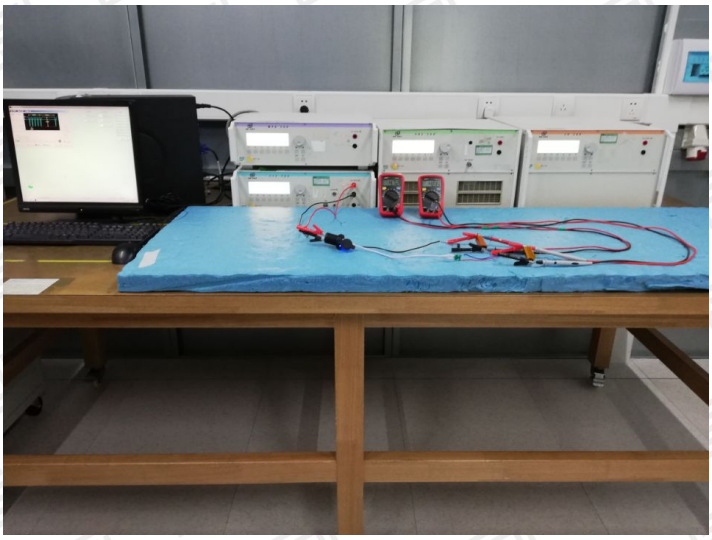
11. TRANSIENT IMMUNITY TEST (TEST METHOD ACCORDING TO ISO 7637-2:2004)

11.1 DESCRIPTION OF THE TEST LOCATION

Test location: Shielded room

11.2 PHOTO DOCUMENTATION OF THE TEST SET-UP

TRANSIENT IMMUNITY TEST



11.3TEST SPECIFICATION

Pulse 1:	Level:	III
	Test level:	-75 V($12V_{DC}$), -450V($24V_{DC}$)
	Number of pulses:	500
Pulse 2a:	Level:	III
	Test level:	+37 V($12V_{DC}$), +37V($24V_{DC}$)
	Number of pulses:	500
Pulse 2b:	Level:	III
	Test level:	+10 V($12V_{DC}$), +20V($24V_{DC}$)
	Number of pulses:	10
Pulse 3a:	Level:	III
	Test level:	-112 V($12V_{DC}$), -150V($24V_{DC}$)
	Coupling duration:	1 h
Pulse 3b:	Level:	III
	Test level:	+75 V($12V_{DC}$), +150V($24V_{DC}$)
	Coupling duration:	1 h
Pulse 4:	Level:	III
	Test level:	-6 V($12V_{DC}$), -12V($24V_{DC}$)
	Number of pulses:	1
Operation mode:		- Full Load for DC 12V - Full Load for DC 24V

11.4TEST RESULT

Product name:	car charger		
Test model:	ZBU032	**Supply voltage:**	DC 13.5V
Temperature:	25.5° C	**Humidity:**	52%RH
Operation mode:	Mode 1	**Test result:**	Pass

Test pulse number	Test voltage	Number of pulses / duration	Required functional status	Functional status of the systems during the test
1 (12V)	-75 V	5000	D	C[1]
2a (12V)	+37 V	5000	D	A
2b (12V)	+10 V	10	D	C[2]
3a (12V)	-112 V	1 h	D	A
3b (12V)	+75 V	1 h	D	A
4 (12V)	-6 V	1	D	A

Remark:
1. During test, the output of EUT's USB beats in 2V-5V and car charger's light flashes, after test, it can recover to normal automatically.
2. During test, the output of EUT's USB beats in 0-5.0V and car charger's light flashes, after test, it can recover to normal automatically.

Product name:	car charger		
Test model:	ZBU032	**Supply voltage:**	DC 27.0V
Temperature:	25.5°C	**Humidity:**	52%RH
Operation mode:	Mode 2	**Test result:**	Pass

Test pulse number	Test voltage	Number of pulses / duration	Required functional status	Functional status of the systems during the test
1 (24V)	-450 V	5000	D	C[1]
2a (24V)	+37 V	5000	D	A
2b (24V)	+20V	10	D	C[2]
3a (24V)	-150 V	1 h	D	A
3b (24V)	+150 V	1 h	D	A
4 (24V)	-12 V	1	D	A

Remark:
1. During test, the output of EUT's USB beats in 2V-5V and car charger's light flashes, after test, it can recover to normal automatically.
2. During test, the output of EUT's USB beats in 0-5.0V and car charger's light flashes, after test, it can recover to normal automatically.

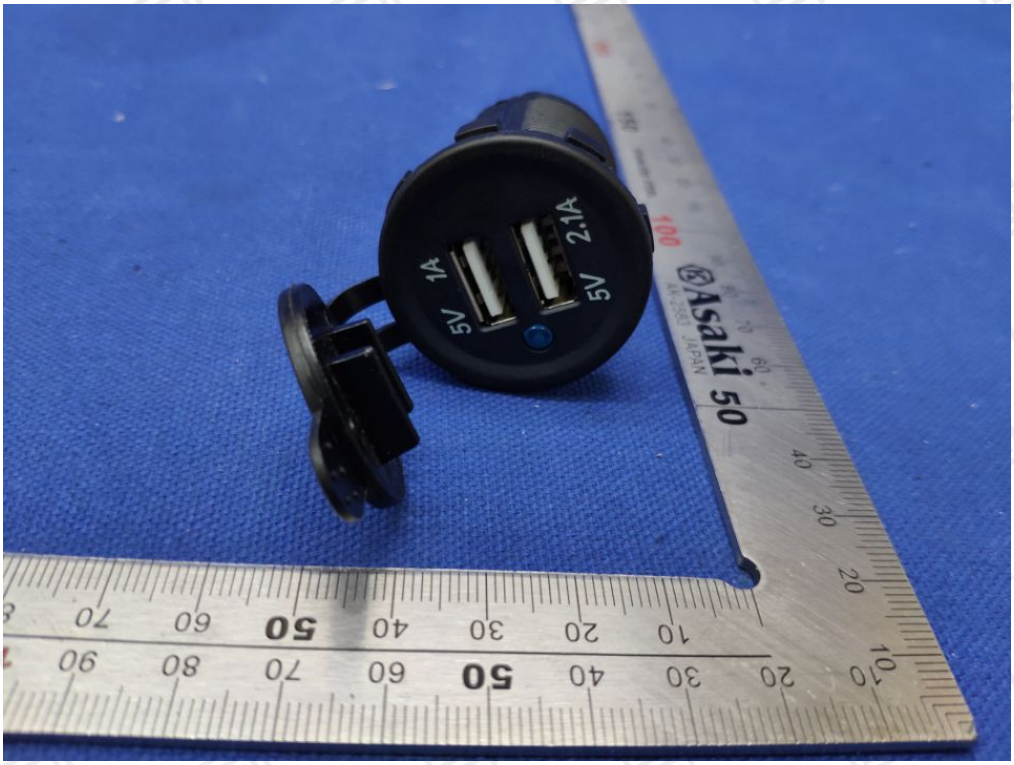
11.5CLASSIFICATION OF FUNCTIONAL STATUS

Criteria A:	All functions of a device/system perform as designed during and after exposure to disturbance.
Criteria B:	All functions of a device/system perform as designed during exposure. However, one or more ofthem can go beyond specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain class A.
Criteria C:	One or more functions of a device/system do not perform as designed during exposure but return automatically to normal operation after exposure is removed.
Criteria D:	One or more functions of a device/system do not perform as designed during exposure and donot return to normal operation until exposure is removed and the device/system is reset by simple“operator/use” action.
Criteria E:	One or more functions of a device/system do not perform as designed during and after exposureand cannot be returned to proper operation without repairing or replacing the device/system.

☒***PASS*** ☐***FAIL***

APPENDIX A: PHOTOGRAPHS OF EUT

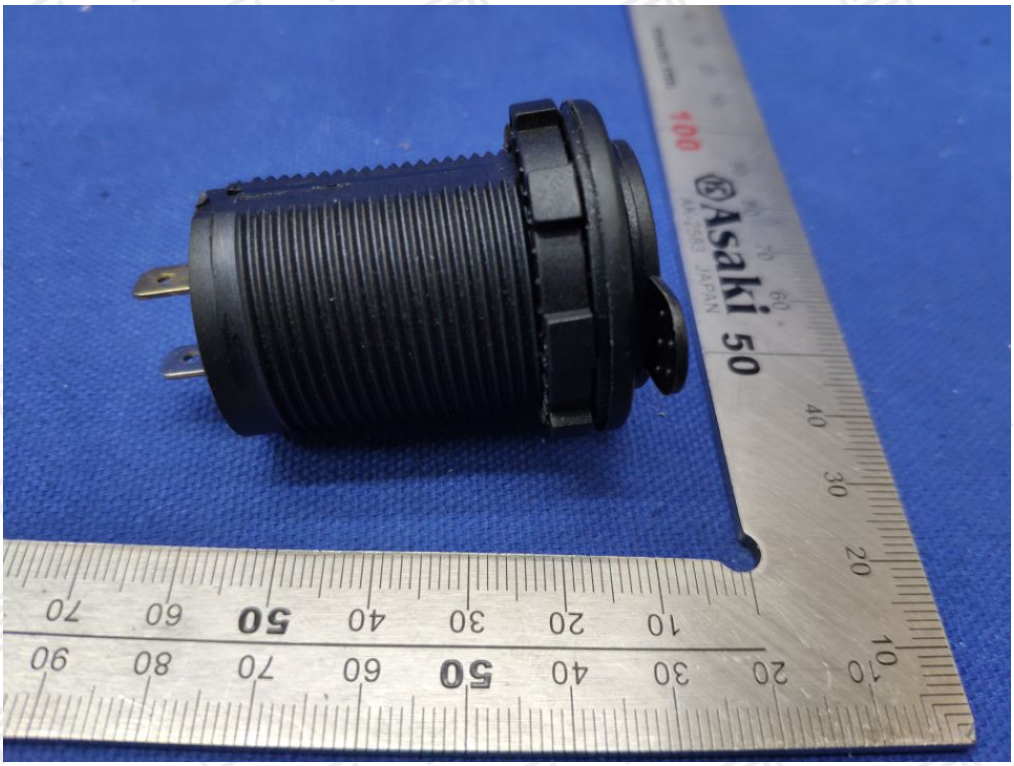
EUT-1



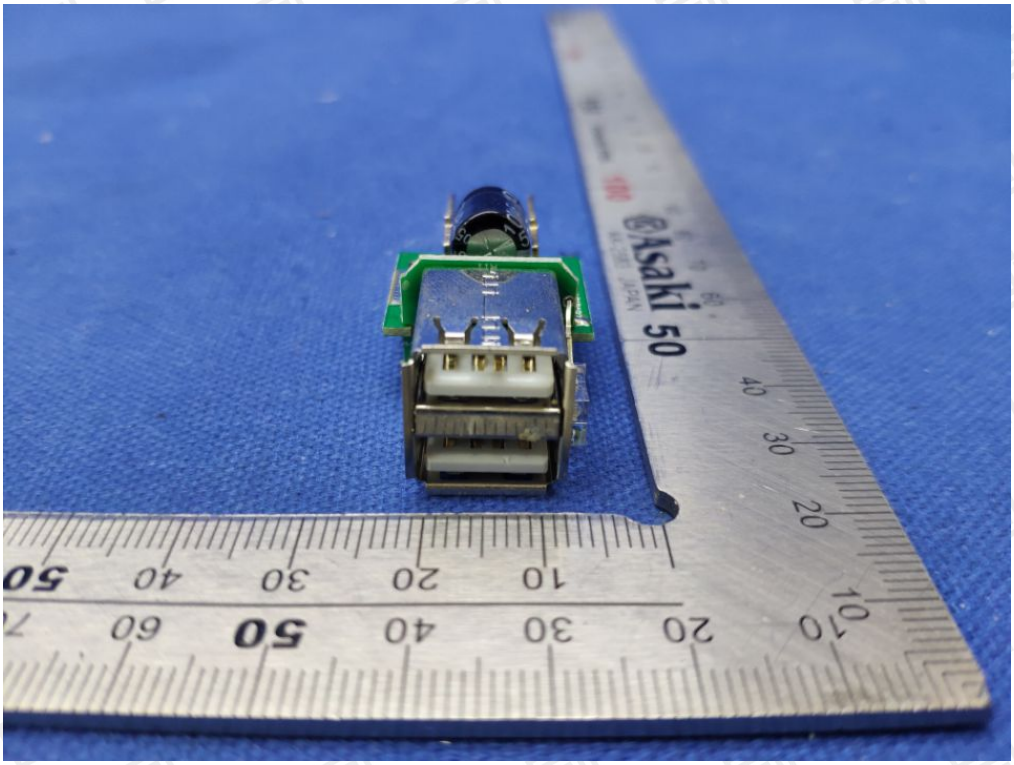
EUT-2

EUT-3

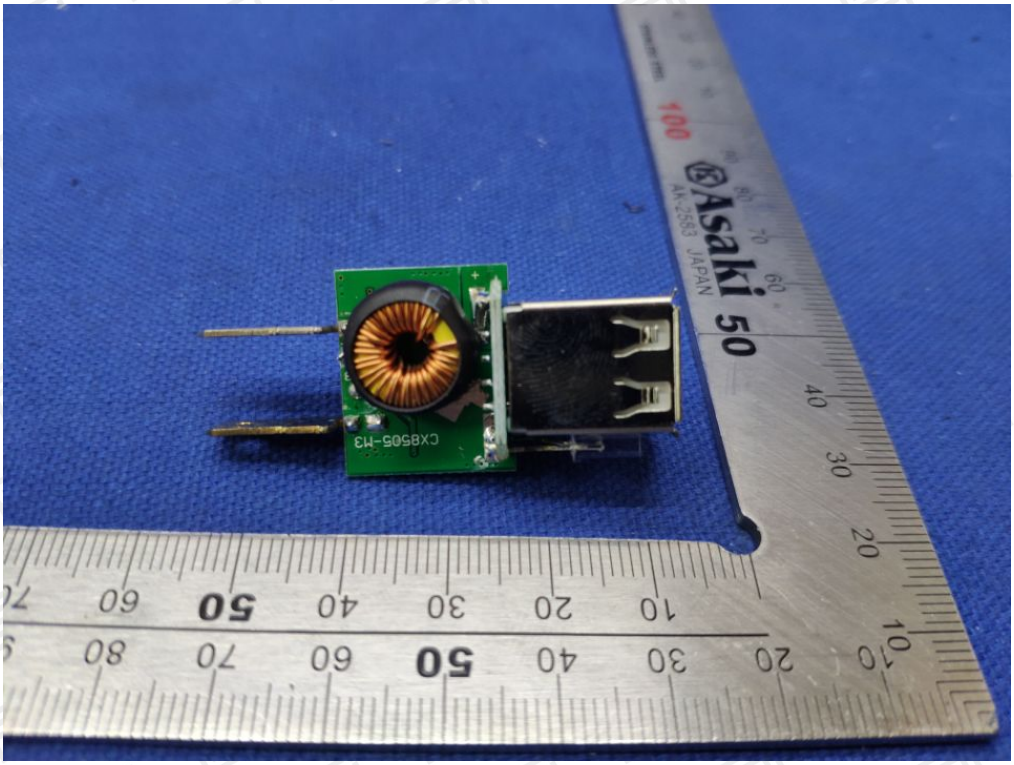
EUT-4



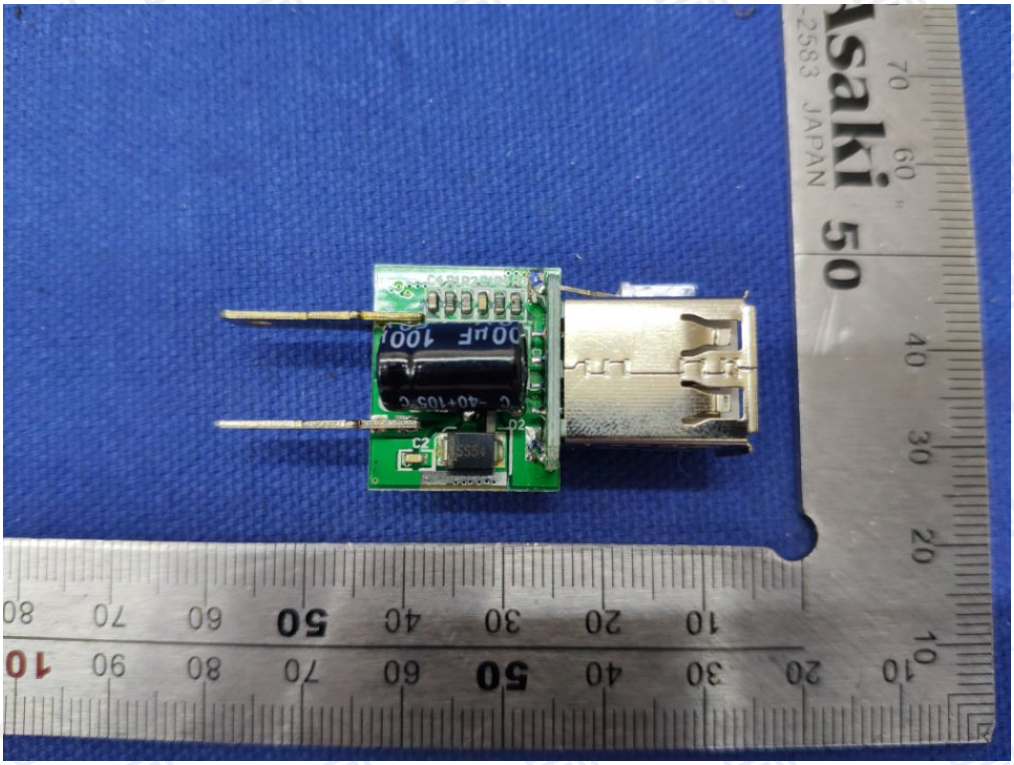
EUT-5



EUT-6



EUT-7



----END OF REPORT----