



中国认可  
国际互认  
检测  
TESTING  
CNAS L7754



# TEST REPORT

**Reference No.** ..... : WTF19U03015794V  
**Applicant** ..... : Mid Ocean Brands B.V.  
**Address** ..... : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong  
**Manufacturer** ..... : 108699  
**Address** ..... : -  
**Product Name** ..... : Car charger with belt cutter  
**Model No.** ..... : MO9314  
**Standards** ..... : EN 50498:2010  
**Test Category** ..... : CE-EMC  
**Test Item** ..... : All item  
**Date of Receipt sample** ..... : 2019-03-20  
**Date of Test** ..... : 2019-03-27 to 2019-05-20  
**Date of Issue** ..... : 2019-05-21  
**Test Report Form No.** ..... : WT-50498A-01B  
**Test Result** ..... : Pass

**Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.  
 The report would be invalid without specific stamp of test institute and the signatures of compiler, reviewer and approver.

**Prepared By:**

**Waltek Services (Suzhou) Co., Ltd.**

Address: No. 699 Lushan Road, SND. Suzhou 215129, Jiangsu China

Tel : + 86 - 512 - 6603 2998

Fax: + 86 - 512 - 6603 2668

Email: suz@waltek.com.cn

Compiled by:

*Tina Zhang*

Tina Zhang/Project Engineer

Reviewed by:

*Mathea Zhang*

Mathea Zhang/Project Engineer

Approved by:



*Jackie Zhang*

Jackie Zhang/Technical Manager



## 1 Test Summary

<b>EMISSION</b>			
<b>Test Item</b>	<b>Test Method</b>	<b>Class / Severity</b>	<b>Result</b>
Broadband radiated disturbances, 30MHz to 1000MHz	CISPR25:2008	Table 1 of Clause 7.1.	Pass
Narrowband disturbances, 30MHz to 1000MHz	CISPR25:2008	Table 2 of Clause 7.2	Pass
Conducted transient disturbances	ISO 7637-2:2004	Table 3 of Clause 7.3	Pass
<b>IMMUNITY</b>			
<b>Test Item</b>	<b>Test Method</b>	<b>Performance Criteria</b>	<b>Result</b>
Conducted transient immunity	ISO 7637-2:2004	D	Pass

Remark:

Pass

Test item meets the requirement

Fail

Test item does not meet the requirement

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### 3 General Information

#### 3.1 General Description of E.U.T.

**Product Name** ..... : Car charger with belt cutter

**Model No.** ..... : MO9314

**Technical Data** ..... : Input: DC 12V-24V; Output: Total DC 5V, 3A

#### 3.2 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

Yes  No

If Yes, list the related test items and lab information:

Test items: ---

Lab information: ---

### 4 Equipment Used during Test

<input checked="" type="checkbox"/> Radiated Emission					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
1	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCI	101346	2020.03.29
2	Biconical Antenna	SCHWARZBECK	VHA 9103B + BBA 9106	VHA 9103-2898	2021.04.21
3	Log-periodic Antenna	SCHWARZBECK	VUSLP 9111 B	9111B-104	2021.04.21
4	LISN	SCHWARZBECK	NNBM 8124	NNBM 8124-429 NNBM 8124-430	2020.03.29
<input checked="" type="checkbox"/> Transient Conducted Emission					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
1	Auto Emissions System	TESEQ	AES 5501	1280	2020.03.29
2	Oscilloscope	TEKTRONIX	TDS3052B	016924	2019.07.19
<input checked="" type="checkbox"/> Transient Conducted Disturbances					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
1	Mainframe	TESEQ	NSG 5500	2047	2020.03.29
2	Mainframe	TESEQ	NSG 5600	2465	2020.03.29
3	Power Amplifier	TESEQ	PA 5840	4135	2020.03.29





## 5 Emission Test Results

### 5.1 Radiated disturbances For 30MHz to 1000MHz

Test Requirement .....	: EN 50498:2010
Test Method .....	: CISPR 25:2008
Test Result .....	: Pass
Frequency Range .....	: 30MHz to 1000MHz
Test Limit .....	: Table 1of Clause 7.1 for Broadband radiated disturbances

Frequency range MHz	Limits (QP) dB $\mu$ V/m
30 to 75	62 – 52 <sup>a</sup>
75 to 400	52 – 63 <sup>b</sup>
400 to 1 000	63
<sup>a</sup> Decreasing linearly with the log of the frequency.	
<sup>b</sup> Increasing linearly with the log of the frequency.	

Table 2 of Clause 7.2 for Narrowband radiated disturbances

Frequency range MHz	Limits (AV) dB $\mu$ V/m
30 to 75	52 – 42 <sup>a</sup>
75 to 400	42 – 53 <sup>b</sup>
400 to 1 000	53
<sup>a</sup> Decreasing linearly with the log of the frequency.	
<sup>b</sup> Increasing linearly with the log of the frequency.	

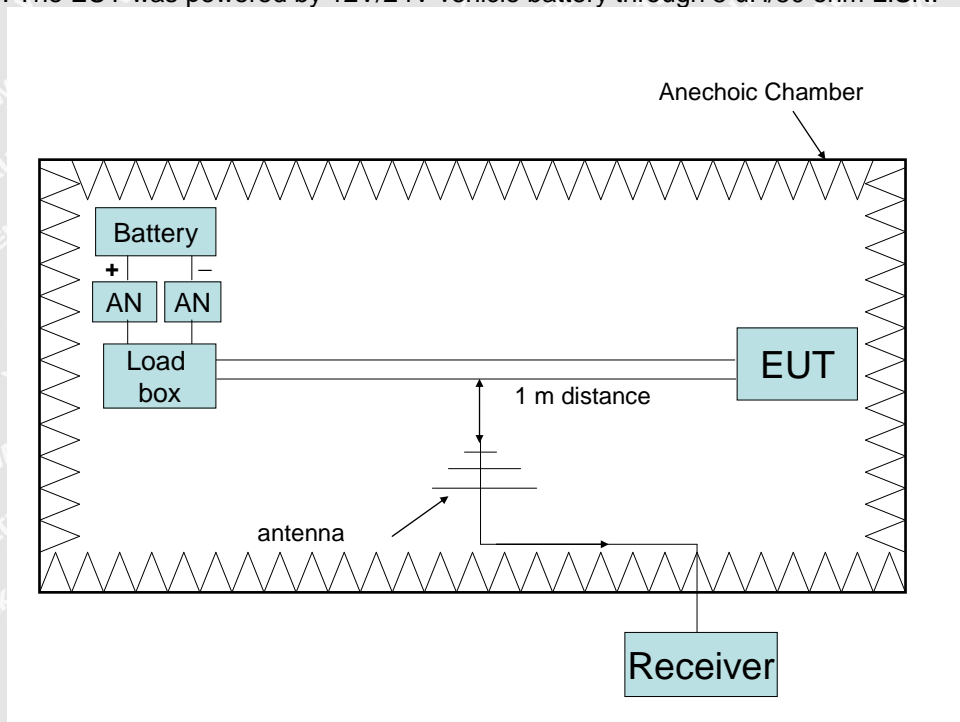
#### 5.1.1 E.U.T. Operation

Operating Environment:	
Temperature .....	: 22.9°C
Humidity .....	: 56.9%RH
Atmospheric Pressure .....	: 102.1 kPa
EUT Operation:	
Test Input Voltage .....	: DC13.5V / DC 27V
Operating Mode .....	: Full Load



### 5.1.2 Block Diagram of Test Setup and procedure

The EUT was insulated placed 50mm above the ground plane, the ground plane was in a height of 1m to the reference plane of semi-anechoic chamber and with electrical connection. No additional electric connection was made between the EUT and ground plane as the EUT will not be intended to be bonded to the bodywork of the vehicle. The EUT was powered by 12V/24V vehicle battery through 5 uH/50 ohm LISN.

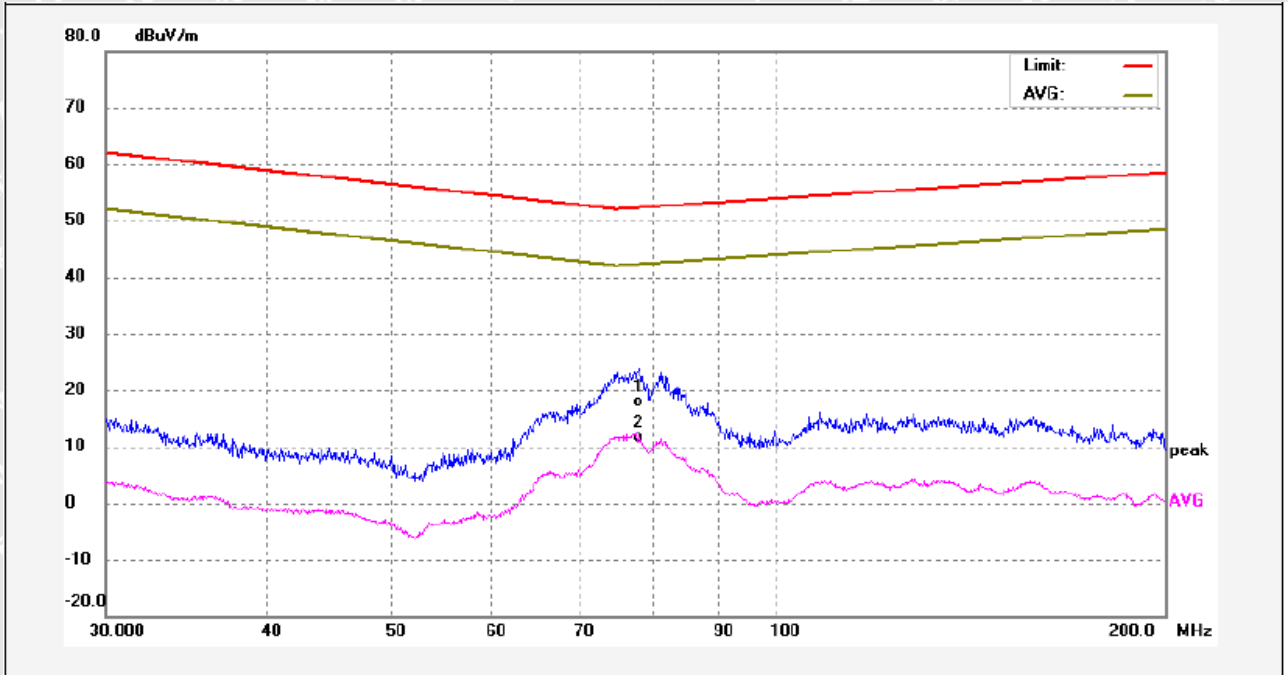


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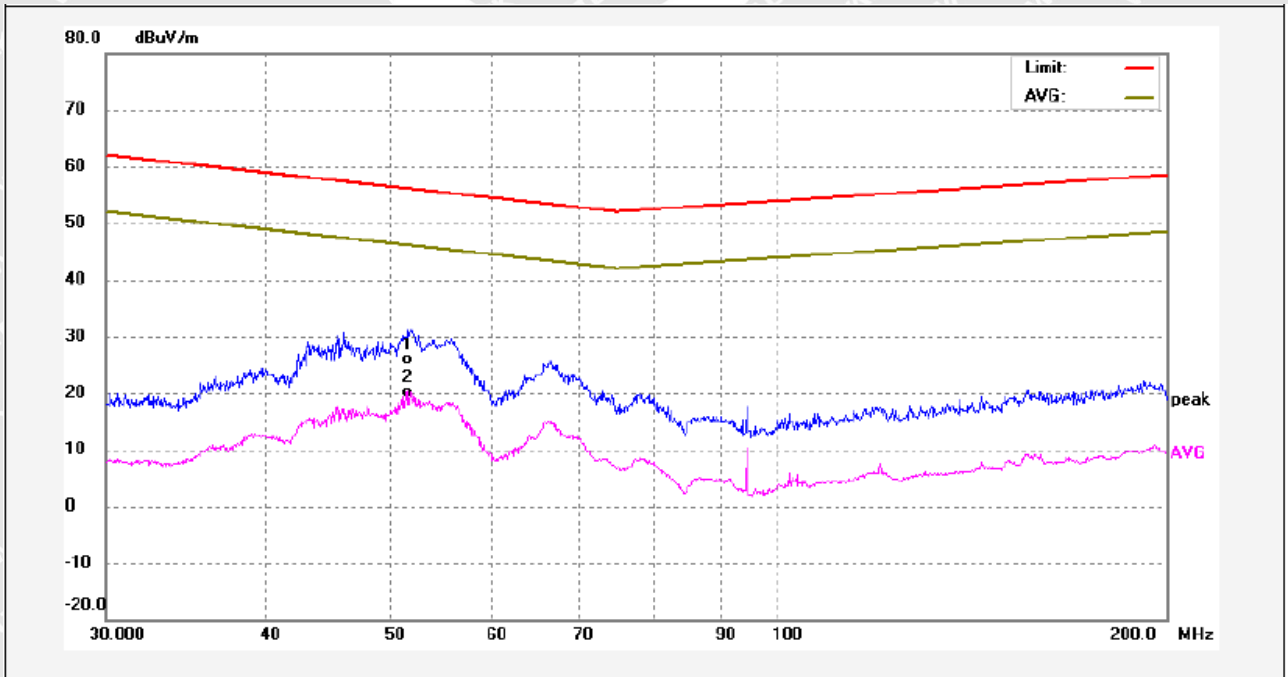
**5.1.3 Measurement Data**

1. Test Voltage: DC 13.5V    Operation Mode: Full Load  
 30MHz-200MHz    Antenna-Horizontal:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit dBuV/	Margin (dB)	Detector	Remark
1	78.1500	9.47	8.52	17.99	52.27	-34.28	QP	
2	78.1500	3.20	8.52	11.72	42.27	-30.55	AVG	

30MHz-200MHz    Antenna Vertical:

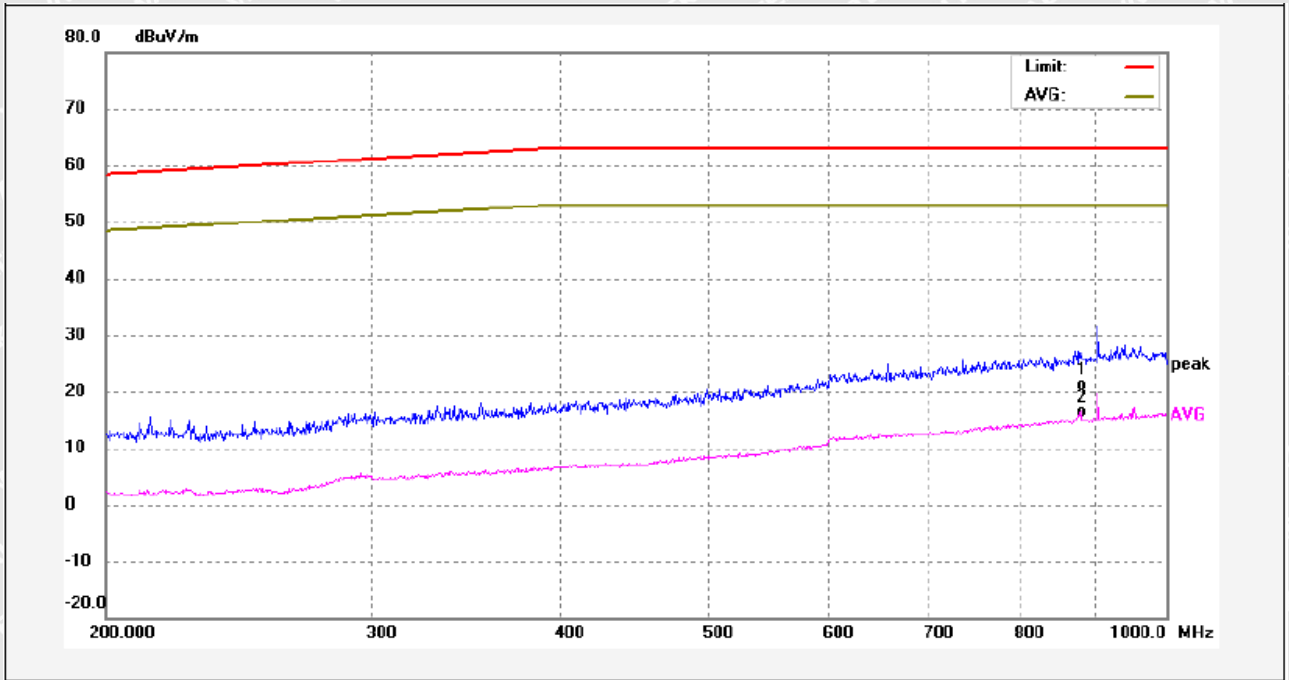


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit dBuV/	Margin (dB)	Detector	Remark
1	51.5500	13.22	12.59	25.81	56.09	-30.28	QP	
2	51.5500	7.54	12.59	20.13	46.09	-25.96	AVG	



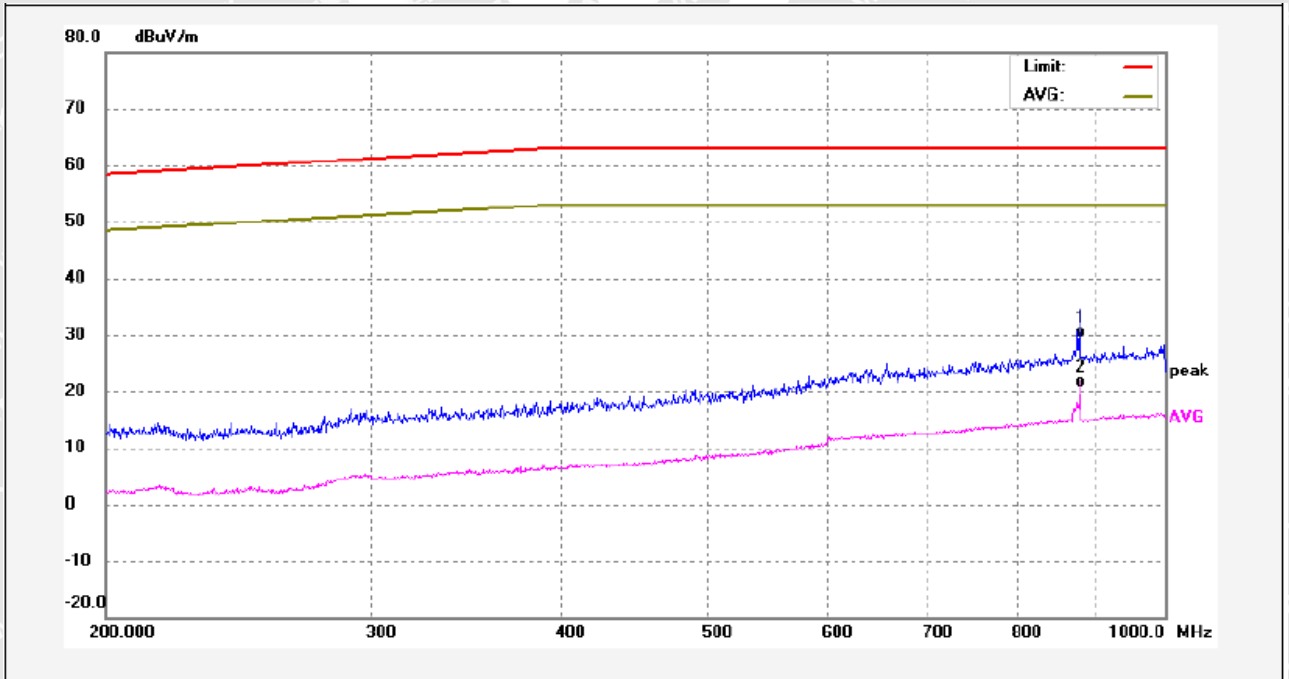


200MHz-1000MHz Antenna-Horizontal:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit dBuV/	Margin (dB)	Detector	Remark
1	877.8500	-2.65	23.90	21.25	63.00	-41.75	QP	
2	877.8500	-7.50	23.90	16.40	53.00	-36.60	AVG	

200MHz-1000MHz Antenna-Vertical:



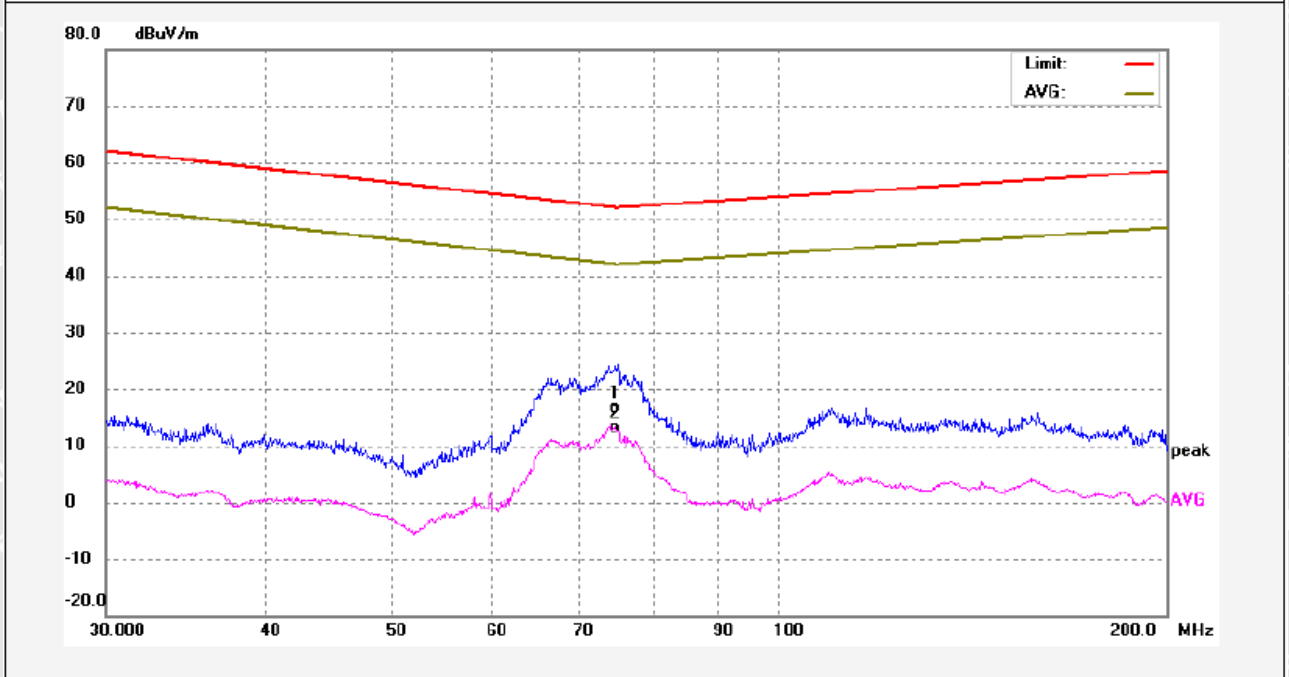
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit dBuV/	Margin (dB)	Detector	Remark
1	879.9000	6.39	23.91	30.30	63.00	-32.70	QP	
2	879.9000	-2.34	23.91	21.57	53.00	-31.43	AVG	





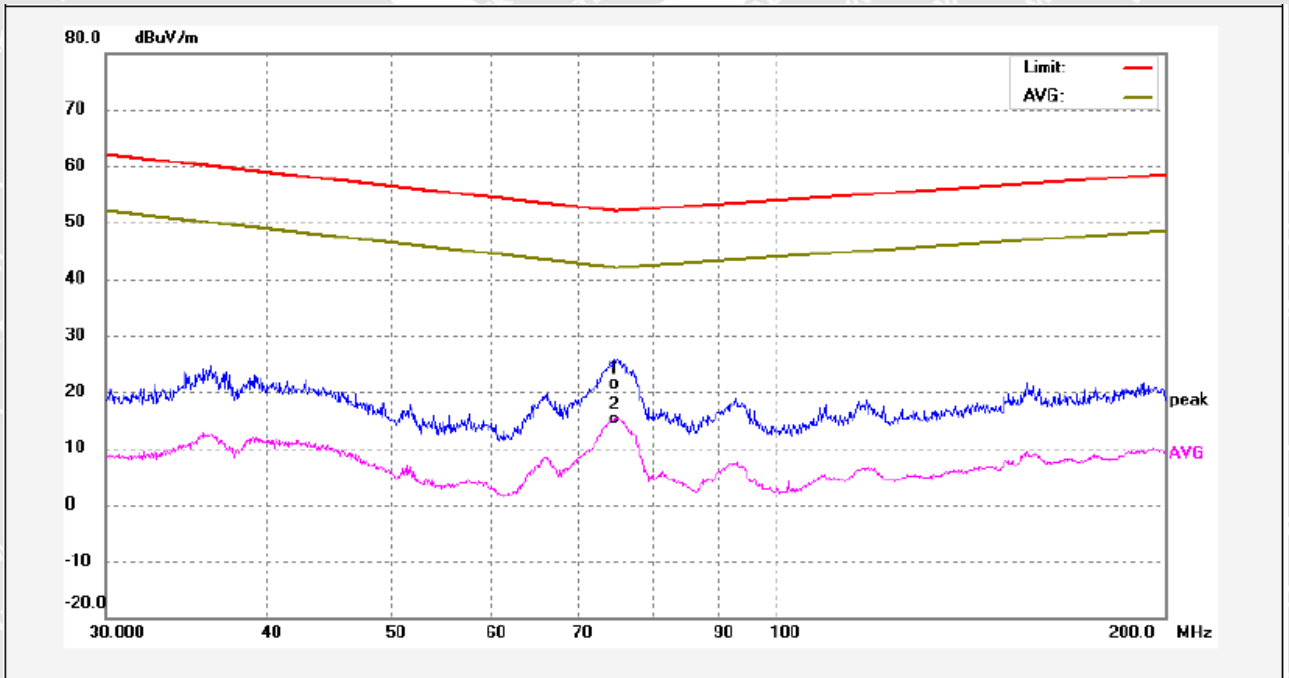
2. Test Voltage:DC 27V Operation Mode: Full Load

30MHz-200MHz Antenna-Horizontal:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit dBuV/	Margin (dB)	Detector	Remark
1	75.1000	8.51	8.02	16.53	52.01	-35.48	QP	
2	75.1000	5.04	8.02	13.06	42.01	-28.95	AVG	

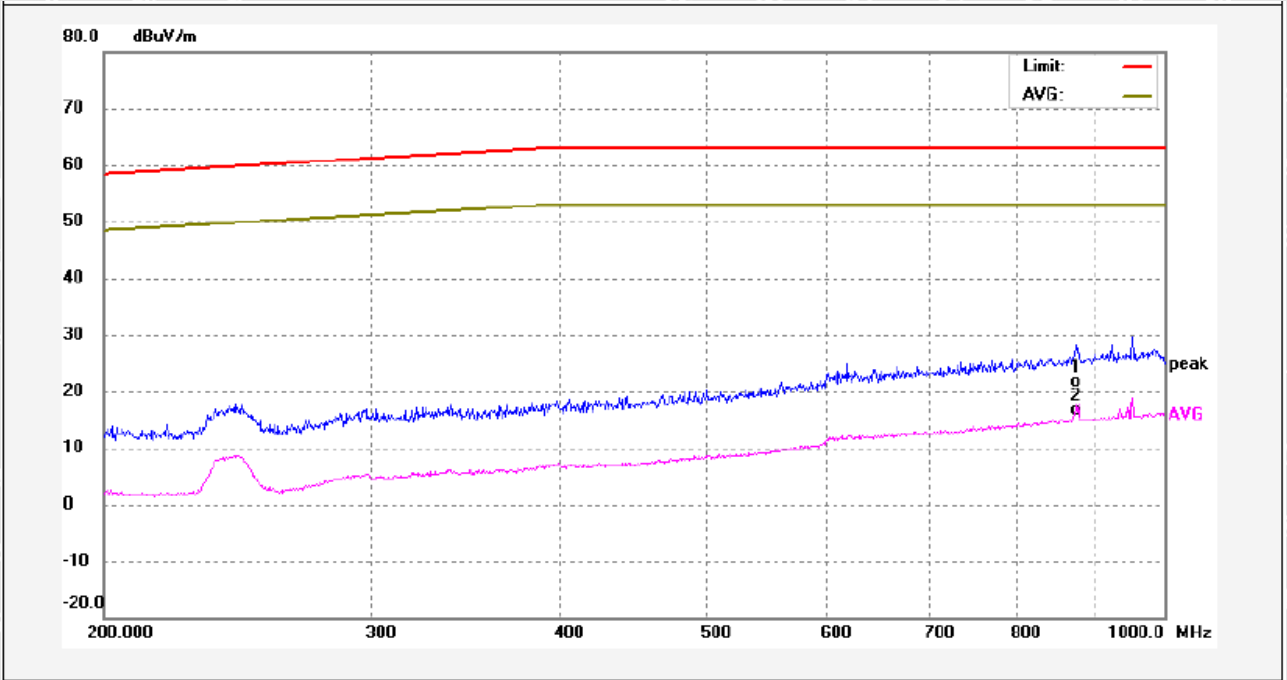
30MHz-200MHz Antenna-Vertical:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit dBuV/	Margin (dB)	Detector	Remark
1	75.1000	13.47	8.02	21.49	52.01	-30.52	QP	
2	75.1000	7.19	8.02	15.21	42.01	-26.80	AVG	

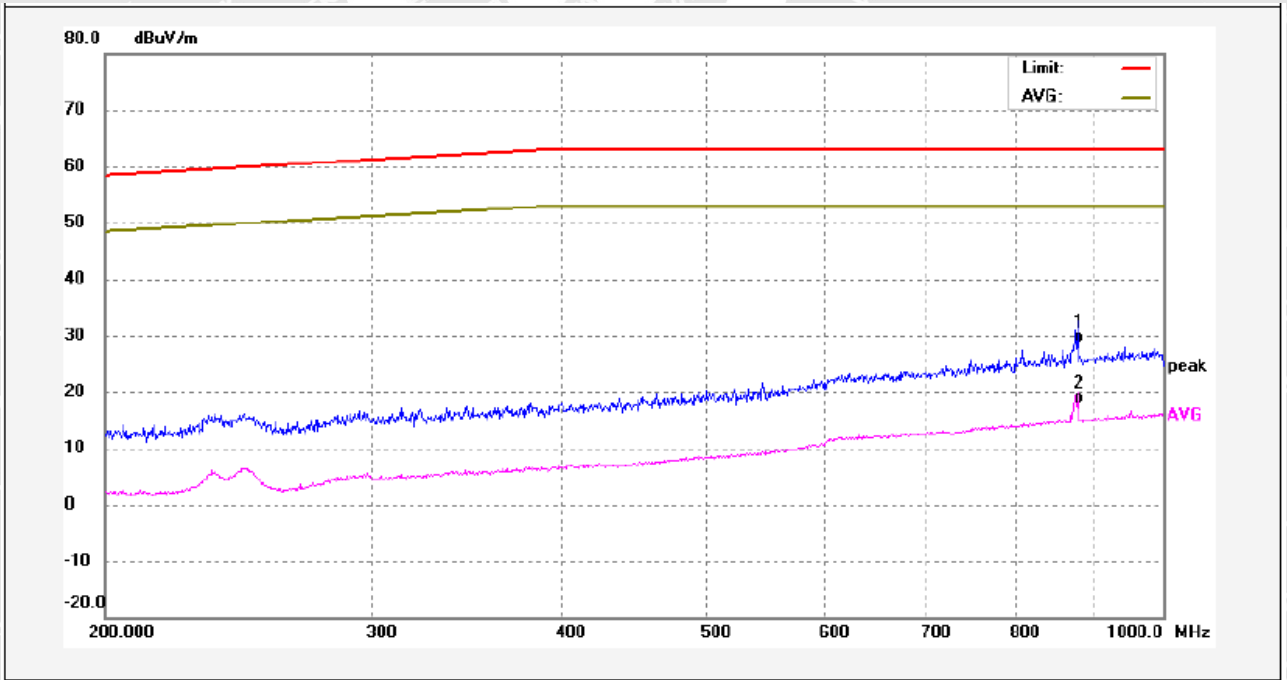


200MHz-1000MHz Antenna-Horizontal:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit dBuV/	Margin (dB)	Detector	Remark
1	874.4000	-2.34	23.87	21.53	63.00	-41.47	QP	
2	874.4000	-7.26	23.87	16.61	53.00	-36.39	AVG	

200MHz-1000MHz Antenna-Vertical:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit dBuV/	Margin (dB)	Detector	Remark
1	879.9500	5.65	23.91	29.56	63.00	-33.44	QP	
2	879.9500	-4.97	23.91	18.94	53.00	-34.06	AVG	



**5.2 Transient Conducted Emissions Test**

Test Requirement..... : EN 50498:2010  
 Test Method ..... : ISO 7637-2:2004  
 Test Result ..... : Pass  
 Test Limit..... : As below Table

	Maximum allowed pulse amplitude for	
Polarity of pulse amplitude	Vehicles with 12 V systems	Vehicles with 24V systems
Positive	+75V	+150V
Negative	-100V	-450V

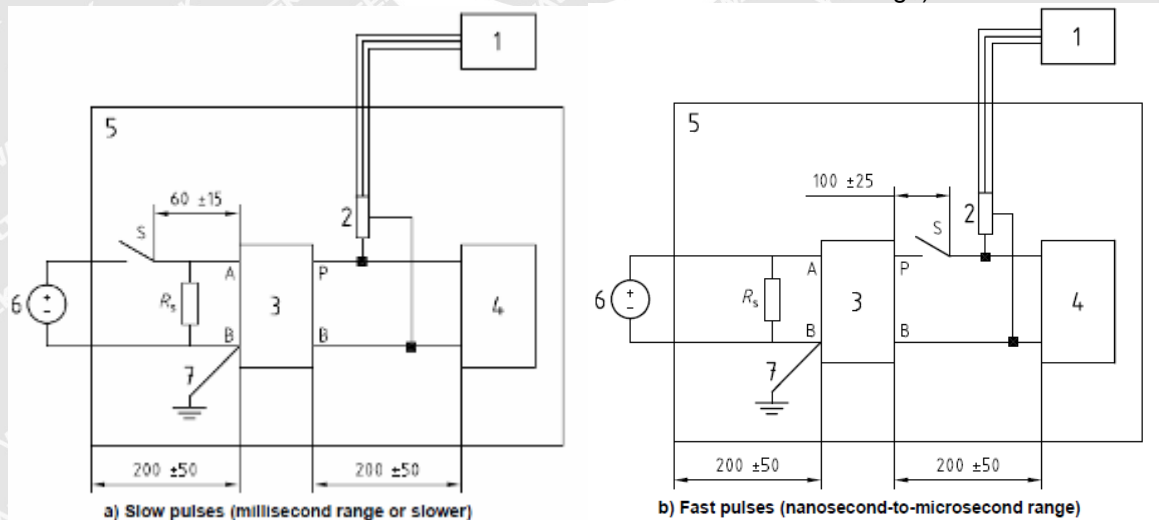
**5.2.1 E.U.T. Operation**

Operating Environment:  
 Temperature ..... : 20.0°C  
 Humidity ..... : 45%RH  
 Atmospheric Pressure..... : 101.6kPa  
 EUT Operation:  
 Test Input Voltage..... : DC 13.5V / DC 27V  
 Operating Mode ..... : Full Load

**5.2.2 Block Diagram of Setup**

The slow pulse(millisecond range or slower)

The fast pulse(nanosecond to microsecond range)



**Key**

- 1 oscilloscope or equivalent
- 2 voltage probe
- 3 artificial network
- 4 DUT (source of transient)
- 5 ground plane
- 6 power supply
- 7 Ground connection; length < 100 mm



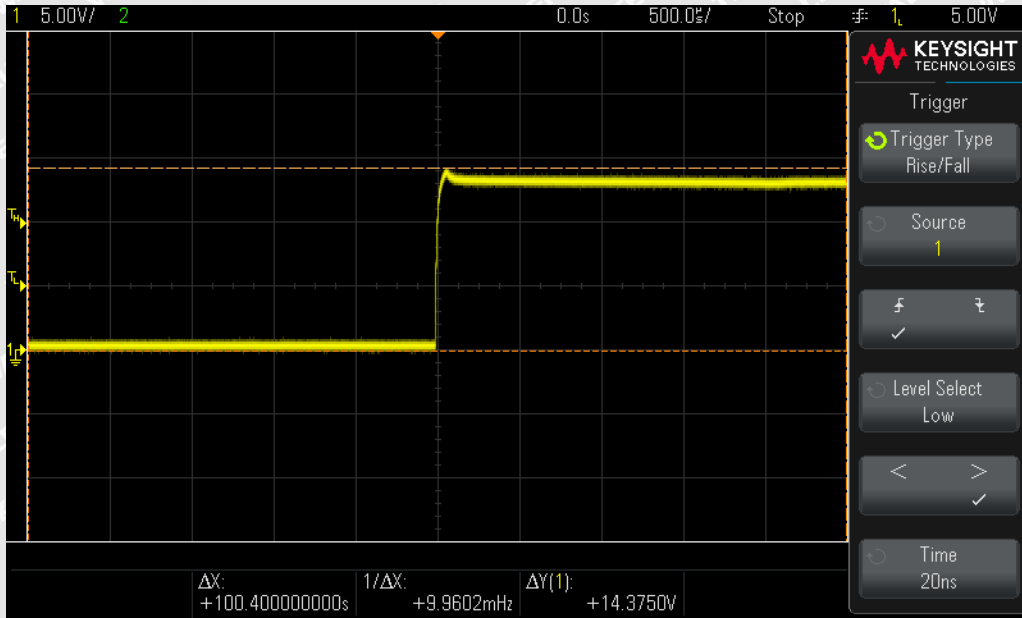


**5.2.3 Measurement data**

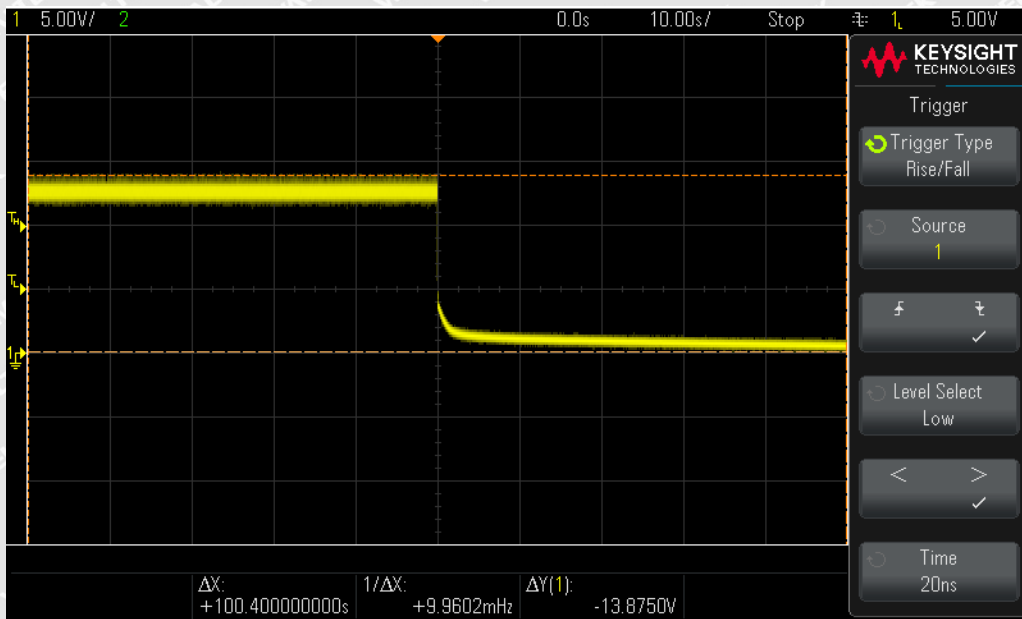
1. Test Voltage: DC 13.5V      Operation Mode: Full Load

Pulse		Maximum allowed pulse amplitude	Measurement Level	Result
Fast	Switch on		Positive: +75V	+14.375V
	Switch off	-13.875V		Pass
Slow	Switch on	Negative: -100V	+14.5V	Pass
	Switch off		-13.25V	Pass

Fast on:

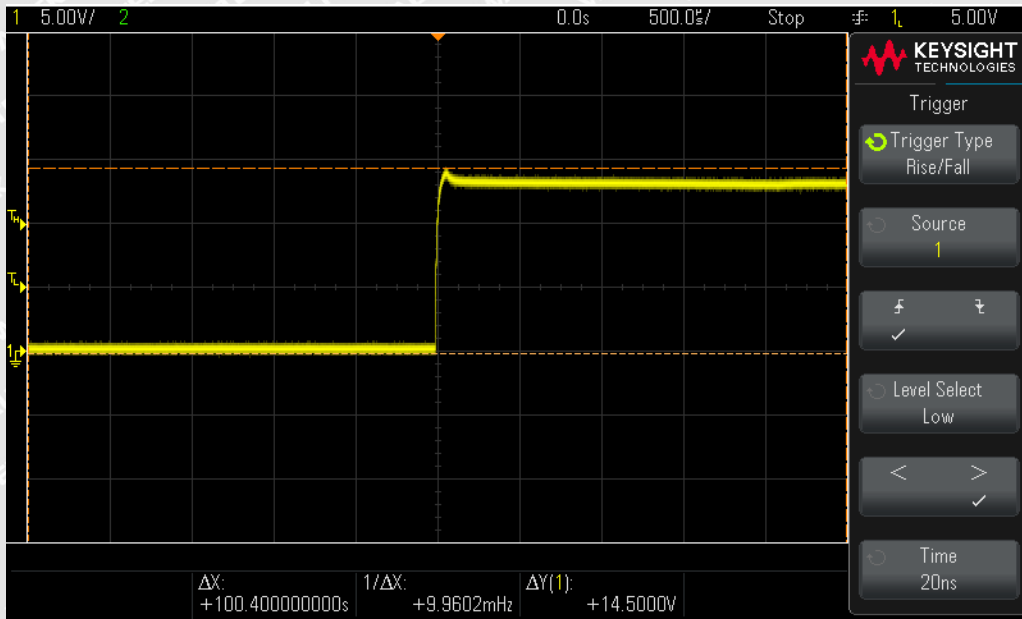


Fast off:

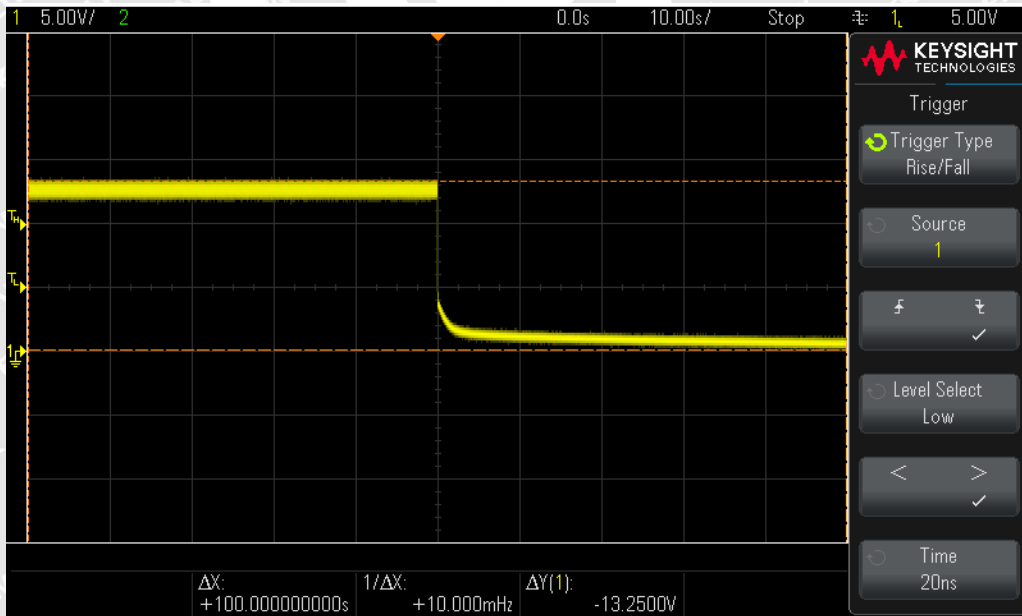




Slow on:



Slow off:

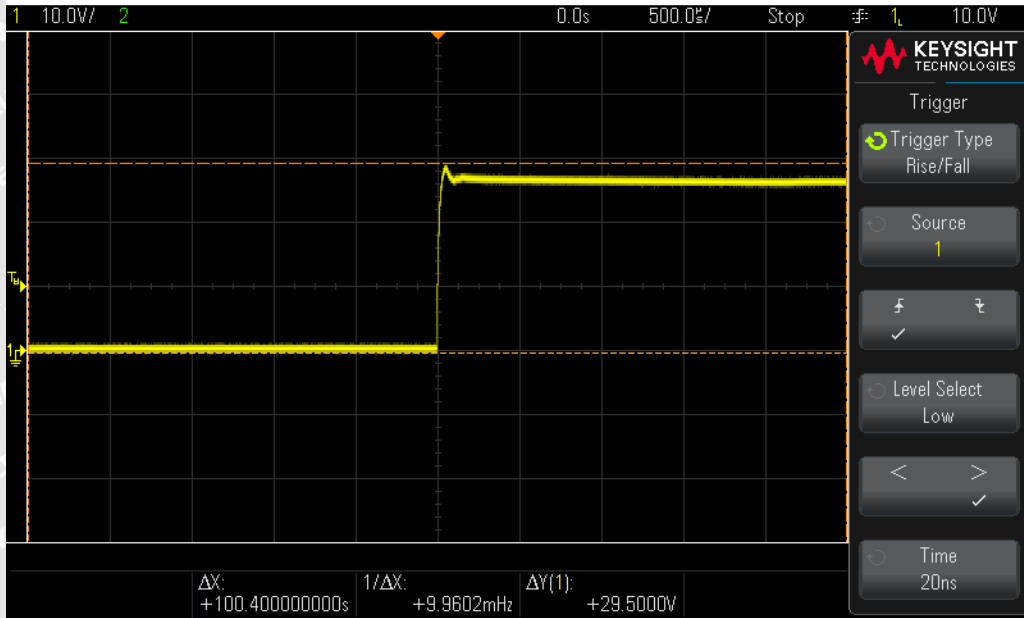




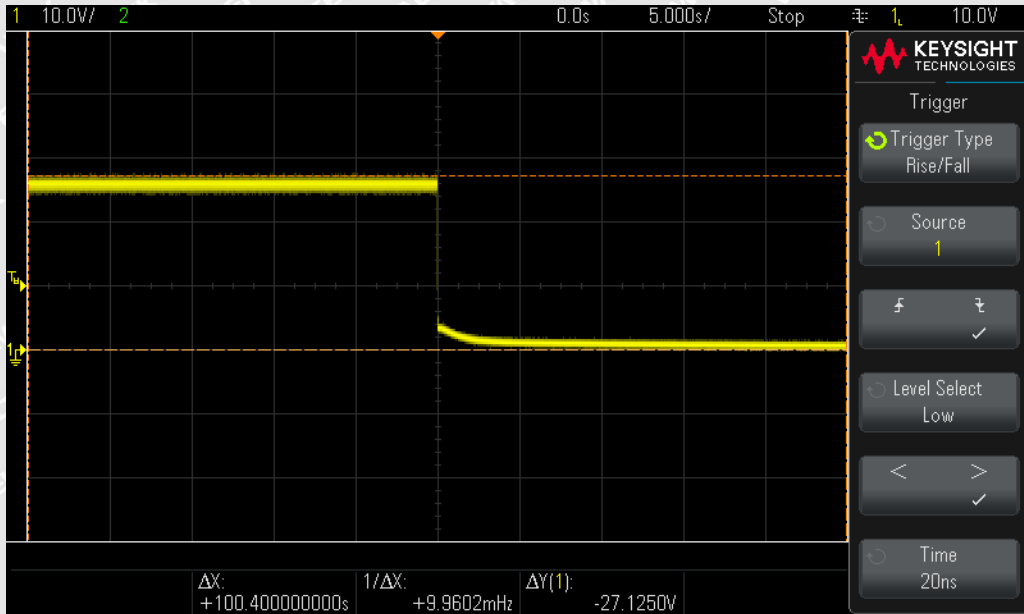
2. Test Voltage: DC 27V Operation Mode: Full Load

Pulse		Maximum allowed pulse amplitude	Measurement Level	Result
Fast	Switch on	Positive: +150V	+29.5V	Pass
	Switch off		-27.125V	Pass
Slow	Switch on	Negative: -450V	+29.375V	Pass
	Switch off		-26.625V	Pass

Fast on:



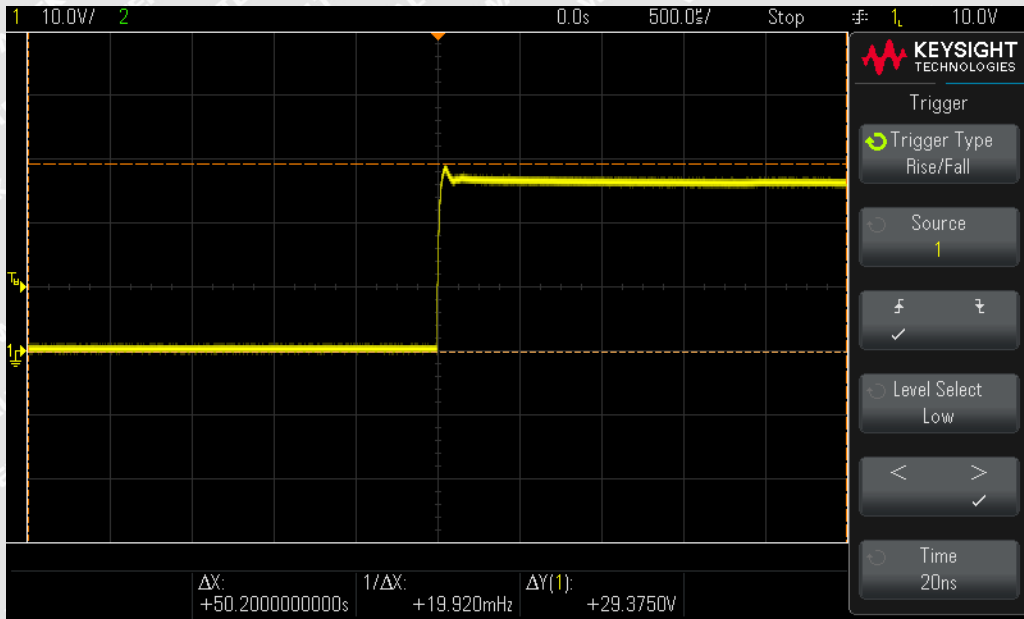
Fast off:



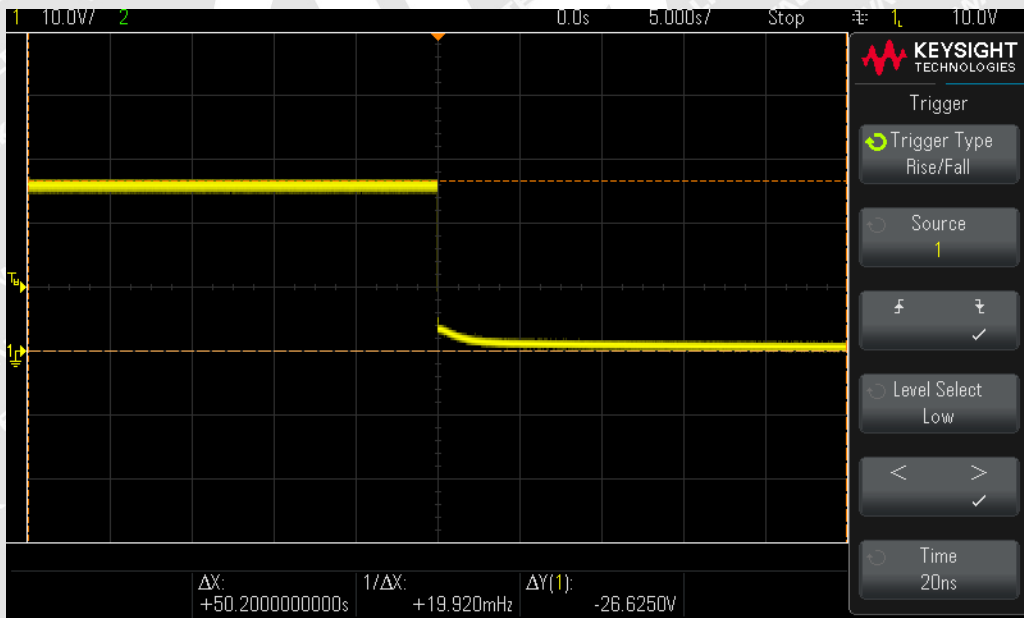




Slow on:



Slow off:





**5.3 Conducted Transient immunity**

Test Requirement..... : EN 50498:2010  
 Test Method ..... : ISO 7637-2:2004  
 Test Result ..... : Pass  
 Test Level..... : Table 4 of EN50498:2010

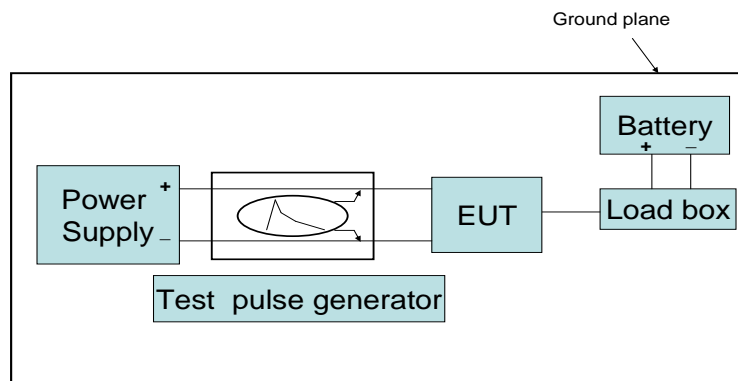
Test pulse number	Immunity test level	Functional status
1	III	D
2a	III	D
2b	III	D
3a/3b	III	D
4	III	D

Functional status ..... : Functional status D (one or more functions of a device/system do not perform as designed during exposure and do not return to normal operation until exposure is removed and the device/system is reset by simple “operator/use” action.)

**5.3.1 E.U.T. Operation**

Operating Environment:  
 Temperature..... : 20.0°C  
 Humidity ..... : 45.0%RH  
 Barometric Pressure ..... : 101.6kPa  
 EUT Operation:  
 Test Input Voltage ..... : DC 13.5V / DC 27V  
 Operating Mode ..... : Full Load

**5.3.2 Block Diagram of Setup**





### 5.3.3 Test Results

1. Test Voltage: DC 13.5V      Operation Mode: Full Load

Test Pulse	Level (V)	Number of pulses / Test Time	Pulse repetition time	Criteria	Actual performance	Result
1	-75	5000	0.5s	D	C <sup>1*</sup>	Pass
2a	+37	5000	0.5s	D	A*	Pass
2b	+10	10	5s	D	C <sup>2*</sup>	Pass
3a	-112	1h	0.1s	D	A*	Pass
3b	+75	1h	0.1s	D	A*	Pass
4	-6	1	5.275s	D	A*	Pass

Remark:

A\*-- DUT work normally during and after test.

C<sup>1\*</sup>-- DUT work abnormally and the indicator light flicker during test, then it can auto returned to normal after test.

C<sup>2\*</sup>-- DUT work intermittently and the indicator light turn off during test, then it can auto returned to normal after test.

2. Test Voltage: DC 27V      Operation Mode: Full Load

Test Pulse	Level (V)	Number of pulses / Test Time	Pulse repetition time	Criteria	Actual performance	Result
1	-450	5000	0.5s	D	C*	Pass
2a	+37	5000	0.5s	D	A*	Pass
2b	+20	10	5s	D	C*	Pass
3a	-150	1h	0.1s	D	A*	Pass
3b	+150	1h	0.1s	D	A*	Pass
4	-12	1	5.275s	D	A*	Pass

Remark:

A\*-- DUT work normally during and after test.

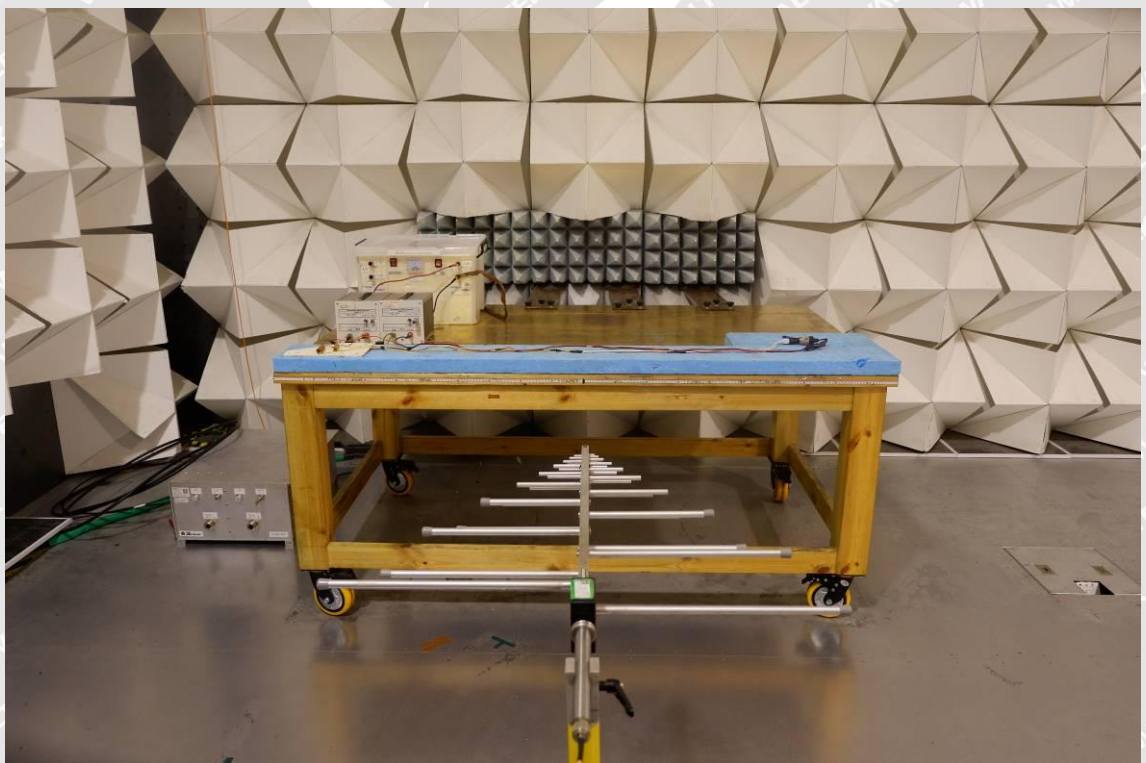
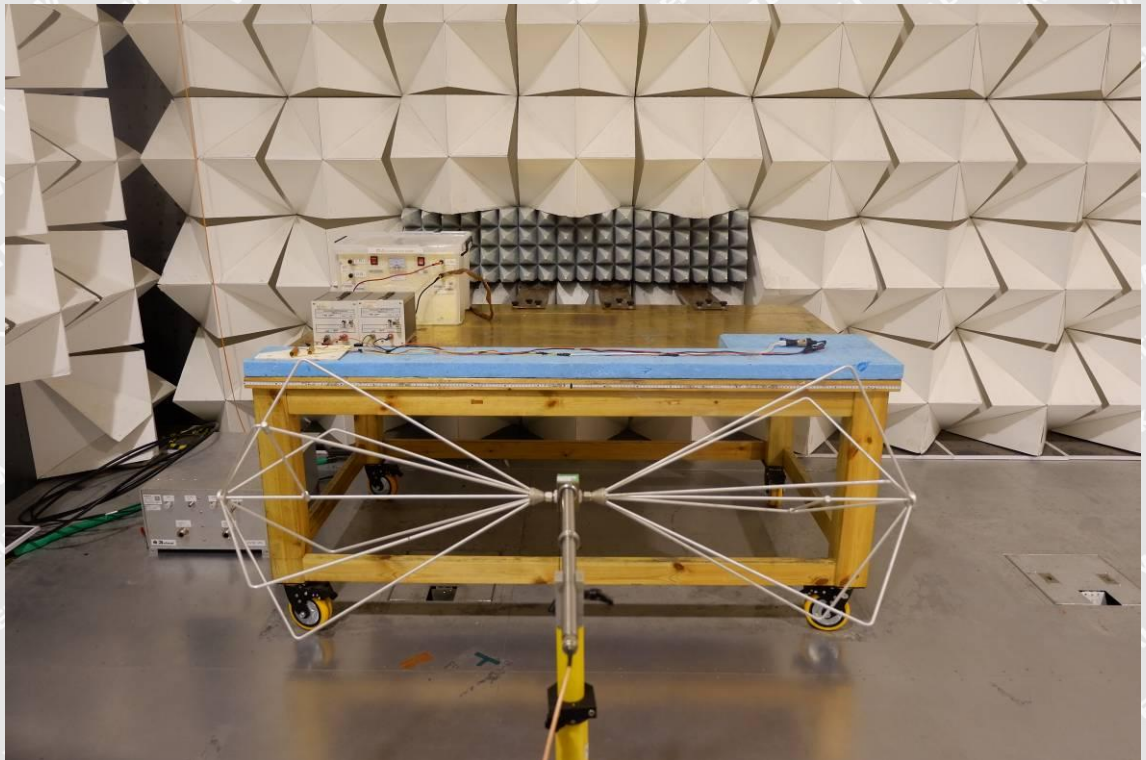
C\*-- DUT don't work and the indicator light flicker during test, then it can auto returned to normal after test.



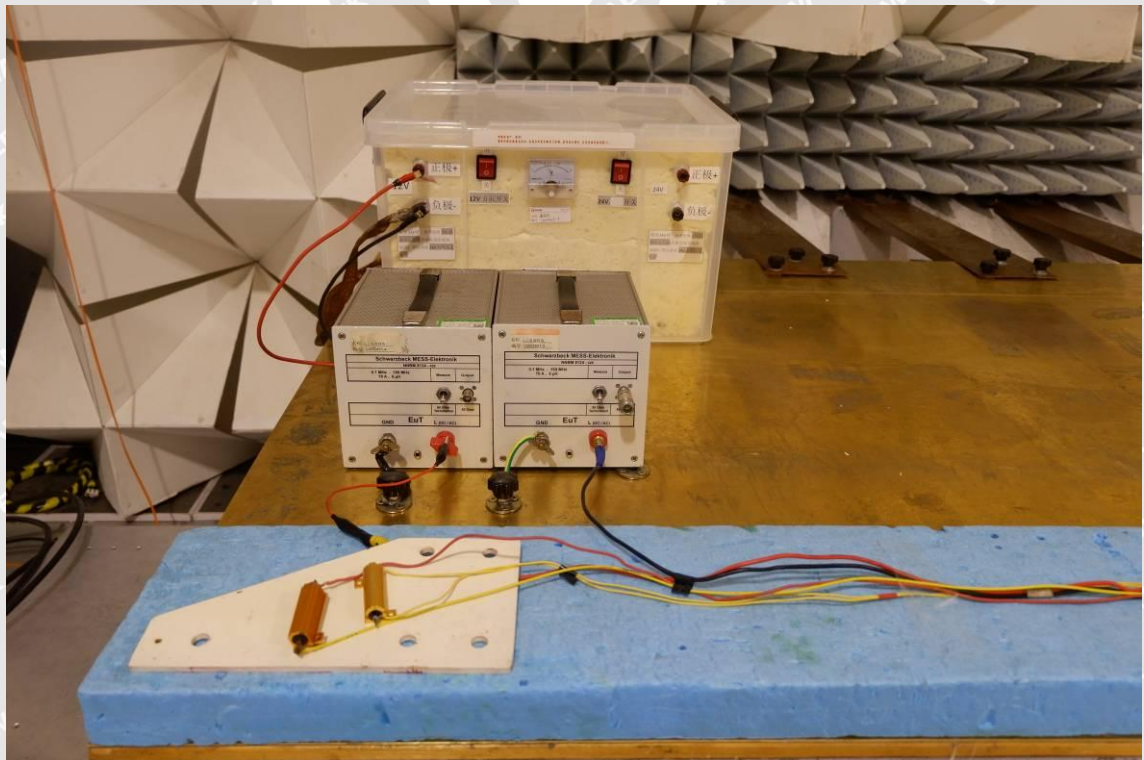
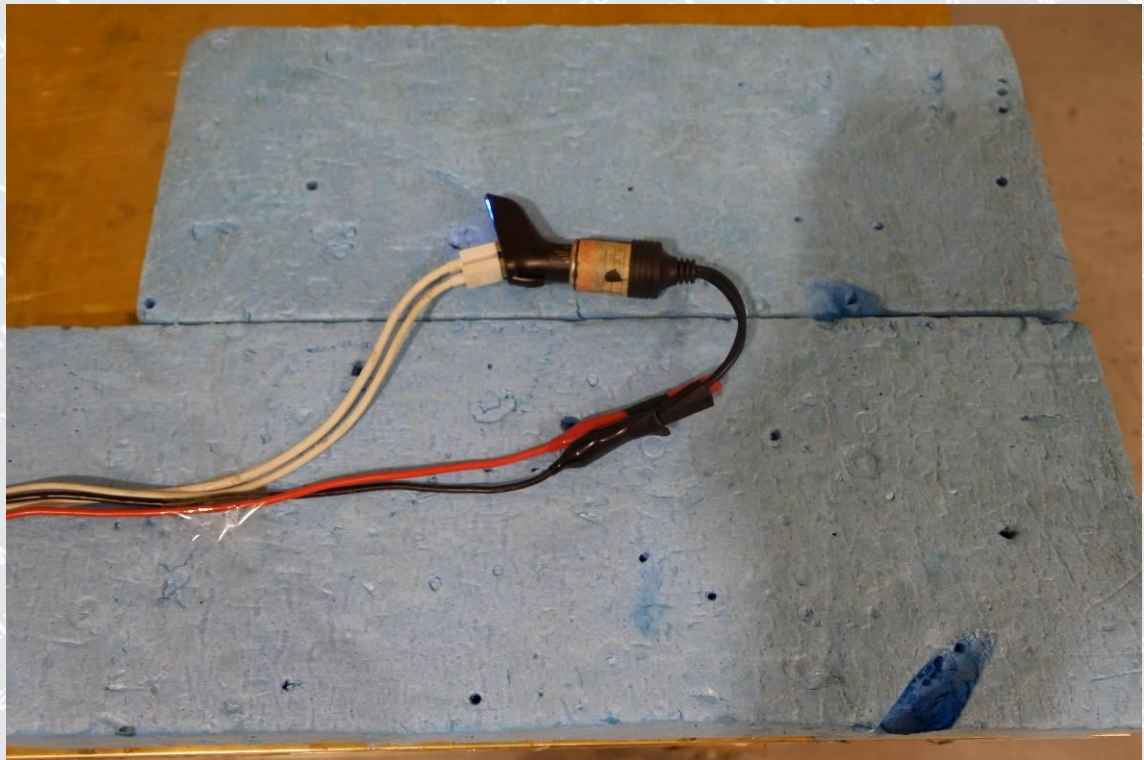


## 6 Photographs – Test Setup

### 6.1 Photograph –Broadband / Narrowband Radiated Emission Test Setup











## 6.2 Photograph –Conducted Transient Disturbances Test Setup

Fast



Slow



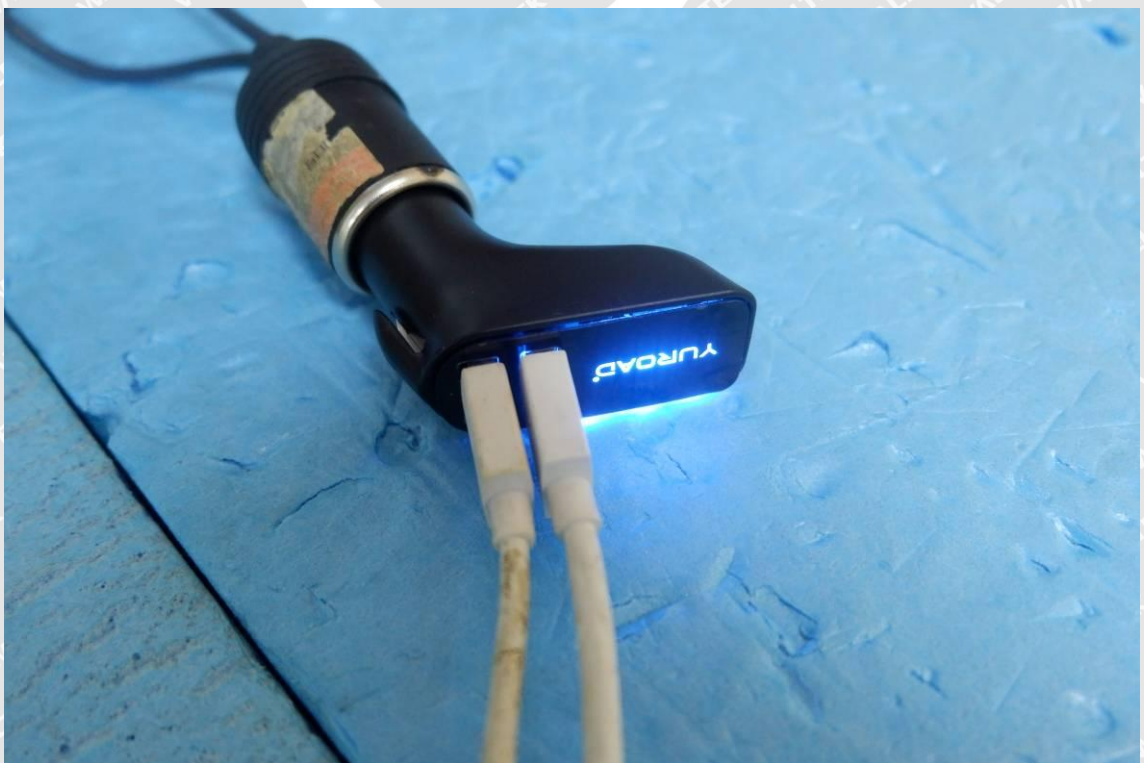




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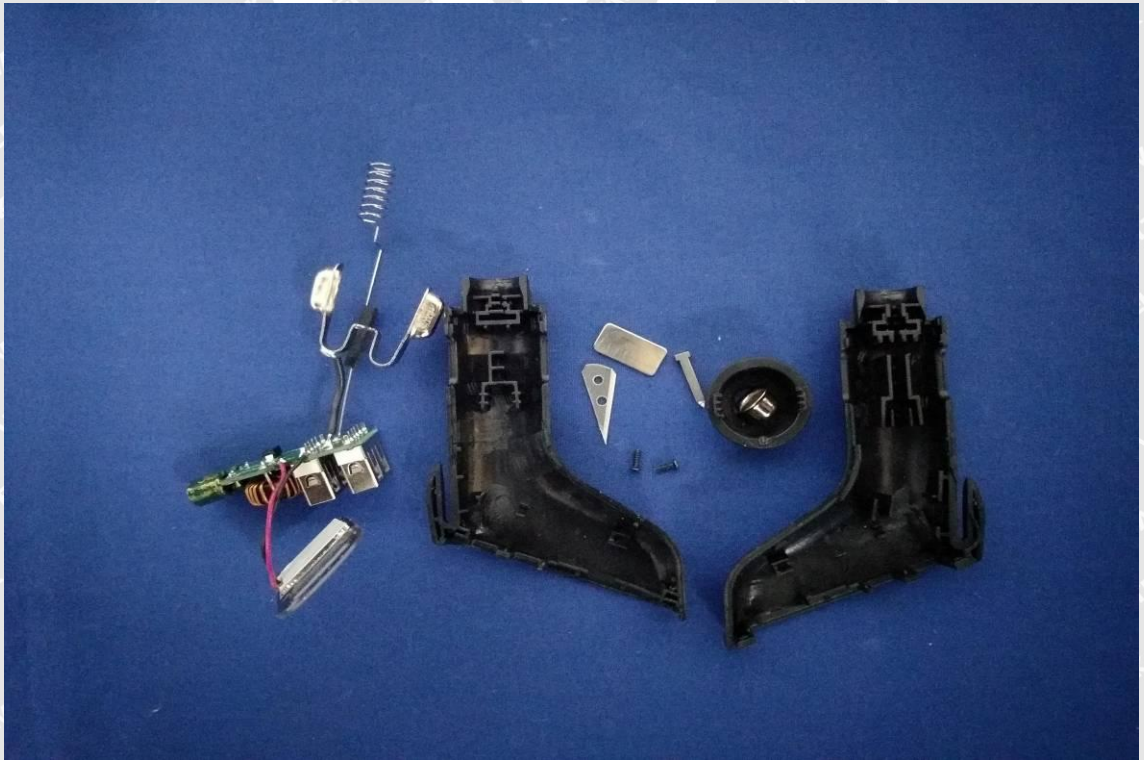
### 6.3 Photograph –Conducted Transient Immunity Test Setup



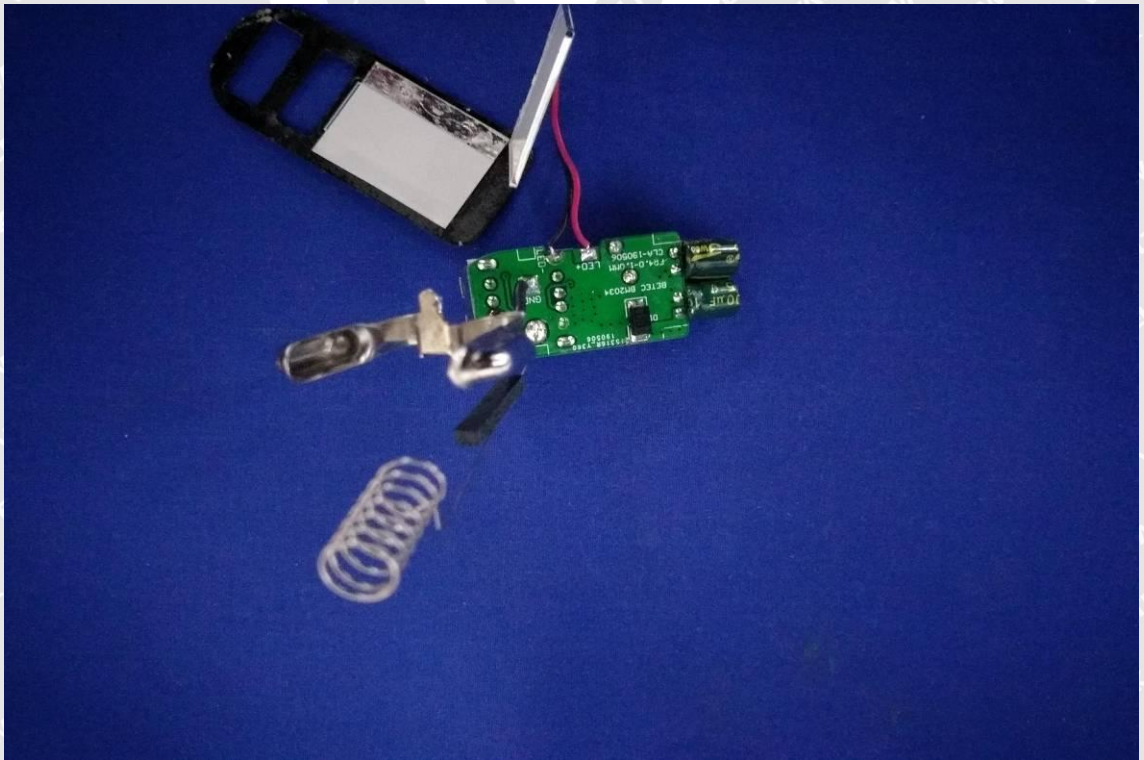
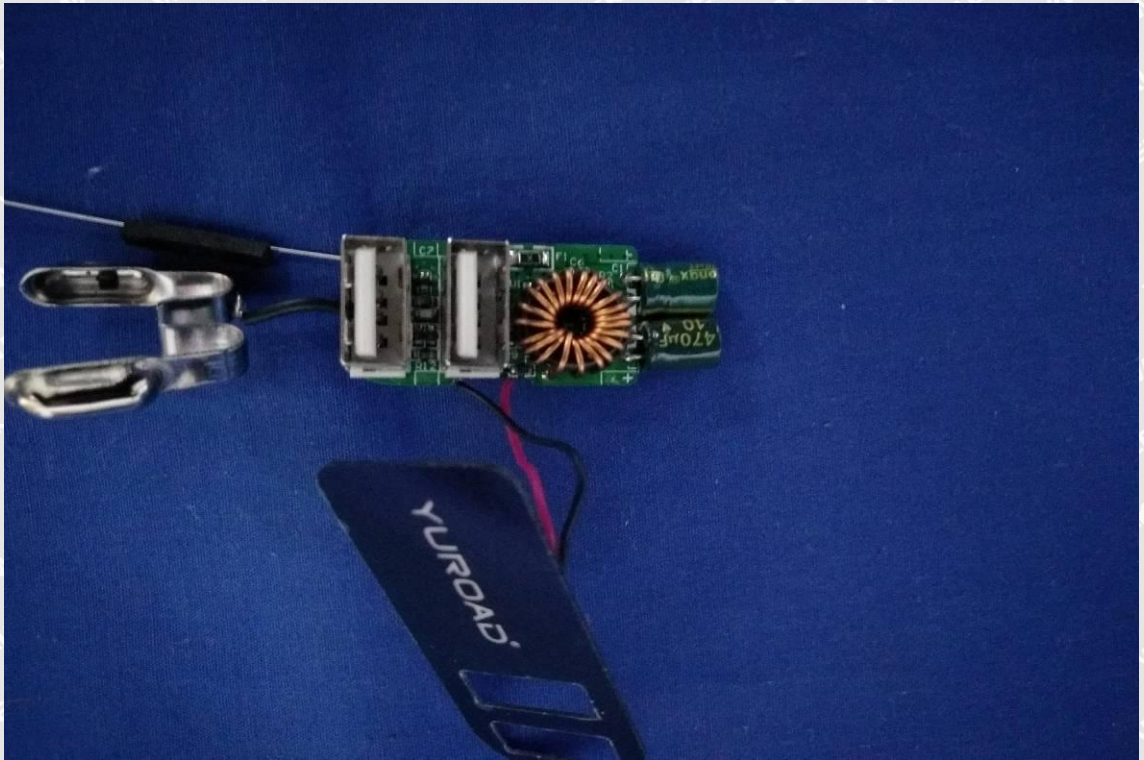




7 Photographs of EUT







=====End of Report=====