EMC Test Report

Report No.: AGC04158151003EE01

PRODUCT DESIGNATION	:	Car charger
BRAND NAME	:	N/A
MODEL NAME	:	BM2034
CLIENT	:	
DATE OF ISSUE	:	Oct.21, 2015
STANDARD(S)	:	EN 50498:2010
REPORT VERSION	:	V1.0

***A**ttestation of **G**lobal **C**ompliance (Shenzhen) Co., Ltd*

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Oct.21, 2015	Valid	Original Report

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1. VERIFICATION OF CONFORMITY

Applicant	
Address	
Manufacturer	
Address	
Product Designation	Car charger
Brand Name	N/A
Test Model	BM2034
Series Model	BM2034B
Model Difference	BM2034B increased the backlight.
Date of test	Oct.15, 2015 to Oct.20, 2015
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-EC-AM/DC(2013-09-01)

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. For compliance with the requirements set forth in the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission 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.

Tested By	Sam Zheng(Zheng Rizan)	Oct.21, 2015
Reviewed By	Rock Huang(Huang Dinglue)	Oct.21, 2015
Approved By	Solger Zhang(Zhang Hongyi) Authorized Officer	Oct.21, 2015

2. SYSTEM DESCRIPTION

NO.	TEST MODE DESCRIPTION
1	Full load for 12V
2	Full load for 24V
Note: 1) Only worst mode data recorded in the test report. 2) During test, the battery voltage is 13.5V for 12V, the battery voltage is 27V for 24V.	

3. 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 = ±3.2 dB

4. PRODUCT INFORMATION

Housing Type	Plastic and metal
EUT Input Rating	DC 10V-24V/10A
EUT Output Rating	DC 5V-1A(Max) DC 5V-2A(Max)

I/O Port Information (☒Applicable ☐Not Applicable)

I/O Port of EUT			
I/O Port Type	**Number**	**Cable Description**	**Tested With**
DC input port	1	unshielded	1
DC output port	2	unshielded	2

5. SUPPORT EQUIPMENT

Device Type	Description	Number
Resistor	5Ω	1
Resistor	2.5Ω	1

6. TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	B112-B113, Building 12, Baoan Building Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen, Guangdong, P.R.China
Description	Test Method according to ISO7637-2:2011 & CISPR 25:2008

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	2015.07.31	2016.07.30
V-network	R&S	ESH3-Z6	2015.08.31	2016.08.30
V-network	R&S	ESH3-Z6	2015.08.31	2016.08.30
Biconical Antenna	SCHWARZBECK	VHBB 9124	2015.03.19	2016.03.18
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	2015.03.20	2016.03.19

TEST EQUIPMENT OF TRANSIENT EMISSION

Equipment	Manufacturer	Model	Cal. Date	Cal. Due
Digital Oscilloscope	Yokogawa	DL9140	2015.07.29	2016.07.28
Switch Simulator	Schaffner	NSG417	2015.09.05	2016.09.04
V-network	R&S	ESH3-Z6	2015.08.31	2016.08.30

TEST EQUIPMENT OF TRANSIENT IMMUNITY TEST

Description	Manufacturer	Model	Cal. Date	Cal. Due
Voltage Drop Simulator	EM Test	VDS 200	2015.08.31	2016.08.30
Electrical Fast Transient Generator	EM Test	EFT 200	2015.08.31	2016.08.30
Micropulse Generator	EM Test	MPG 200	2015.08.31	2016.08.30

7. RADIATED EMISSION TEST (Test method according to CISPR 25:2008)

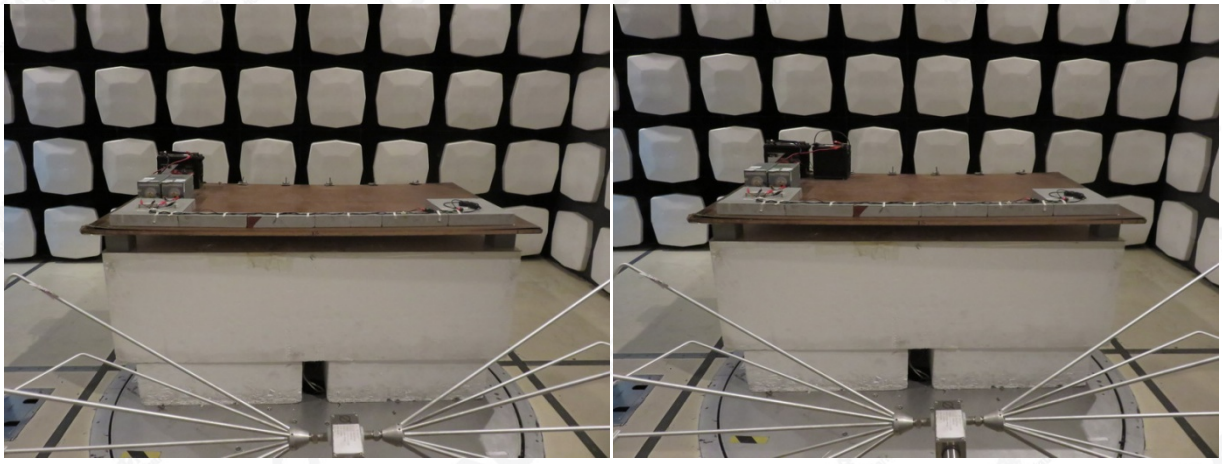
7.1 DESCRIPTION OF THE TEST LOCATION

Test location: Semi-anechoic Chamber

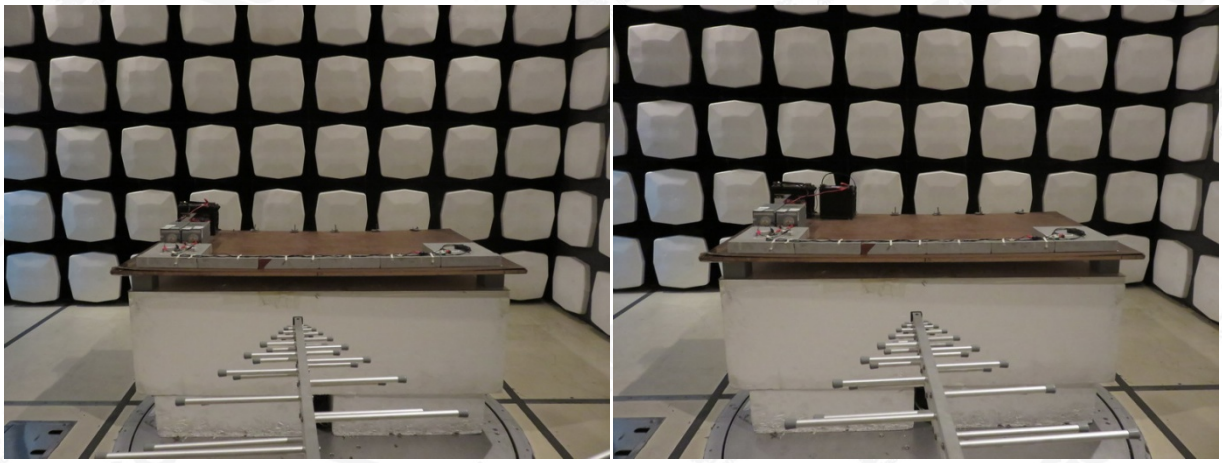
Test distance: 1 meter

7.2 PHOTO DOCUMENTATION OF THE TEST SET-UP

30MHz-200MHz



200MHz-1000MHz



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.

7.3 TEST SPECIFICATION:

Frequency range: 30MHz – 1000MHz

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

- Full load for $12V_{DC}$
- Full Load for $24V_{DC}$

7.4 TEST RESULT

Min. limit margin for QP +31.3dB

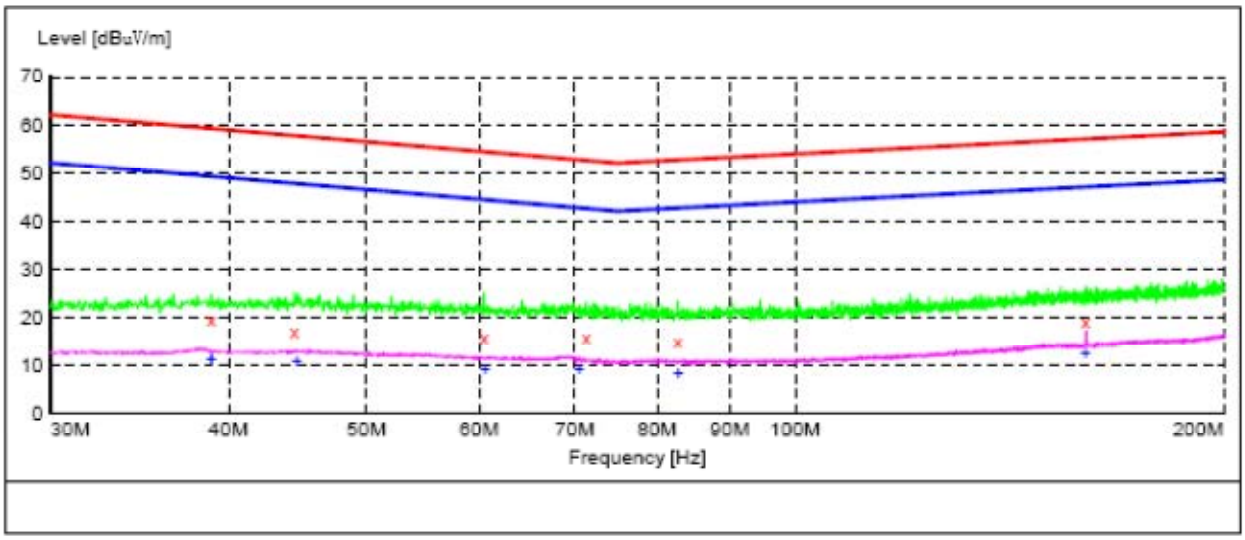
Min. limit margin for AV +28.4dB

The requirements are **FULFILLED**

Remarks:	

7.5 TEST PROTOCOL

Antenna polarisation:	Horizontal	Date:	Oct.20, 2015
Frequency range:	30MHz-200MHz	Tested by:	Sam
Operation mode:	Full load for $12V_{DC}$	Result:	Pass



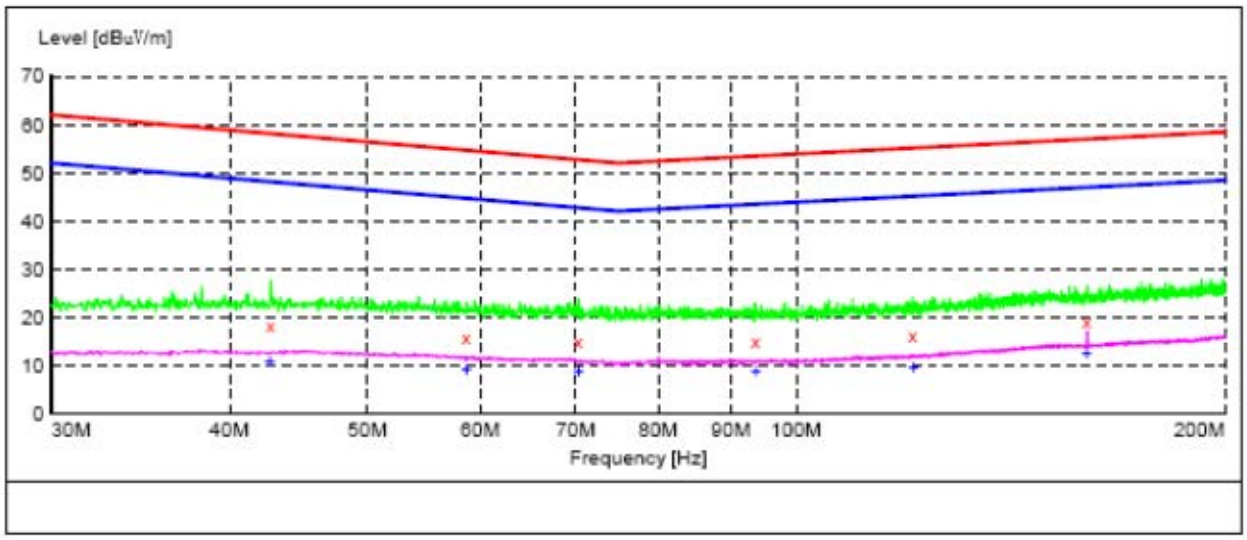
MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
38.900000	19.30	13.0	59.2	39.9	QP	H
44.500000	17.10	13.3	57.7	40.6	QP	H
60.450000	15.90	11.8	54.4	38.5	QP	H
71.300000	15.70	11.3	52.6	36.9	QP	H
82.700000	15.00	11.3	52.6	37.6	QP	H
160.000000	18.90	14.7	57.0	38.1	QP	H

MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
38.900000	11.00	13.0	49.2	38.2	AV	H
44.700000	10.60	13.3	47.6	37.0	AV	H
60.550000	9.30	11.7	44.3	35.0	AV	H
70.550000	9.00	11.3	42.7	33.7	AV	H
82.800000	8.40	11.3	42.7	34.3	AV	H
160.000000	12.30	14.7	47.0	34.7	AV	H

Antenna polarisation:	Vertical	Date:	Oct.20, 2015
Frequency range:	30MHz-200MHz	Tested by:	Sam
Operation mode:	Full load for 12V_{DC}	Result:	Pass



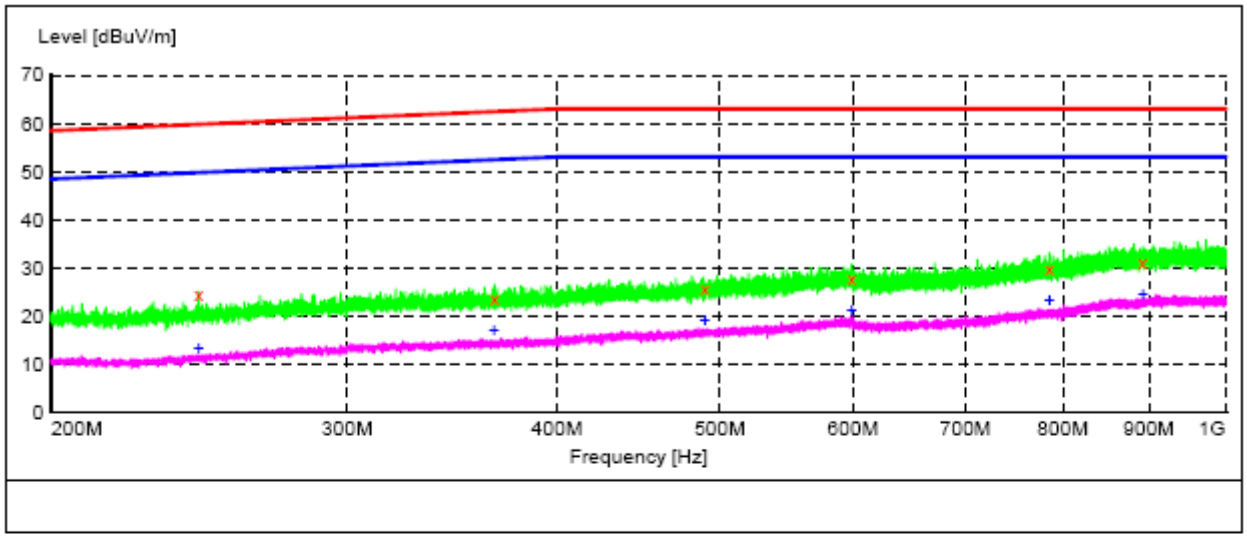
MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
42.750000	18.30	13.2	58.1	39.8	QP	V
58.650000	15.90	12.0	54.7	38.8	QP	V
70.300000	15.10	11.3	52.7	37.6	QP	V
93.600000	15.10	11.5	53.5	38.4	QP	V
120.700000	16.10	12.6	55.1	39.0	QP	V
160.000000	19.00	14.7	57.0	38.0	QP	V

MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
42.700000	10.70	13.2	48.1	37.4	AV	V
58.700000	9.30	12.0	44.7	35.4	AV	V
70.350000	8.60	11.3	42.7	34.1	AV	V
93.700000	8.50	11.5	43.5	35.0	AV	V
120.850000	9.60	12.6	45.1	35.5	AV	V
160.000000	12.40	14.7	47.0	34.6	AV	V

Antenna polarisation:	Horizontal	Date:	Oct.20, 2015
Frequency range:	200MHz-1000MHz	Tested by:	Sam
Operation mode:	Full load for $12V_{DC}$	Result:	Pass



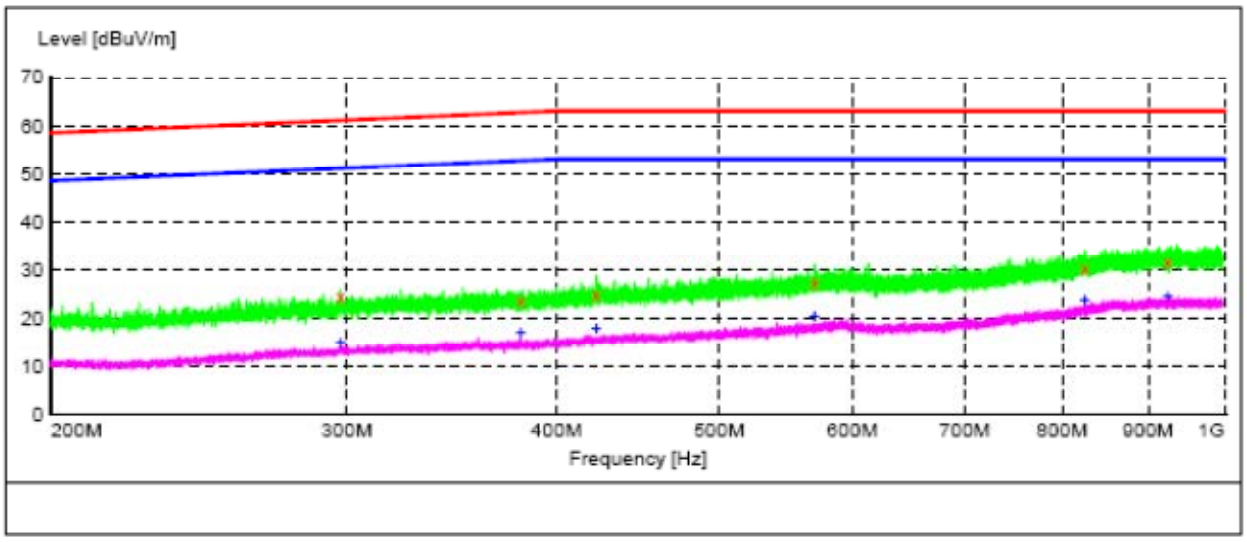
MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
244.800000	24.60	14.3	59.8	35.2	QP	H
367.100000	23.60	17.0	62.4	38.8	QP	H
489.900000	25.70	19.0	63.0	37.3	QP	H
598.850000	27.90	20.7	63.0	35.1	QP	H
785.200000	29.90	22.8	63.0	33.1	QP	H
892.550000	31.10	23.9	63.0	31.9	QP	H

MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
244.800000	13.30	14.3	49.8	36.5	AV	H
367.050000	16.80	17.0	52.4	35.6	AV	H
489.900000	18.90	19.0	53.0	34.1	AV	H
598.900000	21.10	20.7	53.0	31.9	AV	H
785.250000	23.20	22.8	53.0	29.8	AV	H
892.650000	24.30	23.9	53.0	28.7	AV	H

Antenna polarisation:	Vertical	Date:	Oct.20, 2015
Frequency range:	200MHz-1000MHz	Tested by:	Sam
Operation mode:	Full load for 12VDC	Result:	Pass



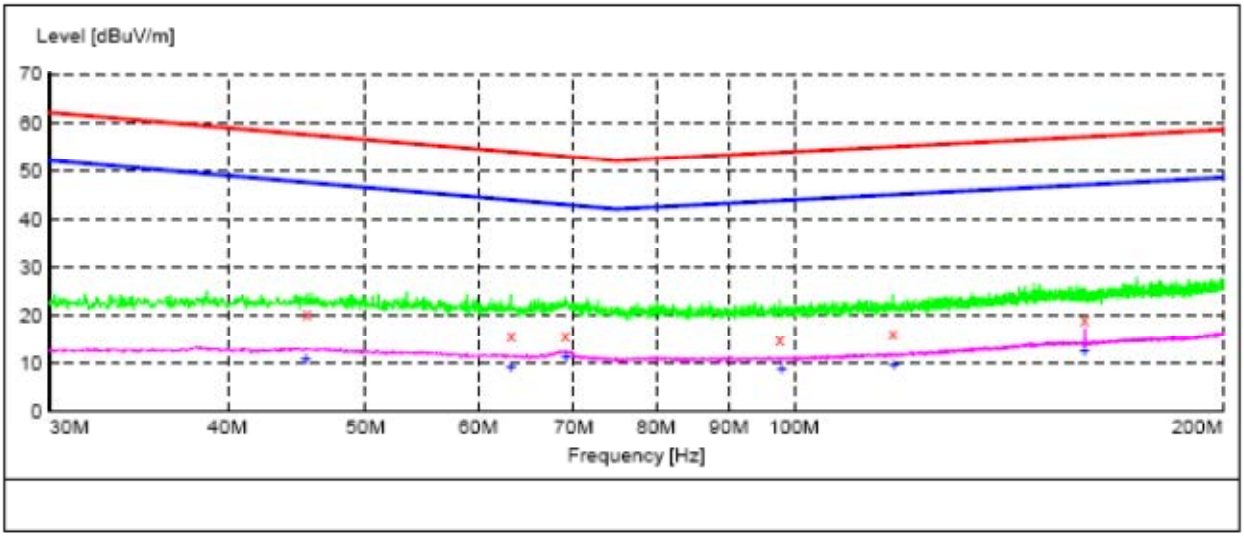
MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
297.400000	24.30	15.7	61.1	36.8	QP	V
380.750000	23.60	17.1	62.7	39.1	QP	V
422.300000	24.70	18.1	63.0	38.3	QP	V
569.650000	27.30	20.2	63.0	35.7	QP	V
824.950000	30.50	23.2	63.0	32.5	QP	V
924.250000	31.40	24.2	63.0	31.6	QP	V

MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
297.500000	15.10	15.7	51.1	36.0	AV	V
380.800000	16.90	17.1	52.7	35.8	AV	V
422.200000	17.80	18.1	53.0	35.2	AV	V
569.650000	20.50	20.2	53.0	32.5	AV	V
825.400000	23.70	23.2	53.0	29.3	AV	V
924.700000	24.60	24.2	53.0	28.4	AV	V

Antenna polarisation:	Horizontal	Date:	Oct.20, 2015
Frequency range:	30MHz-200MHz	Tested by:	Sam
Operation mode:	Full load for 24V_{DC}	Result:	Pass



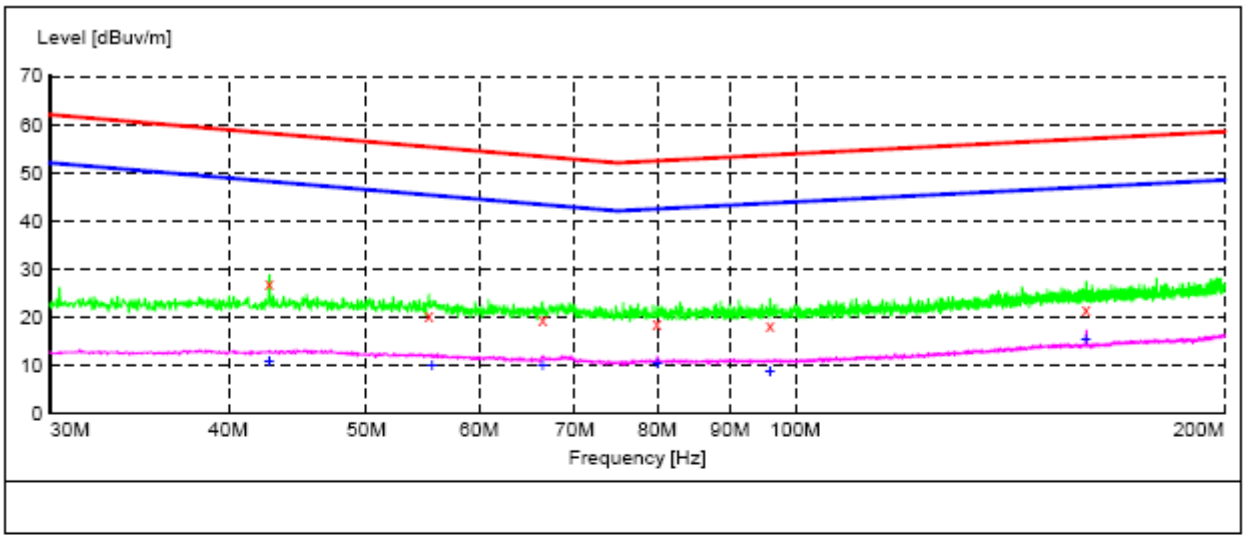
MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
45.500000	20.40	13.3	57.5	37.1	QP	H
63.250000	15.90	11.5	53.9	38.0	QP	H
69.050000	15.90	11.3	52.9	37.0	QP	H
97.700000	15.10	11.5	53.7	38.6	QP	H
117.300000	16.00	12.5	54.9	38.9	QP	H
160.000000	18.90	14.7	57.0	38.1	QP	H

MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
45.400000	10.70	13.3	47.5	36.8	AV	H
63.250000	9.30	11.5	43.9	34.6	AV	H
69.150000	11.30	11.3	42.9	31.6	AV	H
98.000000	8.60	11.5	43.8	35.2	AV	H
117.500000	9.50	12.5	45.0	35.5	AV	H
160.000000	12.30	14.7	47.0	34.7	AV	H

Antenna polarisation:	Vertical	Date:	Oct.20, 2015
Frequency range:	30MHz-200MHz	Tested by:	Sam
Operation mode:	Full load for 24V_{DC}	Result:	Pass



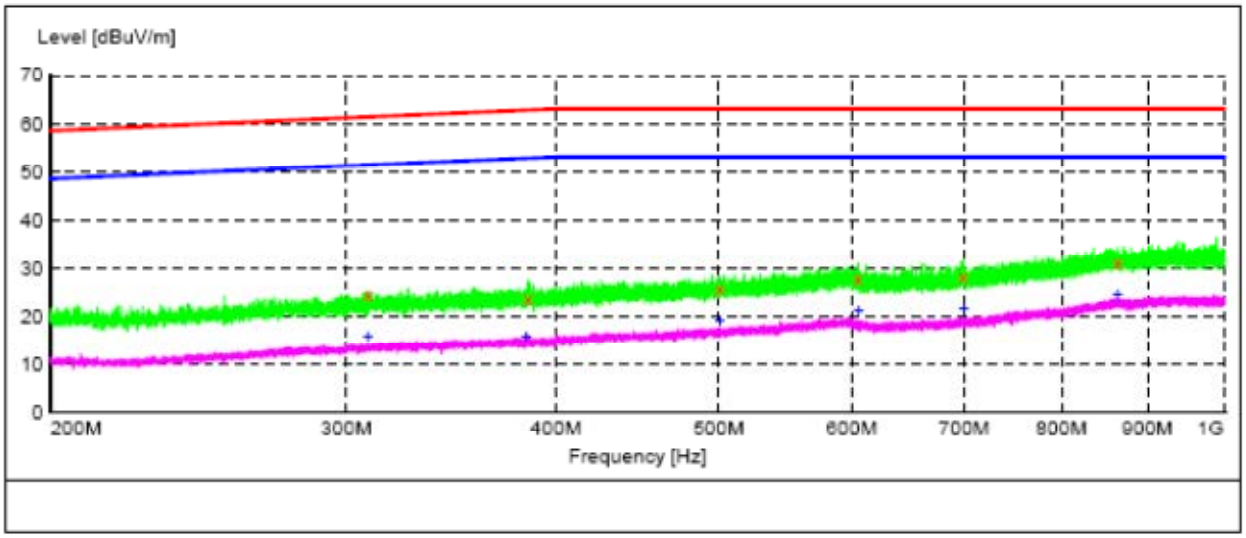
MEASUREMENT RESULT:

Frequency MHz	Level dBuv/m	Transd dB	Limit dBuv/m	Margin dB	Detector	P
42.750000	26.80	13.2	58.1	31.3	QP	V
55.300000	20.50	12.4	55.3	34.8	QP	V
66.450000	19.50	11.4	53.3	39.8	QP	V
79.950000	18.70	11.4	52.4	33.7	QP	V
96.000000	18.30	11.5	53.6	35.3	QP	V
159.950000	21.50	14.7	57.0	35.5	QP	V

MEASUREMENT RESULT:

Frequency MHz	Level dBuv/m	Transd dB	Limit dBuv/m	Margin dB	Detector	P
42.750000	10.60	13.2	48.1	37.5	AV	V
55.600000	9.90	12.4	45.3	35.4	AV	V
66.500000	9.90	11.4	43.3	33.4	AV	V
80.000000	10.30	11.4	42.4	32.1	AV	V
96.000000	8.70	11.5	43.6	34.9	AV	V
160.000000	15.40	14.7	47.0	31.6	AV	V

Antenna polarisation:	Horizontal	Date:	Oct.20, 2015
Frequency range:	200MHz-1000MHz	Tested by:	Sam
Operation mode:	Full load for 24V_{DC}	Result:	Pass



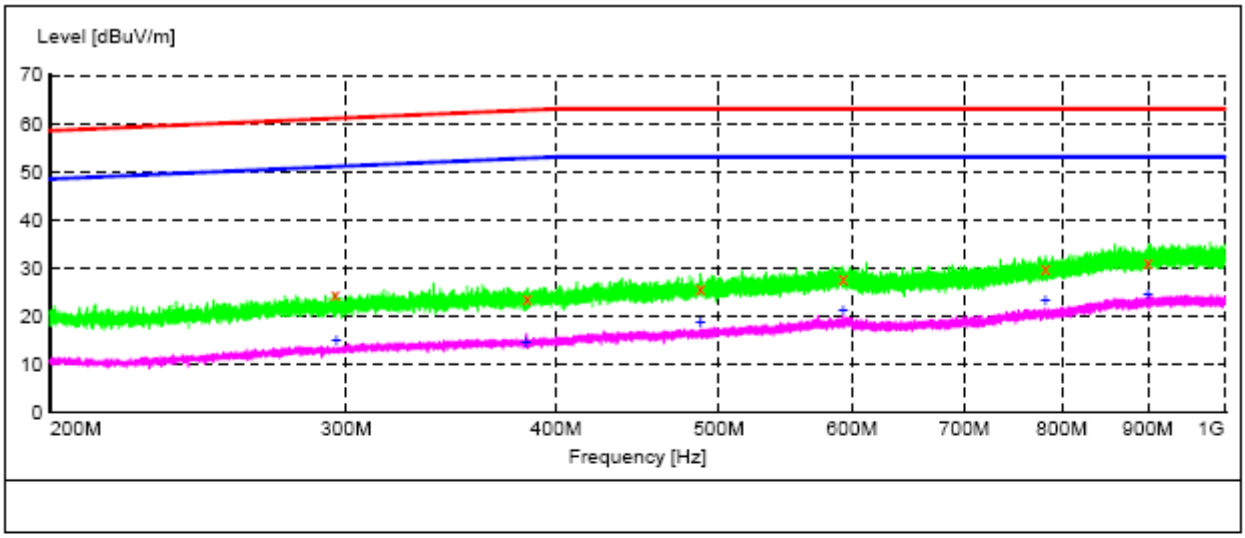
MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
309.100000	24.60	15.9	61.3	36.7	QP	H
384.800000	23.80	17.2	62.7	38.9	QP	H
500.650000	25.80	19.1	63.0	37.2	QP	H
604.950000	27.90	20.6	63.0	35.1	QP	H
699.000000	28.40	21.0	63.0	34.6	QP	H
863.900000	31.20	23.7	63.0	31.8	QP	H

MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
309.050000	15.70	15.9	51.3	35.6	AV	H
384.000000	15.70	17.1	52.7	37.0	AV	H
500.650000	19.00	19.1	53.0	34.0	AV	H
605.700000	21.10	20.6	53.0	31.9	AV	H
700.050000	21.60	21.0	53.0	31.4	AV	H
864.050000	24.30	23.7	53.0	28.7	AV	H

Antenna polarisation:	Vertical	Date:	Oct.20, 2015
Frequency range:	200MHz-1000MHz	Tested by:	Sam
Operation mode:	Full load for 24V_{DC}	Result:	Pass



MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
295.700000	24.30	15.7	61.0	36.7	QP	V
384.500000	23.70	17.1	62.7	39.0	QP	V
487.450000	25.60	19.0	63.0	37.4	QP	V
592.850000	27.80	20.6	63.0	35.2	QP	V
782.300000	30.00	22.8	63.0	33.0	QP	V
900.450000	31.30	24.1	63.0	31.7	QP	V

MEASUREMENT RESULT:

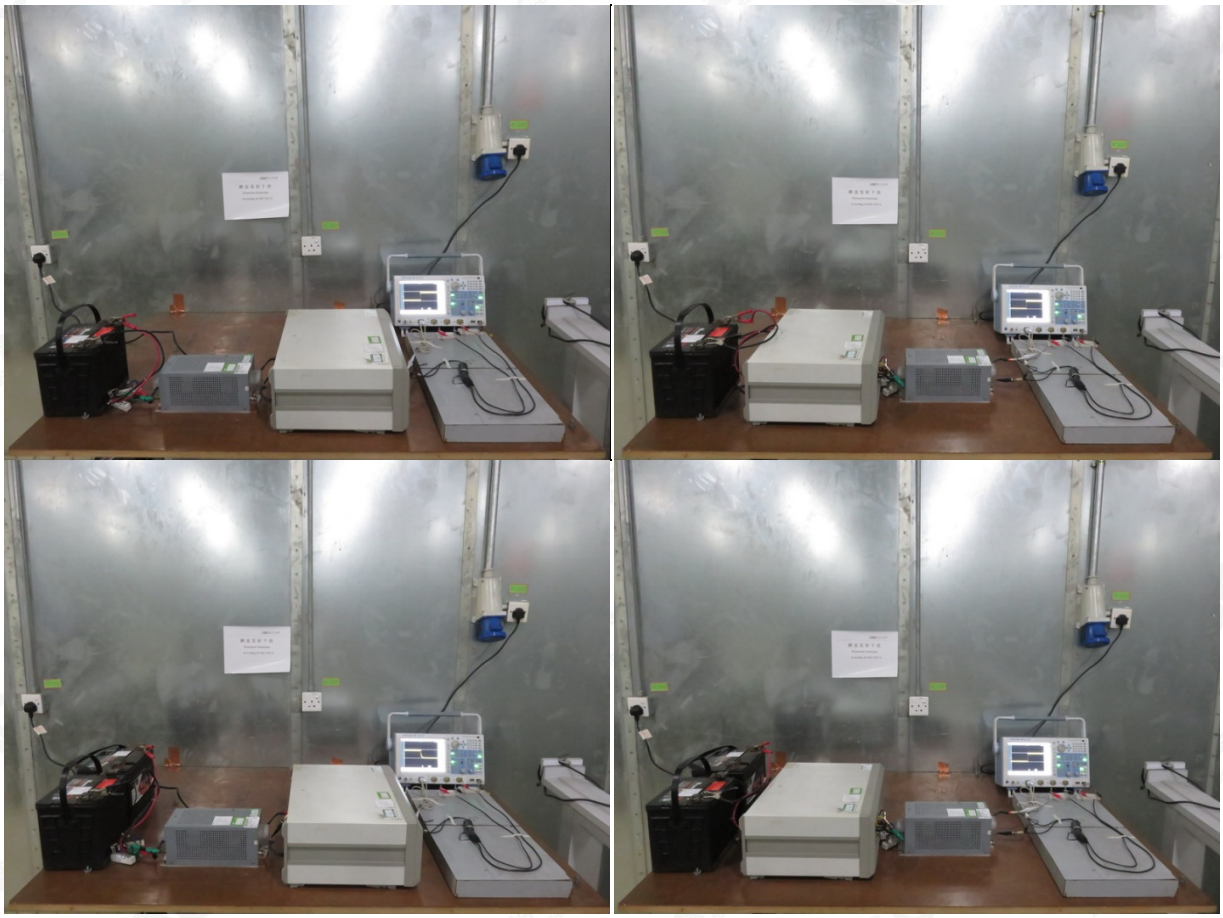
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Detector	P
296.100000	15.10	15.7	51.0	35.9	AV	V
384.000000	14.70	17.1	52.7	38.0	AV	V
487.650000	18.80	19.0	53.0	34.2	AV	V
592.850000	21.00	20.6	53.0	32.0	AV	V
782.150000	23.20	22.8	53.0	29.8	AV	V
900.450000	24.60	24.1	53.0	28.4	AV	V

8. TRANSIENT EMISSION TEST (Test method according to 7637-2:2011)

8.1 DESCRIPTION OF THE TEST LOCATION

Test location: Shielded room

8.2 PHOTO DOCUMENTATION OF THE TEST SET-UP



8.3 TEST SPECIFICATION:

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

- Full load for $12V_{DC}$
- Full load for $24V_{DC}$

8.4 TEST RESULT

Min. limit margin (positive) +1.75 V

Min. limit margin (negative) -26.50V

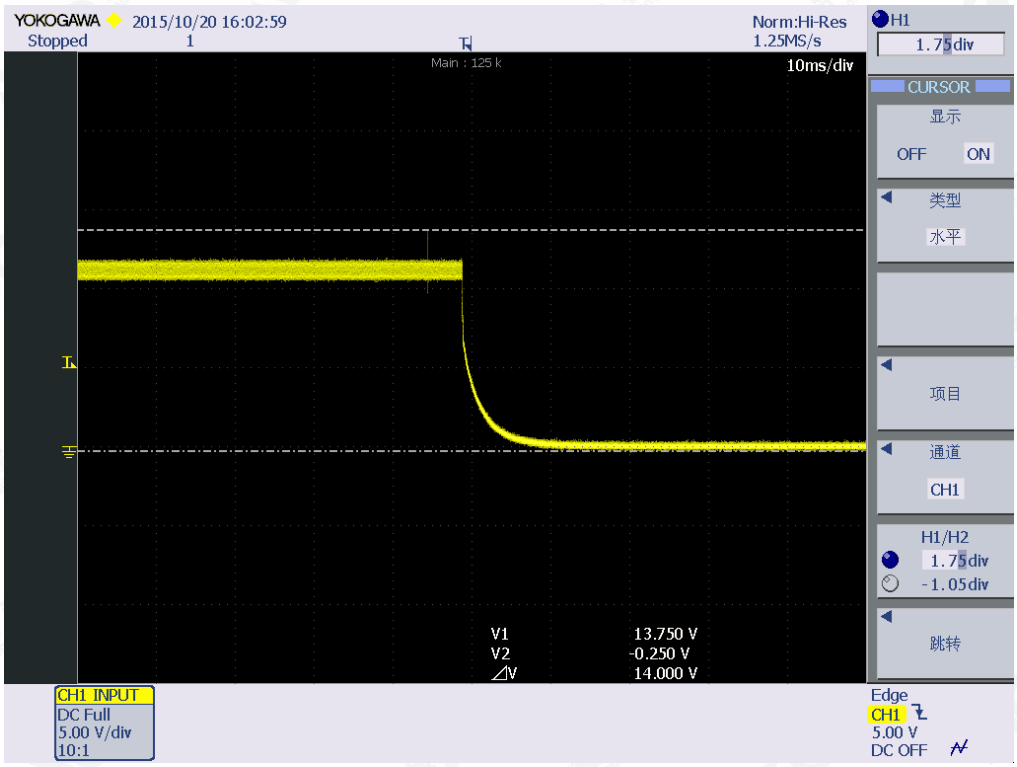
The requirements are **FULFILLED**

Remarks:	

8.5 TEST PROTOCOL

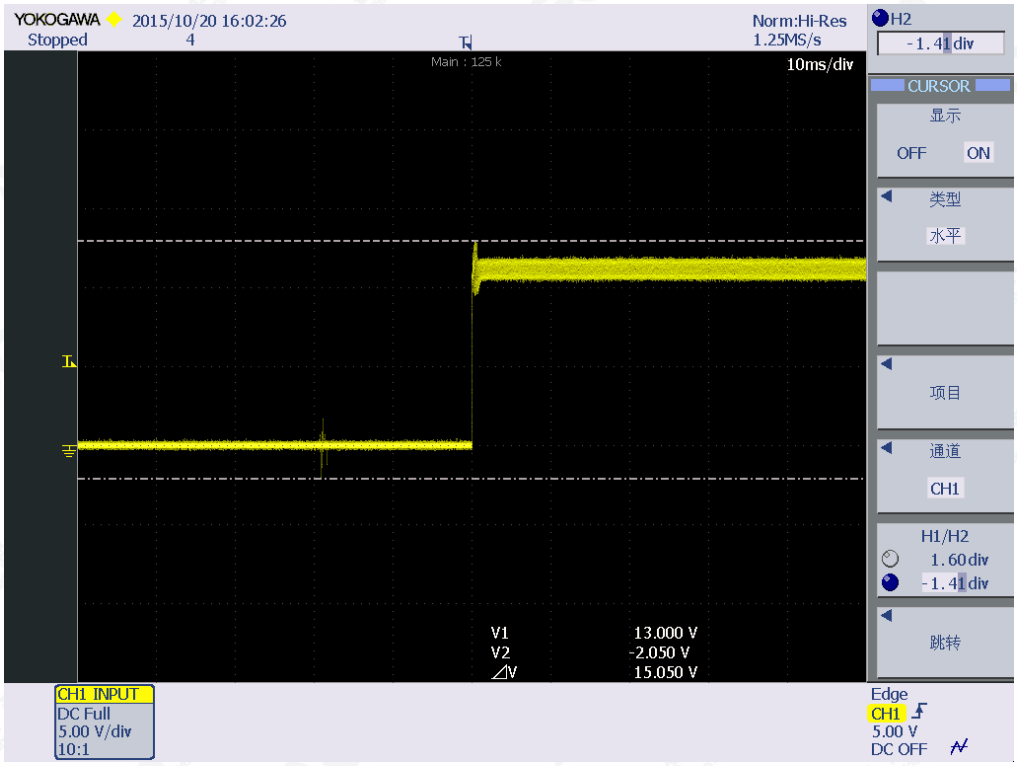
Operation mode:	Full load for 12VDC	Tested by:	Sam
Remarks:	Maximum positive amplitude	Result:	Pass
Date:	Oct.20, 2015		

Pulse type	Limit [V]	Result [V]
Fast pulses	+75	+1.75



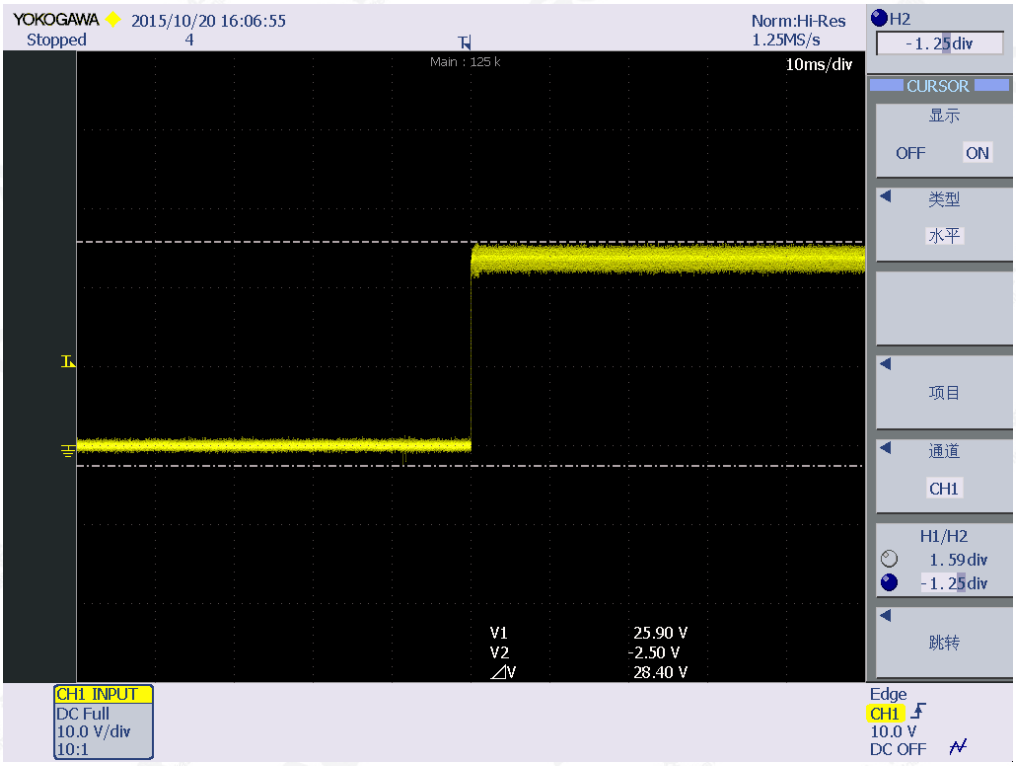
Operation mode:	Full load for $12V_{DC}$	Tested by:	Sam
Remarks:	Maximum negative amplitude	Result:	Pass
Date:	Oct.20, 2015		

Pulse type	Limit [V]	Result [V]
Fast pulses	-100	-14.05



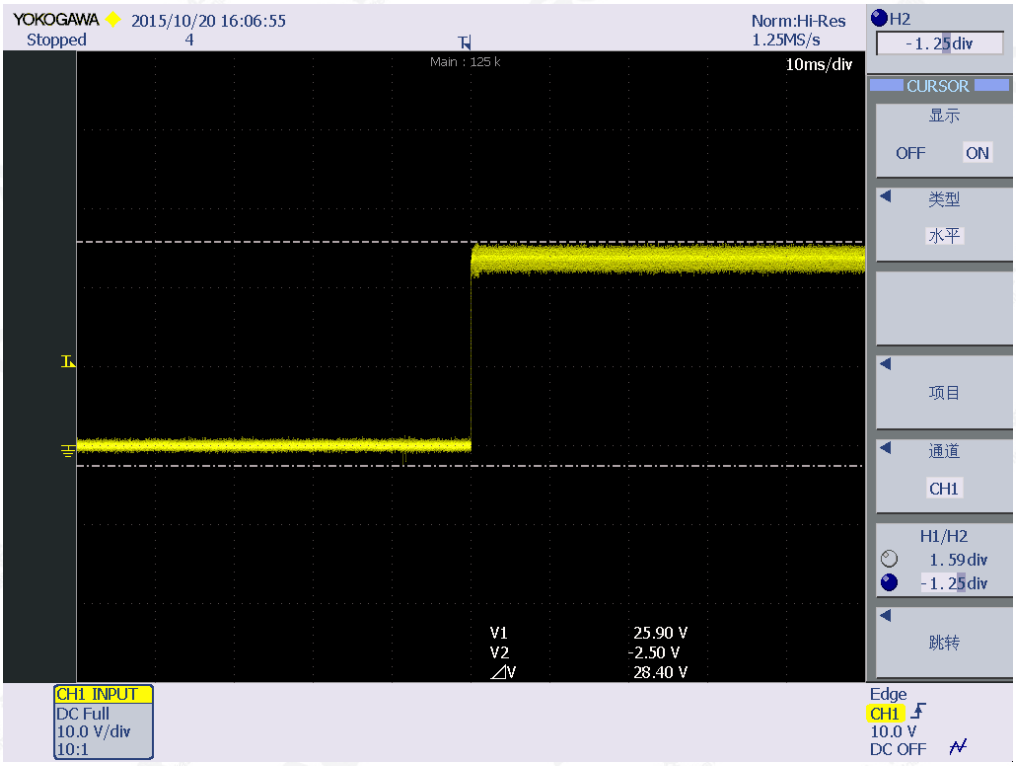
Operation mode:	Full load for 24V_{DC}	Tested by:	Sam
Remarks:	Maximum positive amplitude	Result:	Pass
Date:	Oct.20, 2015		

Pulse type	Limit [V]	Result [V]
Fast pulses	+150	+1.90



Operation mode:	Full load for $24V_{DC}$	Tested by:	Sam
Remarks:	Maximum negative amplitude	Result:	Pass
Date:	Oct.20, 2015		

Pulse type	Limit [V]	Result [V]
Fast pulses	-450	-26.50



9. TRANSIENT IMMUNITY TEST (Test method according to 7637-2:2011)

9.1 DESCRIPTION OF THE TEST LOCATION

Test location: Test Room 2

9.2 PHOTO DOCUMENTATION OF THE TEST SET-UP

9.3 TEST 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 $12V_{DC}$ - Full load for $24V_{DC}$

9.4 TEST RESULT

Test pulse number	Test voltage	Number of pulses / duration	Required functional status	Functional status of the systems during the test
1 (12V)	-75 V	500	D	**C**
1 (24V)	-450 V	500	D	**C**
2a (12V)	+37 V	500	D	**A**
2a (24V)	+37 V	500	D	**A**
2b (12V)	+10 V	10	D	**C**
2b (24V)	+20 V	10	D	**C**
3a (12V)	-112 V	1 h	D	**A**
3a (24V)	-150 V	1 h	D	**A**
3b (12V)	+75 V	1 h	D	**A**
3b (24V)	+150 V	1 h	D	**A**
4 (12V)	-6 V	1	D	**B**
4 (24V)	-12 V	1	D	**A**

9.5 CLASSIFICATION 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 of them 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 do not 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 exposure and cannot be returned to proper operation without repairing or replacing the device/system.

APPENDIX A: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT

TOP VIEW OF EUT

BOTTOM VIEW OF EUT

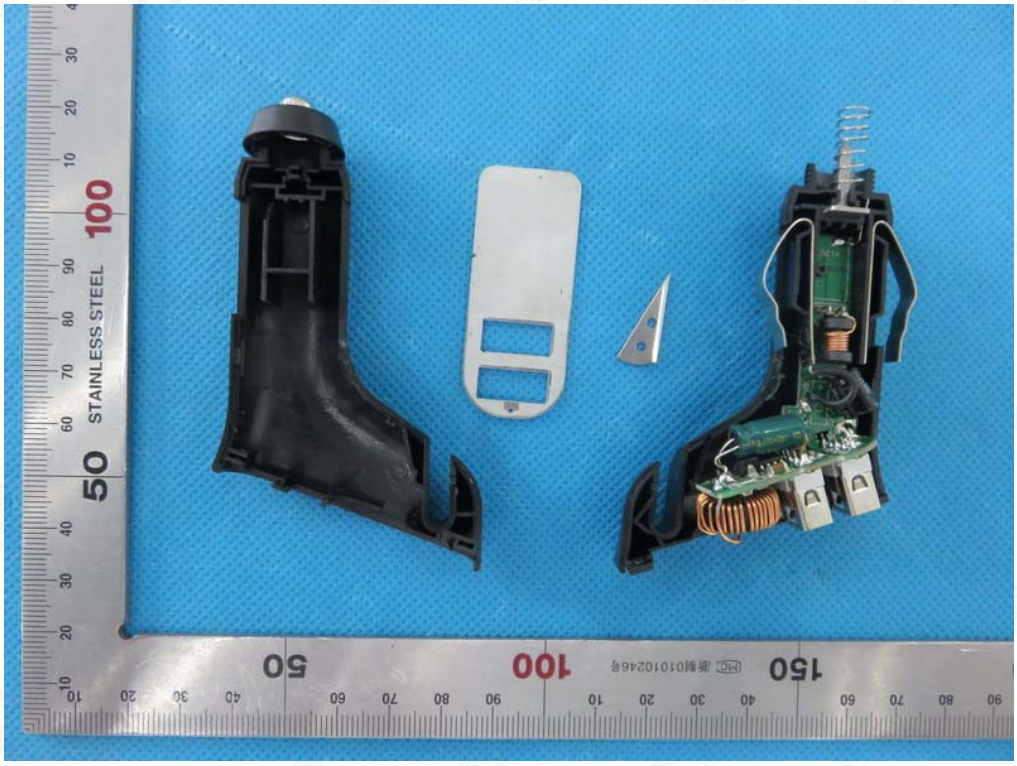
FRONT VIEW OF EUT

BACK VIEW OF EUT

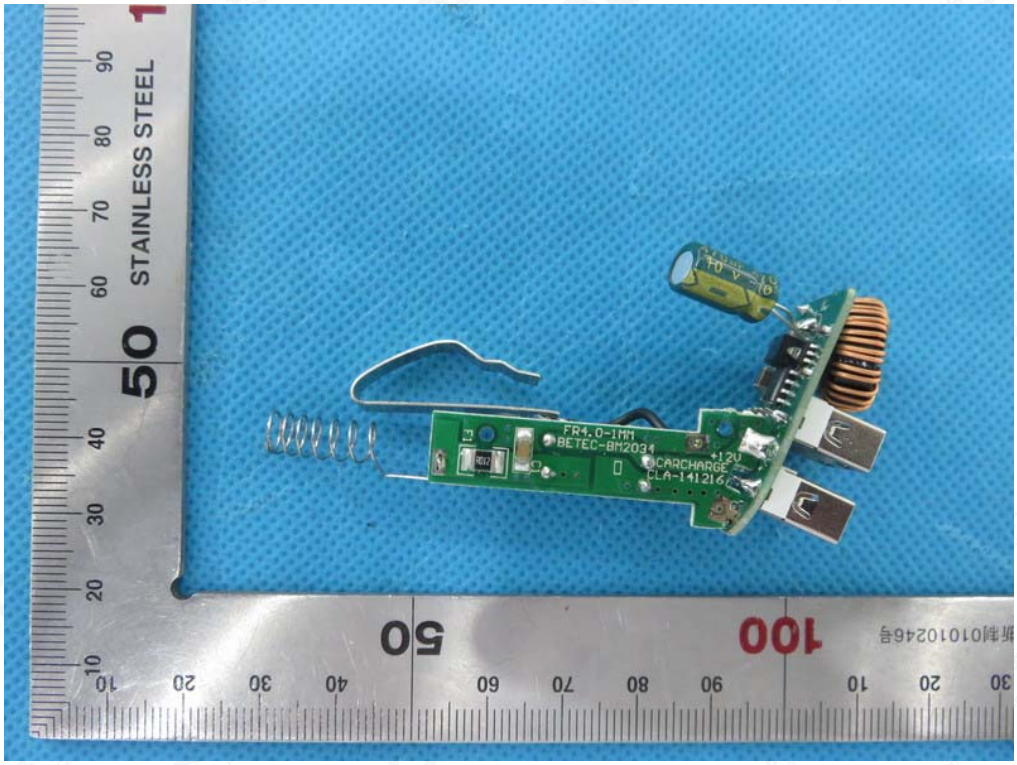
LEFT VIEW OF EUT

RIGHT VIEW OF EUT

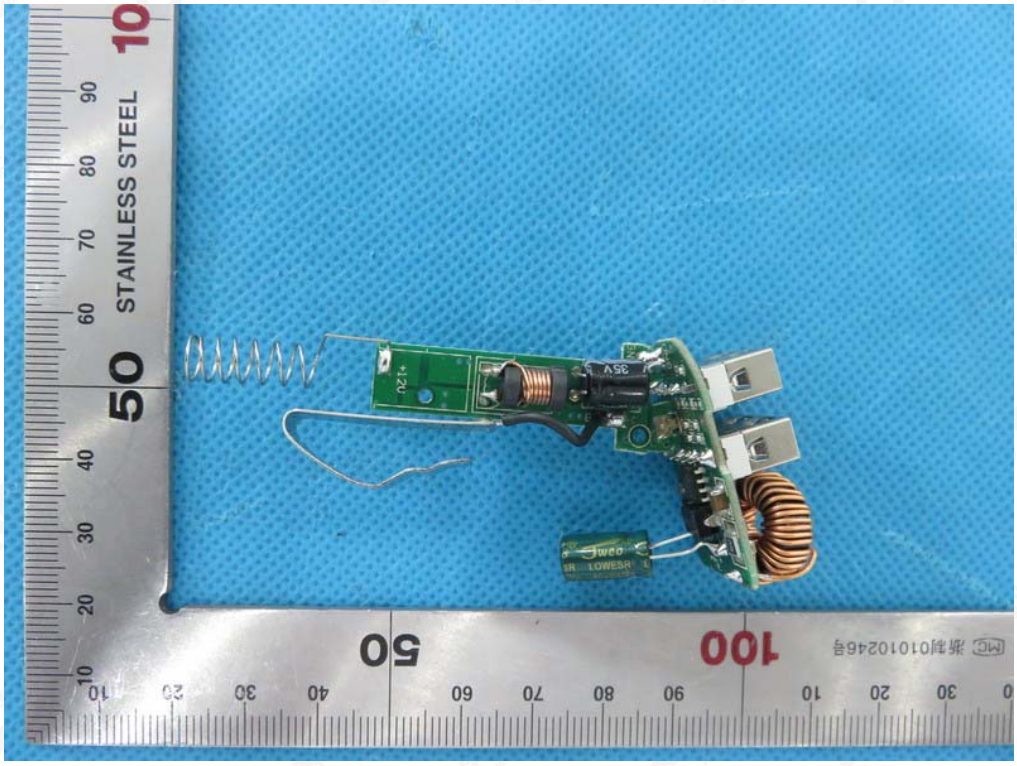
OPEN VIEW OF EUT



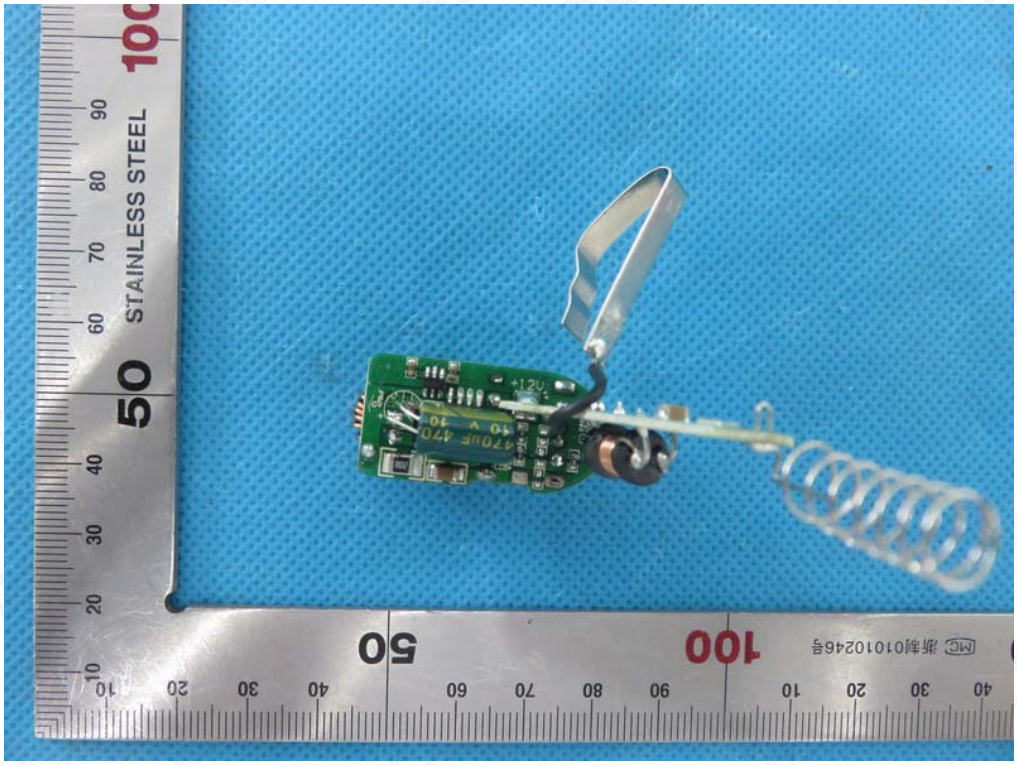
INTERNAL VIEW OF EUT-1



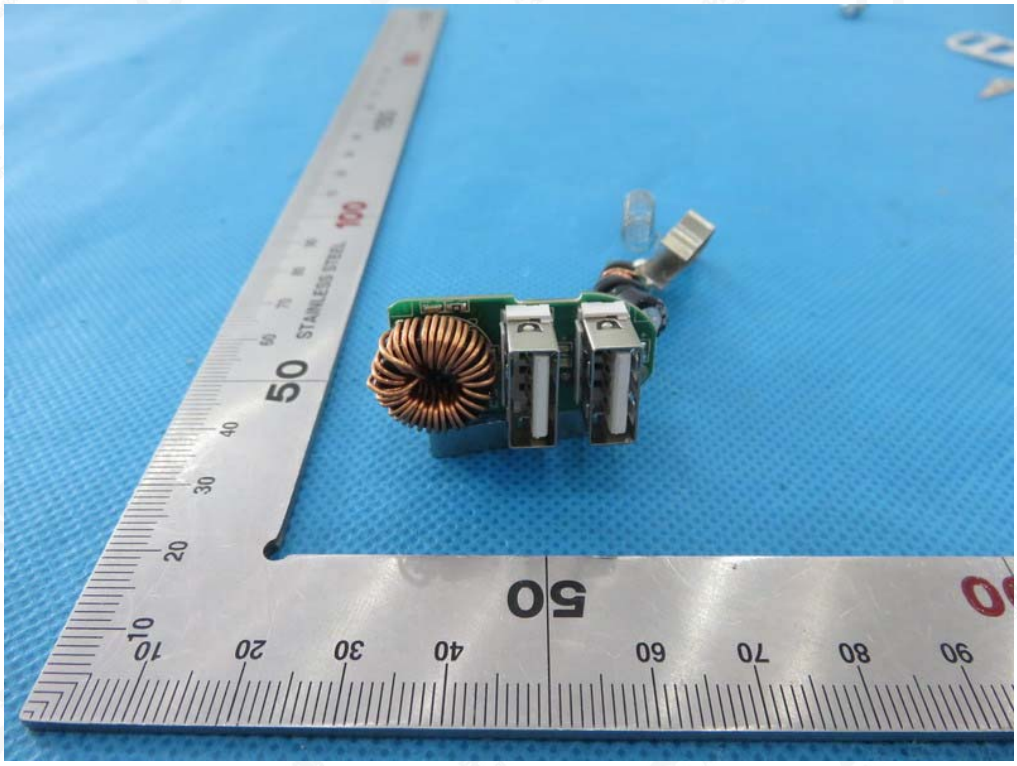
INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



INTERNAL VIEW OF EUT-4



----END OF REPORT----