

EMC TEST REPORT

For

Car Charger
Model No.: P302.272

Prepared for :
Address :

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Report Number : R011509847E
Date of Test : Sept. 29~Oct. 10, 2015
Date of Report : Oct. 10, 2015

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Appendix I (Photos of EUT) (3 pages)

TEST REPORT DESCRIPTION

Applicant :
Manufacturer :
EUT : Car Charger
Model No. : P302.272
Rating : Output: DC 5V, 2.4A

Measurement Procedure Used:

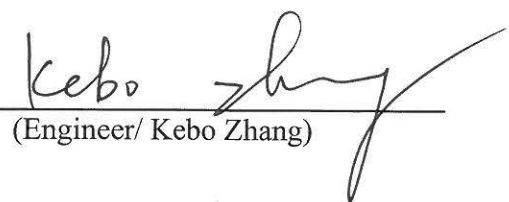
For Automotive EMC Directive 2014/30/EU				
Test	Test Requirement	Test Method	Class/Severity	Result
Radiated Emissions (30MHz to 1GHz)	EN 50498:2010	2014/30/EU Clause 6.5 and 6.6	6.5.2.1 for board band 6.6.2.1 for narrow band	PASS
Transient Conducted Emissions	EN 50498:2010	2014/30/EU & ISO 7673-2:2004	6.9 of 2014/30/EU	N/A
Transient Conducted Immunity	EN 50498:2010	2014/30/EU & ISO 7673-2:2004	6.8 of 2014/30/EU Table 1	PASS
Radiated Immunity (20MHz to 2GHz)	EN 50498:2010	2014/30/EU & ISO 11452-2:2004	6.7 of 2014/30/EU	N/A

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited and TUV Rheinland(Guangdong) Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT is to be technically compliant with the Automotive EMC Directive 2014/30/EU requirements.

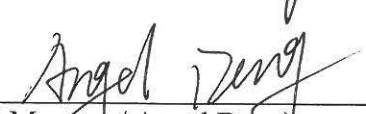
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Date of Test : Sept. 29~Oct. 10, 2015

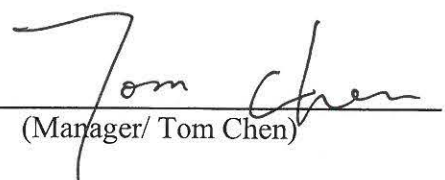
Prepared by :


(Engineer/ Kebo Zhang)

Reviewer :


(Project Manager/ Angel Deng)

Approved & Authorized Signer :


(Manager/ Tom Chen)

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT	:	Car Charger
Model Number	:	P302.272
Trade Mark	:	N.A.
Power Supply	:	DC 12V / DC 24V
Applicant	:	
Address	:	
Manufacturer	:	
Address	:	
Factory	:	
Address	:	
Date of receipt	:	Sept. 29, 2015
Date of Test	:	Sept. 29~Oct. 10, 2015

1.2 Test Facility

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

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 10, 2013.

IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, Feb. 22, 2013.

CNAS - LAB Code: L3503

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing Laboratories.

Test Location

All Emissions tests were performed
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

1.3 Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1dB (Horizontal) Ur = 4.3dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4dB

2. MEASURING DEVICES AND TEST EQUIPMENT

Test equipments list of Shenzhen Anbotek Compliance Laboratory Limited.

DESCRIPTION	MANUFACTURER	MODEL NO	EQUIPMENT NO	CAL.DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESCI	SB9058/05	2014-10-18
Bi-conical Antenna	Rohde & Schwarz	HK116	SB9421/03	2014-10-19
Logarithmic Periodic Antenna	Rohde & Schwarz	HL223	SB9421/04	2014-10-19
Artificial Network	SCHWARZBECK	NNBM8126-A	SB3175	2015-01-19
Artificial Network	SCHWARZBECK	NNBM8126-A	SB3176	2015-01-19
Artificial Network	TESEQ	AN5501	SB8006	2015-05-16
Automotive Emission System	TESEQ	SC5501	SB8006	2015-05-16
Mechanical Switch	TESEQ	MS5501	SB8006	2015-05-16
Electrical Switch	TESEQ	ES5501	SB8006	2015-05-16
DC Power Supply	LongWei	LW-3010KDS	AE5501	2015-05-16
Oscilloscope	Tektronic	DPO4104	SB7327	2015-02-09
Ultra Compact Simulator	EMTEST	UCS200N	SB6806/01	2015-01-19
Power Supply for Charging Battery	EMTEST	LD 200N	SB6806/03	2015-02-25
Load dump generator	EMTEST	VDS200N	SB6806/02	2015-02-25

3. TEST RECORD(For Automotive EMC Directive 2014/30/EU)

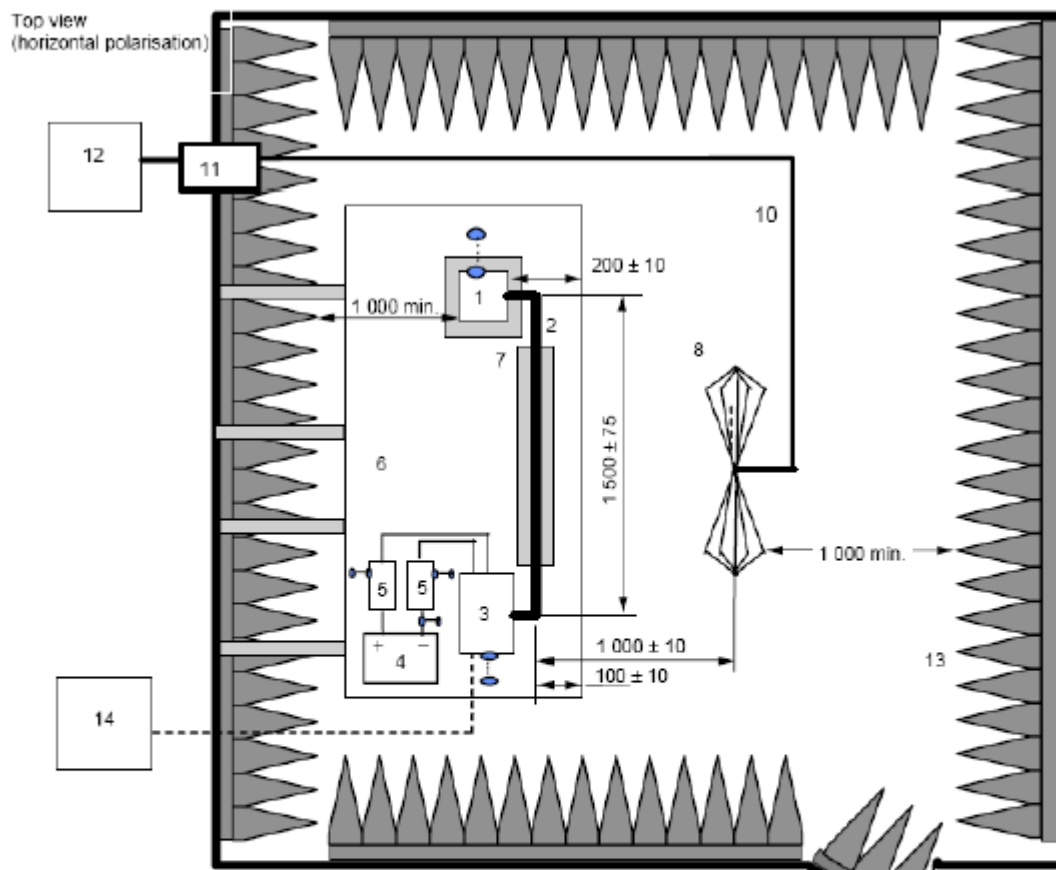
3.1 Radiated Emission Measurement

3.1.1 Block Diagram of Test

3.1.1.1 Block diagram of connection between the EUT and simulators



3.1.1.2 Block diagram of test setup



Key

1. EUT (grounded locally if required in test plan)	8. Antenna
2. Test harness	10. High-quality coaxial cable
3. Load simulator	11. Bulkhead connector
4. Power supply (location optional)	12. Measuring instrument
5. Artificial network (AN)	13. RF absorber material
6. Ground plane (bonded to shielded enclosure)	14. Stimulation and monitoring system
7. Low relative permittivity support	

3.1.2 Measuring Standard

2014/30/EU, Clause 6.5 and 6.6 of 2014/30/EU

3.1.3 Radiated Emission Limits

3.1.3.1 Annex I 6.5.2(For broadband emissions):

Limit E(dB μ V/m) at frequency F (MHz)		
30-75MHz	75-400MHz	400-1000MHz
E=62-25, 13 log(F/30)	E=52+15, 13 log(F/75)	E=63

3.1.3.1 Annex I 6.5.2(For narrowband emissions):

Limit E(dB μ V/m) at frequency F (MHz)		
30-75MHz	75-400MHz	400-1000MHz
E=52-25, 13 log(F/30)	E=42+15, 13 log(F/75)	E=53

3.1.4 EUT Configuration on Test

The 2014/30/EU regulations test method must be used to find the maximum emission during radiated emission measurement.

3.1.5 Operating Condition of EUT

3.1.5.1 Turn on the power.

3.1.5.2 Let the EUT work in test mode (Full Load) and measure it.

3.1.6 Test Procedure

The EUT was insulated placed 50mm above the ground plane, the ground plan 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 and 24V vehicle battery through 5 uH/50 Ohm L.I.S.N.

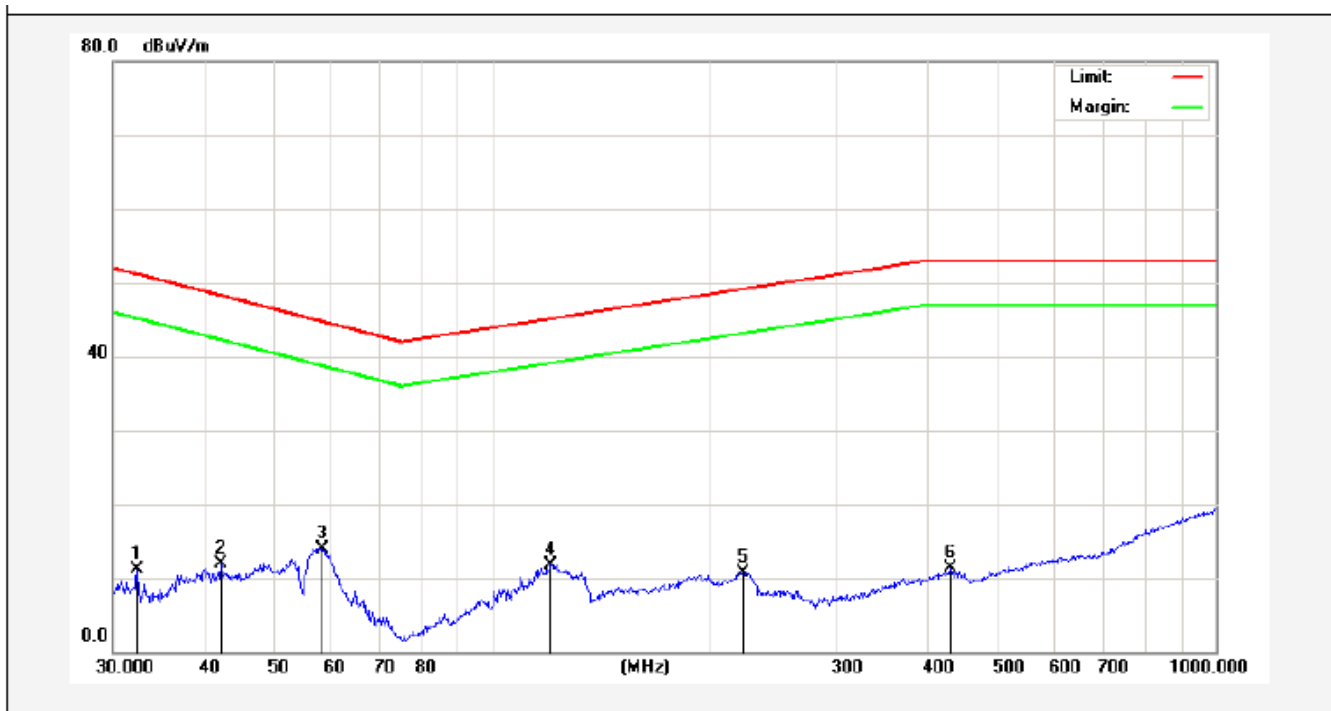
3.1.7 Test Results

PASS.

The frequency range from 30MHz to 1000MHz is investigated.

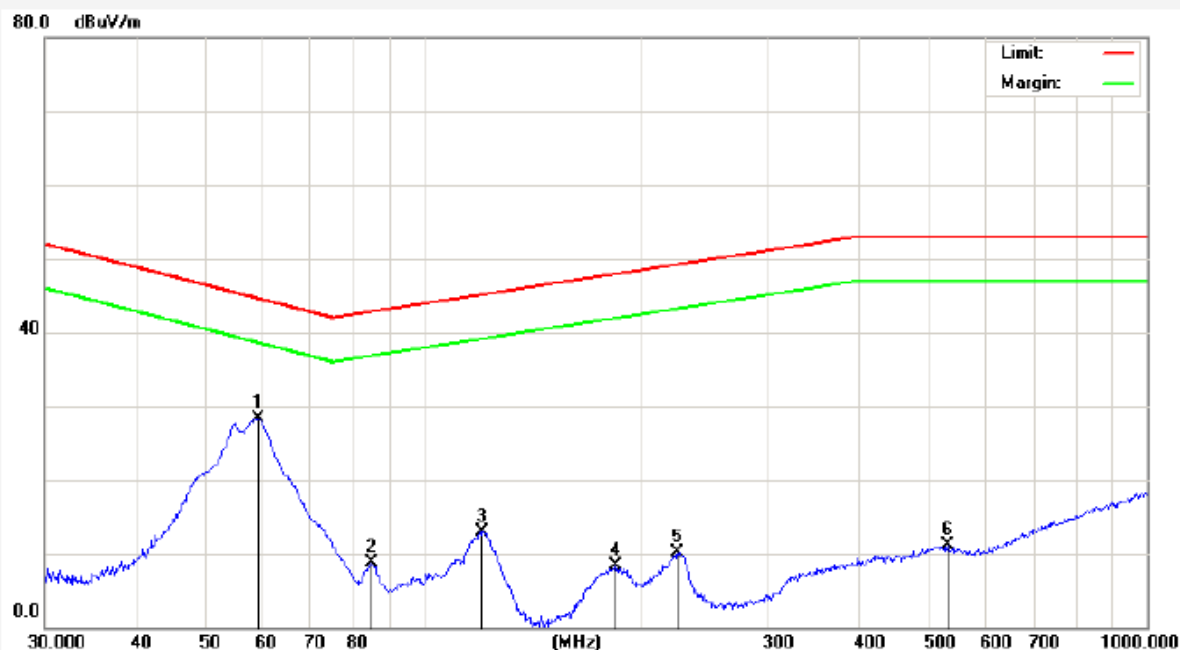
The test curves are shown in the following pages.

Job No.: AT011509847E Polarization: Vertical
Standard: EN50498-AV Power Source: DC 12V
Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH
Note: Full Load Distance: 3m



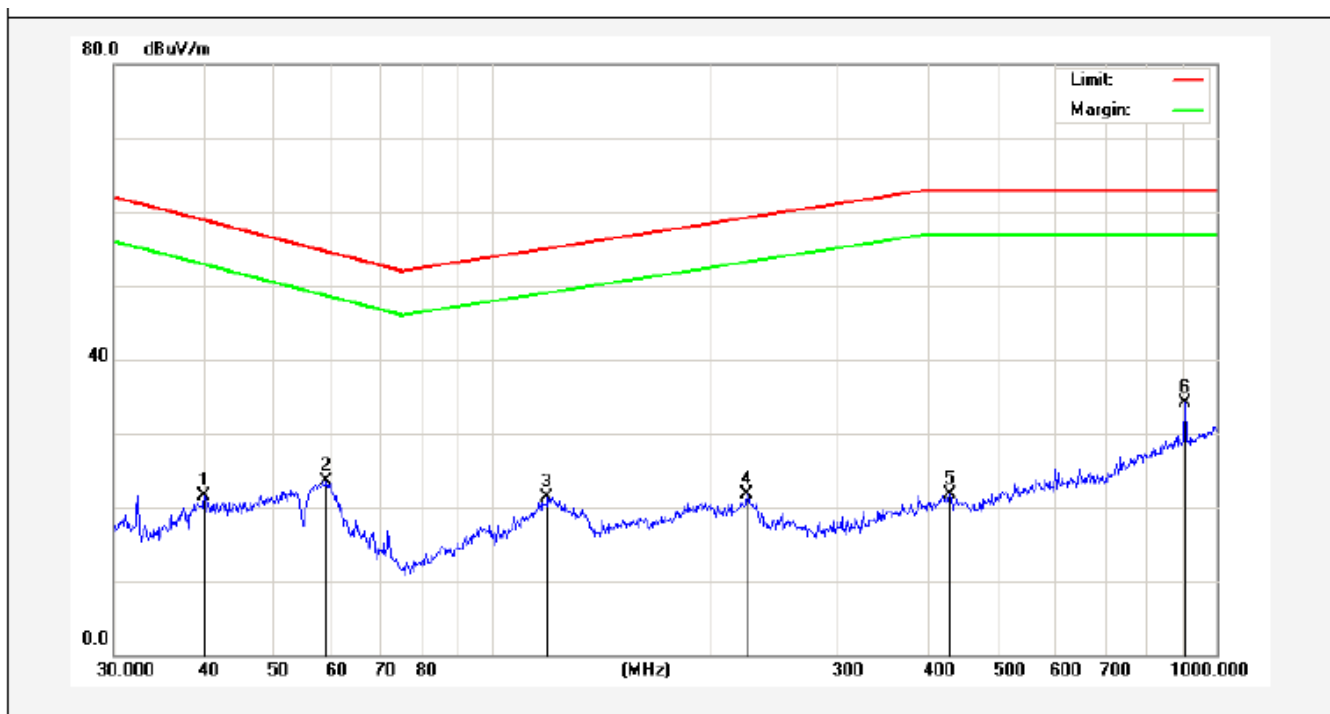
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	32.4059	27.81	-16.63	11.18	51.16	-39.98	AVG			
2	42.3022	26.18	-14.35	11.83	48.25	-36.42	AVG			
3	58.4074	29.23	-15.26	13.97	44.73	-30.76	AVG			
4	120.6991	28.16	-16.43	11.73	45.13	-33.40	AVG			
5	222.1698	25.78	-15.00	10.78	49.14	-38.36	AVG			
6	429.5228	22.52	-11.24	11.28	53.00	-41.72	AVG			

Job No.: AT011509847E Polarization: Horizontal
Standard: EN50498-AV Power Source: DC 12V
Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH
Note: Full Load Distance: 3m



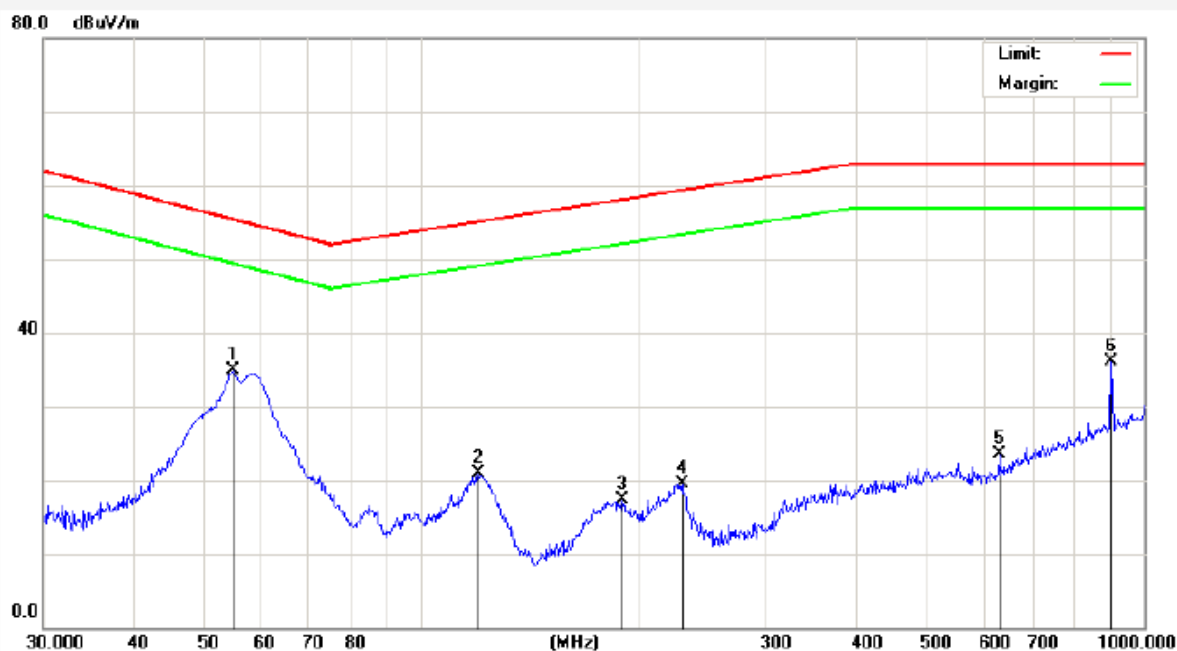
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	59.2325	43.71	-15.32	28.39	44.58	-16.19	AVG			
2	84.9995	29.04	-20.35	8.69	42.82	-34.13	AVG			
3	120.6991	34.38	-21.43	12.95	45.13	-32.18	AVG			
4	184.4898	29.76	-21.44	8.32	47.91	-39.59	AVG			
5	224.5193	29.79	-19.65	10.14	49.21	-39.07	AVG			
6	530.1014	22.11	-11.04	11.07	53.00	-41.93	AVG			

Job No.: AT011509847E Polarization: Vertical
Standard: EN50498-QP Power Source: DC 12V
Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH
Note: Full Load Distance: 3m



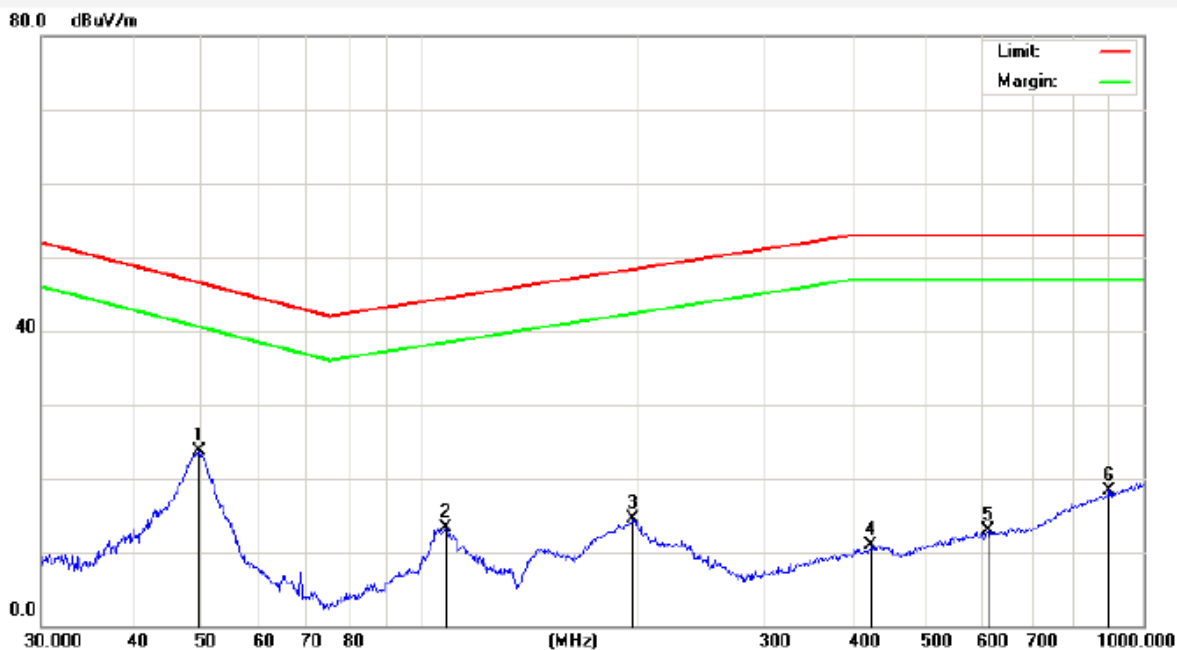
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	39.9942	35.91	-14.37	21.54	58.86	-37.32	QP			
2	59.0251	38.90	-15.31	23.59	54.61	-31.02	QP			
3	119.0180	37.53	-16.27	21.26	55.03	-33.77	QP			
4	224.5193	36.50	-14.88	21.62	59.21	-37.59	QP			
5	428.0193	32.93	-11.25	21.68	63.00	-41.32	QP			
6	903.3094	37.91	-3.71	34.20	63.00	-28.80	QP			

Job No.: AT011509847E Polarization: Horizontal
Standard: EN50498-QP Power Source: DC 12V
Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH
Note: Full Load Distance: 3m



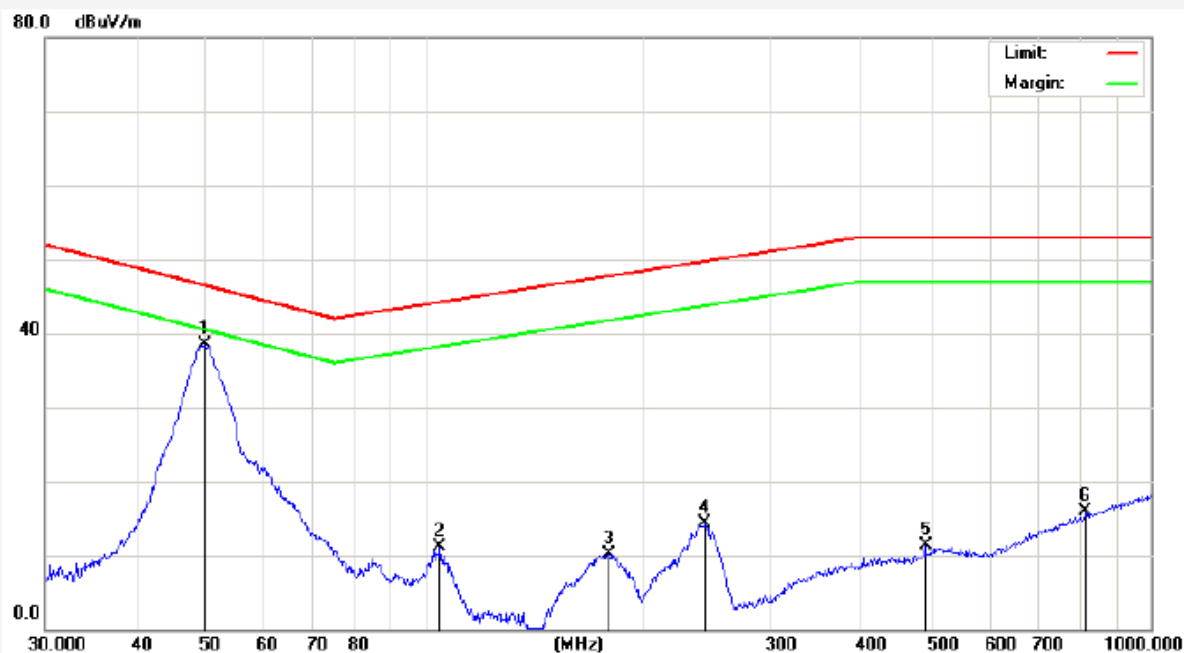
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	55.0274	49.89	-14.93	34.96	55.38	-20.42	QP			
2	119.8556	42.23	-21.32	20.91	55.08	-34.17	QP			
3	189.7385	38.35	-20.95	17.40	58.10	-40.70	QP			
4	229.2931	38.73	-19.17	19.56	59.34	-39.78	QP			
5	629.4772	33.97	-10.42	23.55	63.00	-39.45	QP			
6	900.1474	40.77	-4.76	36.01	63.00	-26.99	QP			

Job No.: AT011509847E Polarization: Vertical
Standard: EN50498-AV Power Source: DC 24V
Test item: Radiation Test Temp.(C)/Hum. (%RH): 24.3(C)/55%RH
Note: Full Load Distance: 3m



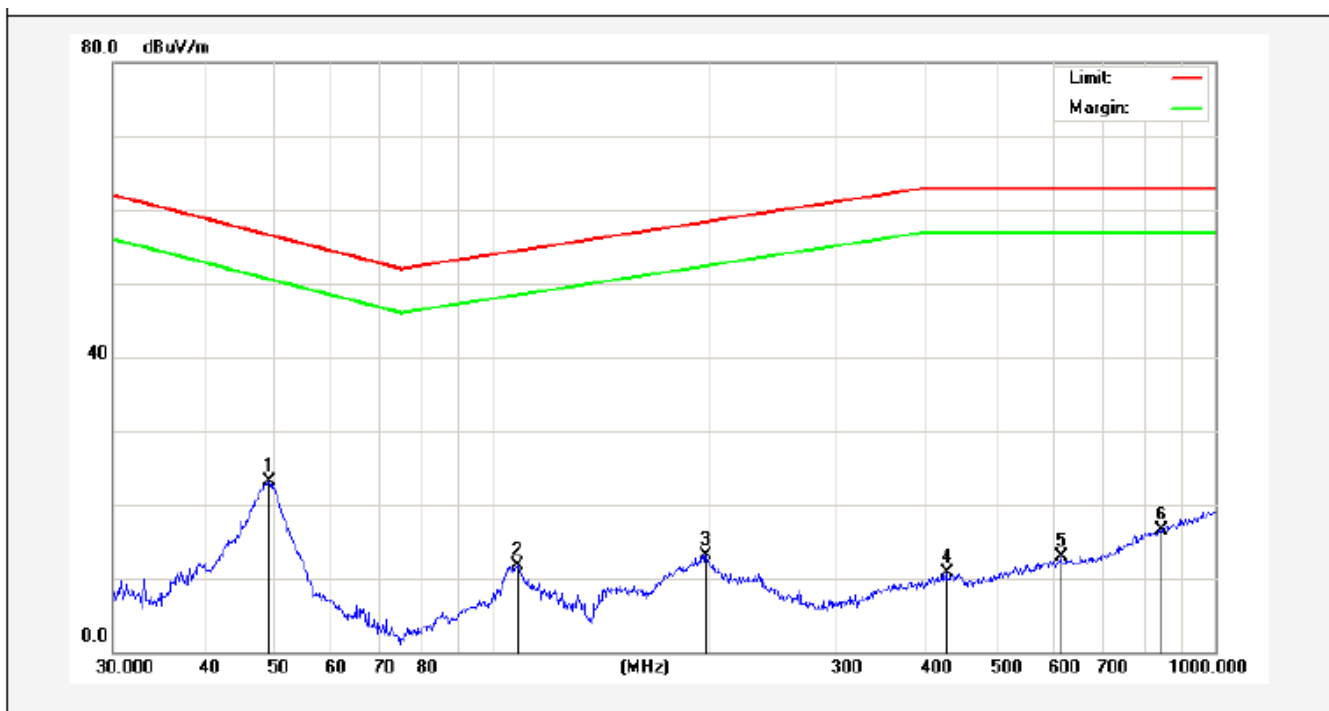
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	49.5328	38.25	-14.55	23.70	46.53	-22.83	AVG			
2	108.6470	28.90	-15.64	13.26	44.44	-31.18	AVG			
3	197.2001	30.36	-15.89	14.47	48.35	-33.88	AVG			
4	420.5803	22.11	-11.28	10.83	53.00	-42.17	AVG			
5	609.9217	22.03	-9.16	12.87	53.00	-40.13	AVG			
6	896.9965	22.21	-3.81	18.40	53.00	-34.60	AVG			

Job No.: AT011509847E Polarization: Horizontal
Standard: EN50498-AV Power Source: DC 24V
Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH
Note: Full Load Distance: 3m



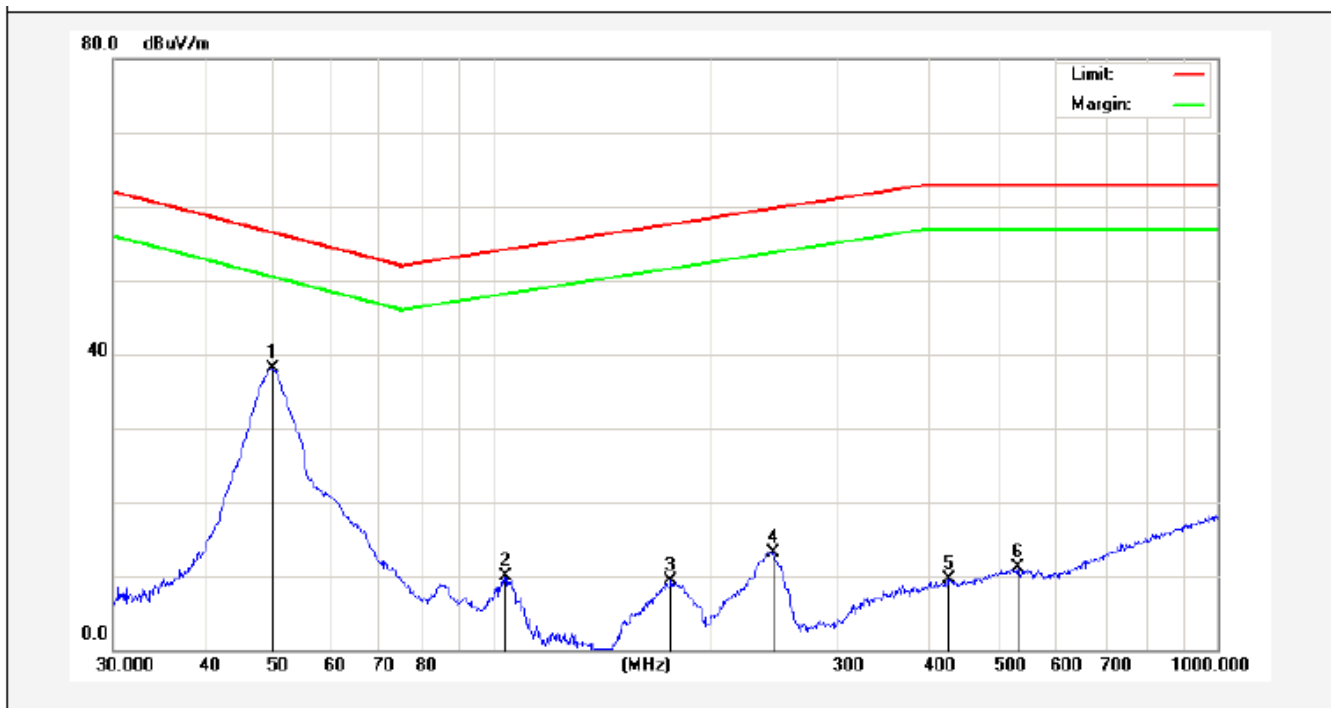
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	49.8814	53.13	-14.56	38.57	46.45	-7.88	AVG			
2	104.9033	31.91	-20.71	11.20	44.20	-33.00	AVG			
3	179.3863	31.99	-21.89	10.10	47.73	-37.63	AVG			
4	243.3772	32.52	-18.24	14.28	49.74	-35.46	AVG			
5	489.0269	22.48	-11.27	11.21	53.00	-41.79	AVG			
6	813.1115	22.20	-6.28	15.92	53.00	-37.08	AVG			

Job No.: AT011509847E Polarization: Vertical
Standard: EN50498-QP Power Source: DC 24V
Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH
Note: Full Load Distance: 3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	49.3594	37.57	-14.54	23.03	56.57	-33.54	QP			
2	108.6470	27.32	-15.64	11.68	54.44	-42.76	QP			
3	197.8928	28.97	-15.88	13.09	58.38	-45.29	QP			
4	425.0280	22.01	-11.25	10.76	63.00	-52.24	QP			
5	612.0642	21.96	-9.15	12.81	63.00	-50.19	QP			
6	842.1296	21.23	-4.73	16.50	63.00	-46.50	QP			

Job No.: AT011509847E Polarization: Horizontal
Standard: EN50498-QP Power Source: DC 24V
Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH
Note: Full Load Distance: 3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	49.7068	52.57	-14.55	38.02	56.49	-18.47	QP			
2	104.1701	30.57	-20.70	9.87	54.16	-44.29	QP			
3	176.2686	31.32	-22.11	9.21	57.62	-48.41	QP			
4	244.2321	31.40	-18.28	13.12	59.76	-46.64	QP			
5	426.5210	21.83	-12.32	9.51	63.00	-53.49	QP			
6	530.1014	22.11	-11.04	11.07	63.00	-51.93	QP			

3.2 Transient Conducted Emission Measurement

There is no need for Transient conducted emission test to be performed on this product in accordance with 8.5 of Annex I of this Directive(2014/30/EU):

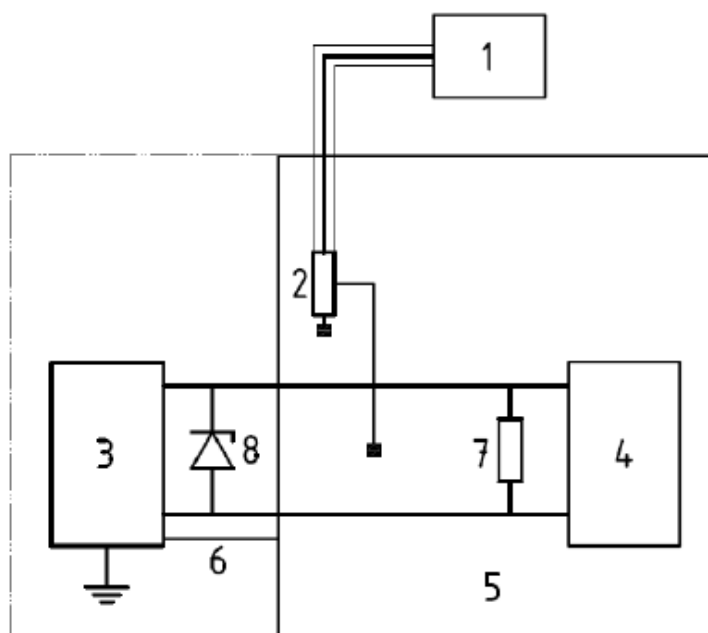
“ESAs that are not switched, contain no switches or do not include loads need not be tested for conducted emission and shall be deemed to comply with paragraph 6.9 of this Annex.”

Performance Criteria Description in A.4 of ISO 7637-2

Criterion A:
all functions of a device/system perform as designed during and after exposure to disturbance.
Criterion 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.
Criterion 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.
Criterion 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.
Criterion 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.

3.3 Transient Conducted Immunity Measurement

3.3.1 Block Diagram of Test



Key	
1. oscilloscope	5. ground plane
2. voltage probe	6. Ground connection
3. test pulse generator with internal power supply resistance R_i	7. optional resistor (R_v) ^a
4. EUT	8. optional diode bridge ^b
a For simulation of vehicle system loading for load dump test pulses 5a and 5b only. If used, the value of R_v shall be specified in the test plan (typical value 0,7 Ω to 40 Ω).	
b For simulation of load dump waveform for alternator with centralized load dump suppression for pulse 5b only	

3.3.2 Measuring Standard

2014/30/EU & ISO 7637-2

3.3.3 Transient Conducted Immunity Limits

Table 1 of 2014/30/EU

Test pulse number	Immunity test level	Functional status for systems	
		Related to immunity-related functions	Not related to immunity-related functions
1	III	C	D
2a	III	B	D
2b	III	C	D
3a	III	A	D
3b	III	A	D
4	III	B for ESA which must be operational during engine start phases other or C	D

3.3.4 Operating Condition of EUT

3.3.4.1 Turn on the power.

3.3.4.2 Let the EUT work in test mode (On) and measure it.

3.3.5 Test Procedure

Refer to item 3.1.6.

3.3.6 Test Results

PASS.

These test result outsourced to TUV Rheinland(Guangdong) Ltd.

Please refer to the data in the following page.

Test Results(For 12V/24V):

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

Functional status C: The EUT stops charging during the pulse. After the pulse the EUT re-starts by itself.

3.4. Radiated Immunity Measurement(20MHz-2GHz)

3.4.1 Measuring Standard

Clause 6.7 of 2014/30/EU

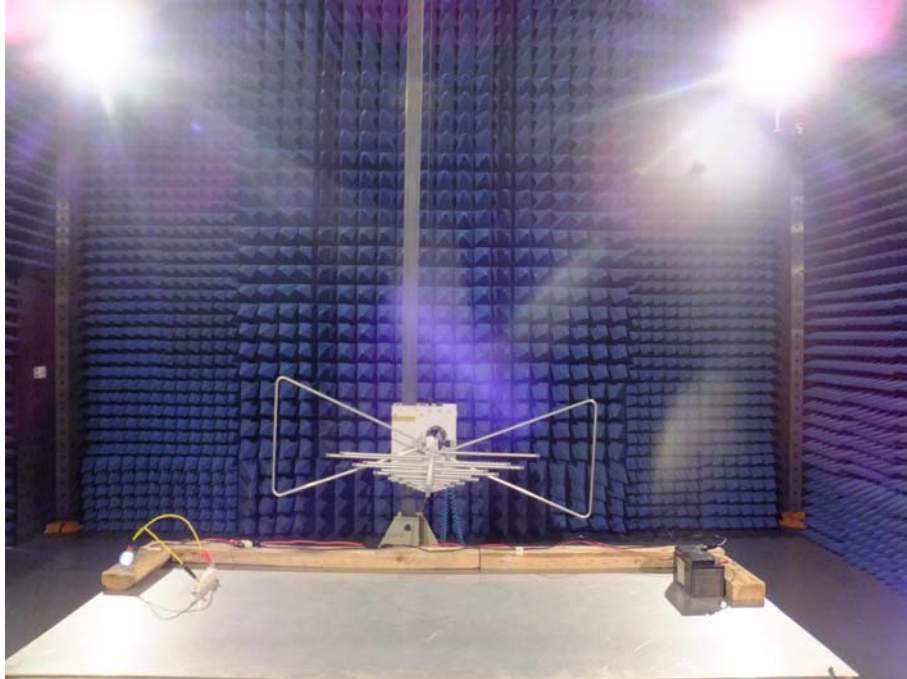
3.4.2 Test Results

There is no immunity related function in the EUT, radiated Immunity test was not applicable according to 8.3 of 2014/30/EU.

The ESAs with no immunity-related functions need not be tested for immunity to radiated disturbances and shall be deemed to comply with paragraph 6.7 of Annex IX to this Directive.

4. PHOTOGRAPH

4.1 Photo of Radiated Emission Measurement(2014/30/EU)



APPENDIX I (Photos of EUT)

Figure 1
The EUT-Front View



Figure 2
The EUT-Back View



Figure 3
The EUT-Inside View



Figure 4
PCB Of The EUT- Front View



Figure 5
PCB Of The EUT- Back View

