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Pony Testing International Group

CERTIFICATE

Of Conformity
EC Council Directive 2014/30/EU
Electromagnetic Compatibility

Report No.: MDDKKOMU58393024

Applicant : Dongguan Greenway Battery Co., Ltd

Address : Xinyuan Road, Tongsha industrial Zone, Dongcheng District, Dongguan City, Guangdong Province, China

Sample Name : Li-ion battery

M/N : SH361001

Ratings : 36V 2.5Ah 90Wh

Standards : EN61000-6-3: 2007+A1:2011
EN61000-6-1:2007

The certificate of conformity is based on an evaluation of a sample of the above-mentioned product. Technical report and documentation are at the applicant's disposal. This is to certify that the tested sample is in conformity with all provisions of Annex I of council Directive 2014/30/EU, referred to as the EMC. The applicant of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to Annex IV of the Directive.



Approved By: *tome*

Date: Dec 06, 2016

The CE Marking may only be used if all relevant and effective EC Directive are complied with.



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TianjinLab: (022) 27360730	DalianLab: (0411) 84650820	HangzhouLab: (0571) 87219096	WuhanLab: (027) 83997127
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Applicant: Dongguan Greenway Battery Co., Ltd
Address: Xinyuan Road, Tongsha industrial Zone, Dongcheng District,
Dongguan City, Guangdong Province, China

The following sample(s) was/were submitted and identified on behalf of the client as:

Sample Name: Li-ion battery

Sample Model: SH361001

Sample Received Date: Nov 29, 2016

Testing Period: Nov 29, 2016 to Dec 06, 2016

Testing Item: EMC

Testing Method: EN61000-6-3: 2007+A1:2011
EN61000-6-1:2007(EN61000-4-2:2009,
EN61000-4-3:2006+A1:2009+A2:2010)

Testing Result: Please refer to next page(s)

Edited by: Wu Li Hua Checked by: zheg chun mei Approved by: tome



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1. GENERAL INFORMATION

Applicant: Dongguan Greenway Battery Co., Ltd
Product: Li-ion battery
Model No.: SH361001
Power Supply: DC 36V
Ratings: 36V 2.5Ah 90Wh

2. Test Procedure Used

EMI:EN61000-6-3:2007+A1:2011

EMS:EN61000-6-1:2007 (EN61000-4-2: 2009, EN61000-4-3:2006+A1: 2009+A2:2010)

3. Test Summary

Test Items	Standards	Status
Power line conducted emission test	EN61000-6-3:2007+A1:2011	N/A
Radiated emission test	EN61000-6-3:2007+A1:2011	Complied
Harmonic Current Emission Test	EN61000-3-2:2014	N/A
Voltage fluctuations & flicker test	EN 61000-3-3:2013	N/A
Electrostatic discharge Test	EN61000-4-2: 2009	Complied
RF Field strength susceptibility Test	EN61000-4-3: 2006+A1:2008+A2:2010	Complied
Electrical fast transient/Burst Test	EN61000-4-4: 2012	N/A
Surge Test	EN61000-4-5: 2006	N/A
Injected currents susceptibility test	EN61000-4-6: 2014	N/A
Magnetic field immunity test	EN61000-4-8: 2010	N/A
Voltage dips and interruptions test	EN61000-4-11: 2004	N/A

4. Test Facility

Test Firm : ACCURATE TECHNOLOGY CO.,LTD

Address : F1,Bldg.A,Changyuan New Material Port Keyuan Rd.,
Science&Industry Park, Nanshan ShenZhen, P.R.China

Tel : 0755-26503290/0755-26507022 Fax : 0755-26503396

5. Test Uncertainty

Radiated Emission Uncertainty = ± 4.26 dB



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6. Test Instrument Used

No.	Equipment	Manufacturer	Model No.	S/N	Cal .Date	Next Cal .Date
1	ESD TESTER	HAEFELY	PESD1610	H401552	2016.11.5	2017.11.4
2	MAGNETIC FIELD TESTER	HAEFELY	MAG100	150577	2016.11.5	2017.11.4
3	5kVA AC POWER SOURCE	CALIFORNIA INSTRUMENTS	5001ix-400	55692	2016.11.5	2017.11.4
4	HARMONICS/FLICKER TEST ANALYZER	CALIFORNIA INSTRUMENTS	PACS-1	72254	2016.11.5	2017.11.4
5	50Ω COAXIAL SWITCH	ANRITSU	MP59B	6200283933	2016.11.5	2017.11.4
6	CONICAL HOUSING	ATC	N/A	N/A	N/A	N/A
7	VOLTAGE PROBE	SCHWARZBECK	TK9416	N/A	2016.11.5	2017.11.4
8	RF CURRENT PROBE	ROHDE& SCHWARZ	EZ-17	100048	2016.11.5	2017.11.4
9	BILOG ANTENNA	SCHWARZBECK	VULB9163	194	2016.11.5	2017.11.4
10	SPECTRUM ANALYZER	ANRITSU	MS2651B	N/A	2016.11.5	2017.11.4
11	PRE-AMPLIFIER	AGILENT	8447D	294A10619	2016.11.5	2017.11.4
12	RF COAXIAL CABLE(844 CHAMBER)	SCHWARZBECK	N-5m	NO.1	2016.11.5	2017.11.4
13	THERMO-HYGROMETER	OREGON SCIENTIFIC	JB913R	GZ-WS004	2016.11.5	2017.11.4
14	1# SHIELDING ROOM	CHANGZHOU ZHONGYU	843	N/A	N/A	N/A
15	2# SHIELDING ROOM	CHANGZHOU ZHONGYU	843	N/A	N/A	N/A
16	3m Semi-ANECHOIC CHAMBER	CHANGZHOU ZHONGYU	844	N/A	N/A	N/A



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No.	Equipment	Manufacturer	Model No.	S/N	Cal .Date	Next Cal .Date
17	ANTENNA/TURNTABLE CONTROLLER	INNCO	CO2000	CO2000/077/ 7301203/L	N/A	N/A
18	101 LCR METER	YANGZHI	YD2810B	20101170	2016.11.5	2017.11.4
19	RF COAXIAL CABLE(844 CHAMBER)	NTGS8017	N-1m	NO.6	2016.11.5	2017.11.4
20	RF COAXIAL CABLE(844 CHAMBER)	NTGS8017	N-1m	NO.7	2016.11.5	2017.11.4
21	AUDIO GENERATOR	GW	GAG-809	EG835424	N/A	N/A
22	THERMO-HYGROMETER	OREGON SCIENTIFIC	JB913R	GZ-WS002	2016.11.5	2017.11.4
23	EMC PRO SYSTEM (IMMUNITY TESTER)	THERMO	PRO-BASE	0403271	2016.11.5	2017.11.4
24	CAPACITIVE CLAMP(EFT)	THERMO	PRO-CCL	0403272	2016.11.5	2017.11.4
25	COUPLER DECOUPLER FOR TELECOM LINES	THERMO	CM-TEL-CD	0403273	2016.11.5	2017.11.4
26	L.I.S.N.	ROHDE& SCHWARZ	ESH3-Z5	100305	2016.11.5	2017.11.4
27	EMI TEST RECEIVER	ROHDE& SCHWARZ	ESPI-3	100396/003	2016.11.5	2017.11.4
28	SIGNAL GENERATOR	ROHDE& SCHWARZ	SML01	101161	2016.11.5	2017.11.4
29	EMI TEST RECEIVER	ROHDE& SCHWARZ	ESPI-3	101526/003	2016.11.5	2017.11.4
30	SPECTRUM ANALYZER	AGILENT	E7405A	MY45115511	2016.11.5	2017.11.4
31	L.I.S.N.	SCHWARZBECK	NSLK8126	8126431	2016.11.5	2017.11.4
32	PULSE LIMITER (FOR ESPI3)	ROHDE& SCHWARZ	ESH3-Z2	100815	2016.11.5	2017.11.4
33	PRE-AMPLIFIER	ROHDE& SCHWARZ	CBLU1183540-01	3791	2016.11.5	2017.11.4
34	50Ω COAXIAL SWITCH	ANRITSU	MP59B	6200506474	2016.11.5	2017.11.4



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No.	Equipment	Manufacturer	Model No.	S/N	Cal .Date	Next Cal .Date
35	BILOG ANTENNA	SCHWARZBECK	VULB9163	9163-323	2016.11.5	2017.11.4
36	HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D-655	2016.11.5	2017.11.4
37	HORN ANTENNA	SCHWARZBECK	BBHA9170	9170-359	N/A	N/A
38	LOOP ANTENNA	SCHWARZBECK	FMZB1516	1516131	2016.11.5	2017.11.4
39	ULTRA COMPACT SIMULATOR	EM TEST	UCS 500 N5	V0928104968	2016.11.5	2017.11.4
40	CAPACITIVE CLAMP	EM TEST	HFK	0509-34	2016.11.5	2017.11.4
41	Transformer	EM TEST	V4780S2	0109-44	N/A	N/A
42	Conducted Immunity Test System	FRANKONIA	CIT-10	126B1121	2016.11.5	2017.11.4
43	CDN	FRANKONIA	CDN-M2/3	A3027020	2016.11.5	2017.11.4
44	EM Injection Clamp	FCC	F-203I-23mm	091824	2016.11.5	2017.11.4
45	LISN	AFJ	LS16C	16010946249	2016.11.5	2017.11.4
46	CLICK METER	AFJ	CL55C	55040947164	2016.11.5	2017.11.4



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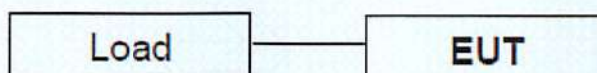
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7. Test Method and Test Result

7.1 RADIATED EMISSION TEST

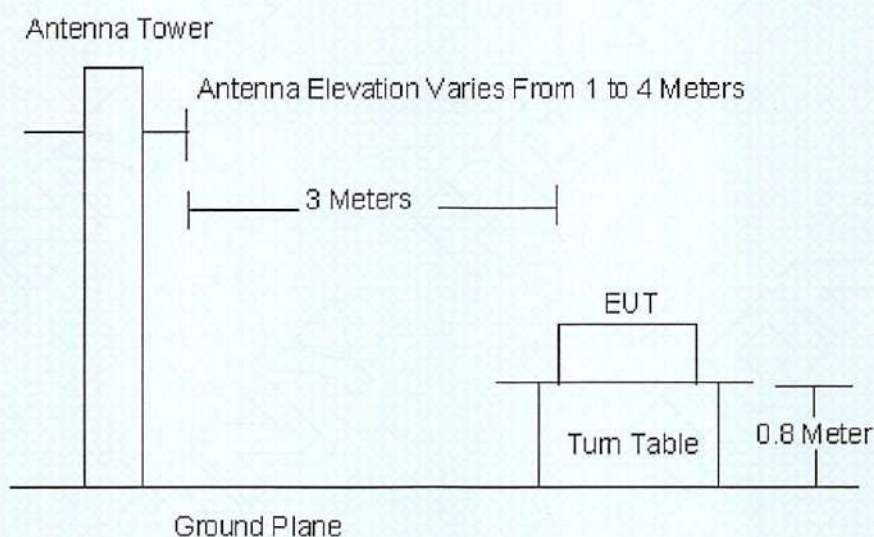
7.1.1 Block Diagram of Test Setup

7.1.1.1 Block Diagram of EUT Test Setup



(EUT: Li-ion battery)

7.1.1.2 Anechoic Chamber Setup Diagram



(EUT: Li-ion battery)

7.1.2 Test Standard

EN61000-6-3:2007+A1:2011

7.1.3 Radiated Emission Limit

Frequency MHz	Distance (Meter/s)	Field Strengths Limits dB(μV)/m
30 ~ 230	3	40.0
230 ~ 1000	3	47.0

Remark: (1) Emission level (dB (μV)/m) = 20 log Emission level (μV/m)

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance refers to the distance in meters between the measuring instrument, antenna and the closed point of any part of the device or system.



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7.1.4 EUT Configuration on Test

The EN61000-6-3: regulations test method must be used to find the maximum emission during radiated emission test.

7.1.4.1 Li-ion battery (EUT)

(A) Model No. : SH361001

(B) Applicant: Dongguan Greenway Battery Co., Ltd

7.1.5 Operating Condition of EUT

7.1.5.1 Setup the EUT and simulators as shown in Section 7.1.1.

7.1.5.2 Turn on the power of all equipments.

7.1.5.3 Let the EUT work in test mode and test it.

7.1.6 Test Procedure

The EUT and its simulators are placed on a turned table that is 0.8 meter above the ground. The turned table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna that is mounted on the antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated biconical and log periodical antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. In order to find the maximum emission levels, the interface cable must be manipulated according to EN61000-6-3 on radiated emission test.

The bandwidth setting on the field strength meter (R & S Test Receiver ESPI) is set at 120 KHz. The frequency range from 30 MHz to 1000 MHz is investigated. The test data are listed in the Section 7.1.7 and the scanning waveform are attached within APPENDIZ I.

7.1.7 Radiated Emission Test Result

PASS.

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

Detailed information, please see 9 file.



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7.2 ELECTROSTATIC DISCHARGE TEST

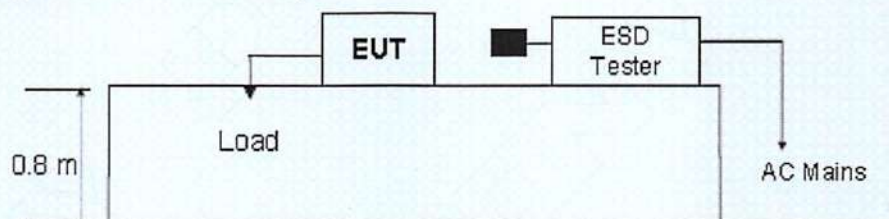
7.2.1 Block Diagram of Test Setup

7.2.1.1 Block Diagram of EUT Test Setup



(EUT: Li-ion battery)

7.2.1.2 Block Diagram of ESD Test Setup



Remark: ■ Is Discharge Electrode

(EUT: Li-ion battery)

7.2.2 Test Standard

EN61000-6-1:2007 (EN61000-4-2: 2009)

7.2.3 Severity Levels and Performance Criterion

Severity Level 3 for Air Discharge at 8KV

Severity Level 2 for Contact Discharge at 4KV

7.2.3.1 Severity level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

7.2.3.2 Performance criterion: A



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7.2.4 EUT Configuration on Test

The configuration of EUT is listed in Section 7.1.4.

7.2.5 Operating Condition of EUT

7.2.5.1 Setup the EUT as shown in Section 7.2.1

7.2.5.2 Turn on the power of all equipments.

7.2.5.3 Let the EUT work in test mode (ON) and test it.

7.2.6 Test Procedure

7.2.6.1 Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

7.2.6.2 Contact Discharge:

All the procedure shall be same as Section 7.2.6.1 except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

7.2.6.3 Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode's position is vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

7.2.6.4 Indirect discharge for vertical coupling plane

At least 20 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

7.2.7 Test Results

PASS.



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Electrostatic Discharge Test Results

EUT: Li-ion battery		Temperature: 25°C
M/N: SH361001		Humidity: 55%
Power Supply: DC 36V		Test Mode: ON
Air Discharge: $\pm 8\text{KV}$ For each point positive 10 times and negative 10 times discharge Contact Discharge: $\pm 4\text{KV}$		
Location	Kind A- Air Discharge C-Contact Discharge	Result
Slot	A	PASS
HCP	C	PASS
VCP	C	PASS
Remark: Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).		Test Equipment: See Clause 6.



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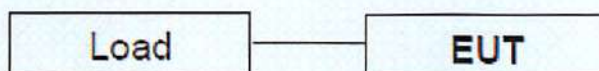
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7.3 RF FIELD STRENGTH SUSCEPTIBILITY TEST

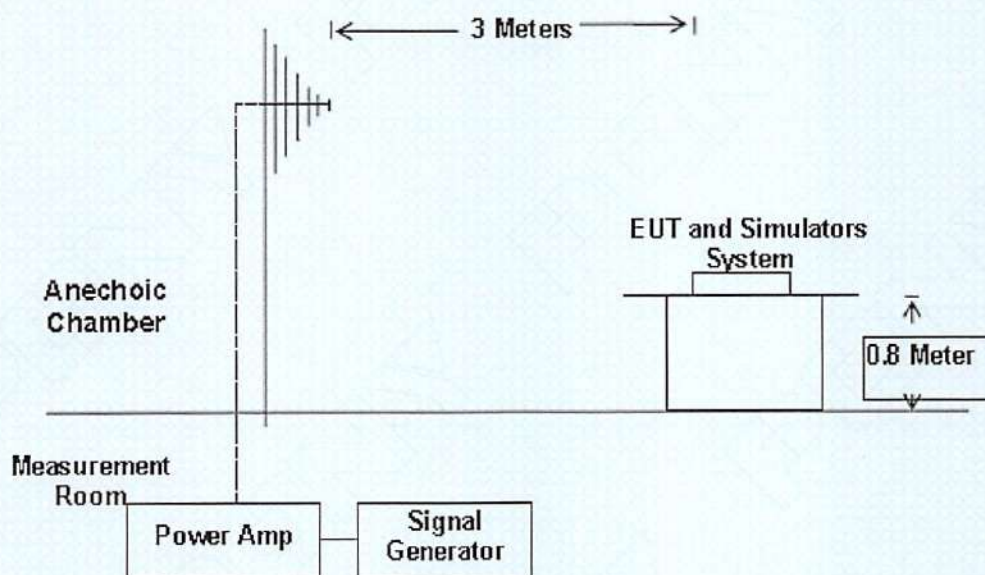
7.3.1 Block Diagram of Test Setup

7.3.1.1 Block Diagram of the EUT and the simulators



(EUT: Li-ion battery)

7.3.1.2 R/S Test Setup



(EUT: Li-ion battery)

7.3.2 Test Standard

EN61000-6-1: 2007(EN61000-4-3:2006+A1: 2008+A2:2010)



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7.3.3 Severity Levels and Performance Criterion

7.3.3.1 Severity Level 2 at 3V / m, Severity level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

7.3.3.2 Performance criterion: A

7.3.4 EUT Configuration on Test

The configuration of EUT is listed in Section 7.1.4

7.3.5 Operating Condition of EUT

7.3.5.1. Setup the EUT as shown in Section 7.3.1

7.3.5.2 Turn on the power of all equipments.

7.3.5.3 Let the EUT work in test mode and test it.

7.3.6 Test Procedure

The EUT and its simulators are placed on a turned table that is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna that is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna is set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor the EUT.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 - 1000 MHz
4. Sweeping time of radiated	0.0015 decade/s
5. Dwell Time	1 Sec.

7.3.7 Test Results

PASS.

Detailed information, Please refer to the following page.



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RF Field Strength Susceptibility Test Results

EUT: Li-ion battery		Temperature: 25°C	
M/N: SH361001		Humidity: 55%	
Power Supply: DC 36V		Test Mode: ON	
Modulation: ☒ AM ☐ Pulse ☐ None 1 KHz 80%			
		Frequency Range: 80MHz to 1000 MHz	
Steps	#	/	%
	Horizontal		Vertical
Front	PASS		PASS
Right	PASS		PASS
Rear	PASS		PASS
Left	PASS		PASS
Test Equipment: See Clause 6.			



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8. PHOTOGRAPHS OF TEST SETUP

8.1 Photo of Radiated Emission Test

Front View





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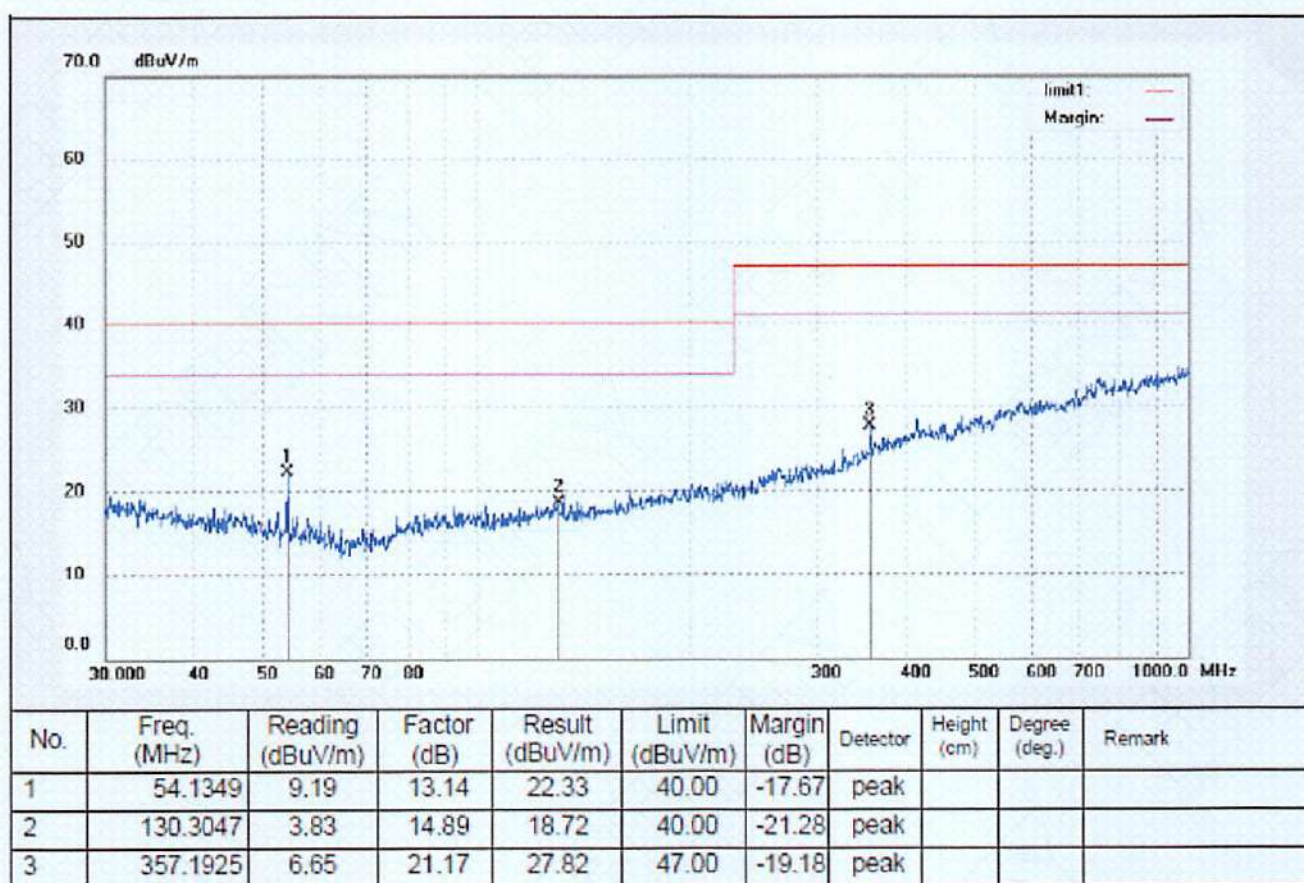
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9. Radiated Emission Test Data

EUT: Li-ion battery	Time : 2016/12/2
Limit: EN61000-6-3	Comment : 25°C/55%
MN: SH361001	Note : Hor





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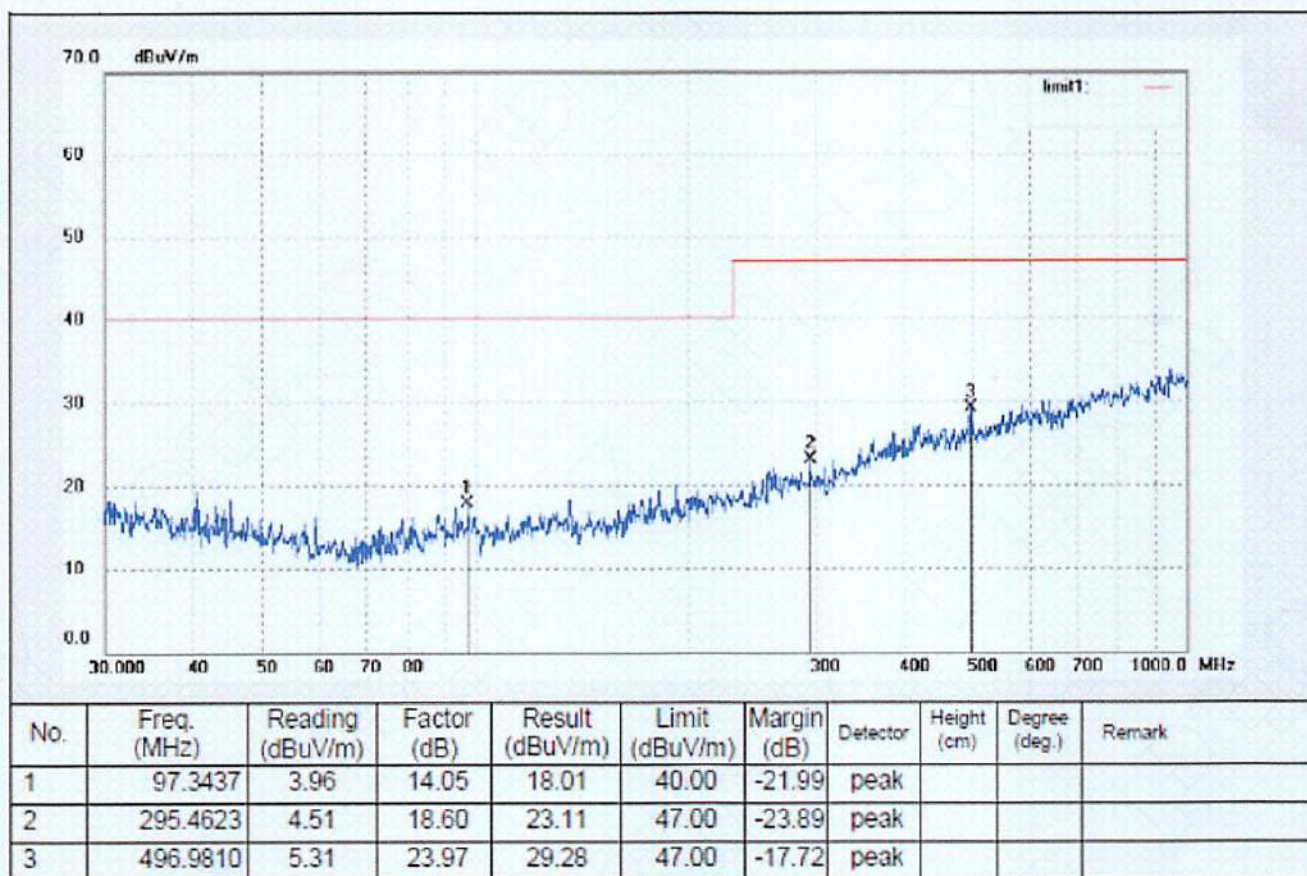
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EUT: Li-ion battery	Time : 2016/12/2
Limit: EN61000-6-3	Comment : 25°C/55%
MN: SH361001	Note : Ver





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10. Photographs of the EUT

Sample number and photos: U58393024

General Appearance of EUT (M/N: SH361001)



General Appearance of EUT (M/N: SH361001)





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General Appearance of EUT (M/N: SH361001)



General Appearance of EUT (M/N: SH361001)



Authenticate the photo on original report only

*** End of Report***