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1. Apply Scope (适用范围)

This specification shall be applied to **USB charger ET860 RUS ENG RoverPC S7 ROVER Titan**
 本规格适用于 **ET860 RUS ENG RoverPC S7 ROVER Titan** 充电器。

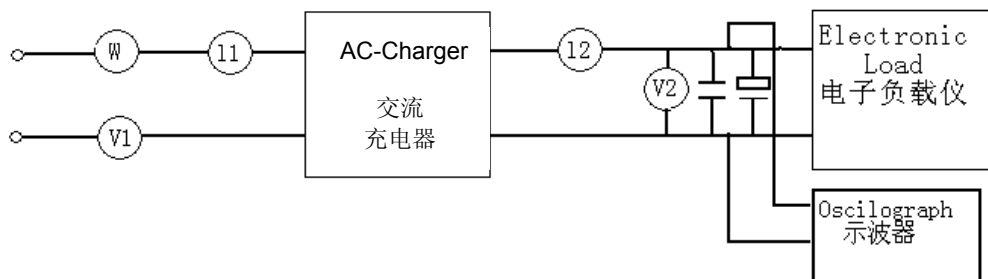
2. Quote Criterion (引用标准)

EN55022
 EN60950
 YD/T 1591-2006

3. Electrical characteristic (电气特性)

Test Circuit (测试电路)

If the test is to be made on a specified circuit, be sure to use the following circuit.
 (无特殊规定的情况下依照下面的电路进行测试.)



4. Input Characteristics (输入特性)

4.1 Rated Input Voltage (额定输入电压)

It is normal for **100Vac** to **240Vac** input AC voltage.

(额定输入交流 **100V~240V**)

4.2 Input Voltage Range (输入电压范围)

The charger shall operate from **90Vac** to **264Vac** and the range switching is unnecessary.

(输入电压范围交流 **90 V~264V**)

4.3 Input Frequency (输入频率)

It is normal for **50Hz or 60Hz** and single phase.

(输入频率 **50Hz/60Hz**)

4.4 Input Frequency Range (输入频率范围)

The charger shall operate with an input frequency from **47Hz to 63Hz**.

(输入频率范围 **47 Hz~ 63 Hz**)

4.5 Input AC Current (AC 输入电流)

Maximum steady state input current is less than **0.15A** rms. Measured at 90Vac input and maximum load.

(90V 满载时输入电流小于 **0.15Arms**)

4.6 Inrush Current (峰值输入电流)

With cold starting, the inrush current should less than **30A**.

(电源启动时最大峰值输入电流小于 **30A**)

4.7 Efficiency (效率)

50% min. measured at **100Vac to 240Vac** input voltage, maximum load and include the DC cable loss.

(在输入电压 **100 ~240Vac**, 输出最大负荷下, 充电器工作效率大于 **50%**)

5. Output Characteristics (输出特性)

5.1 Rated Output Voltage (输出额定电压)

The rated output voltage is specified at **5.0V±0.2V**

(额定输出电压范围 **5.0V±0.2V**)

5.2 Output Voltage (输出电压)

No load voltage (空载输出电压): **4.8V ~ 5.2V**

Full load voltage (满载输出电压): **4.8V ~ 5.2V**

5.3 Rated Output Current (额定输出电流)

The output current will be performed from **500mA±50mA** at CV mode.

(在 CV 模式下典型额定输出电流 **500mA±50mA**, 最大输出电流范围为 450~550mA)

5.4 Rated Power (额定功率)

This Charger is capable to support **2.5 Watts** continuously at all specified conditions.

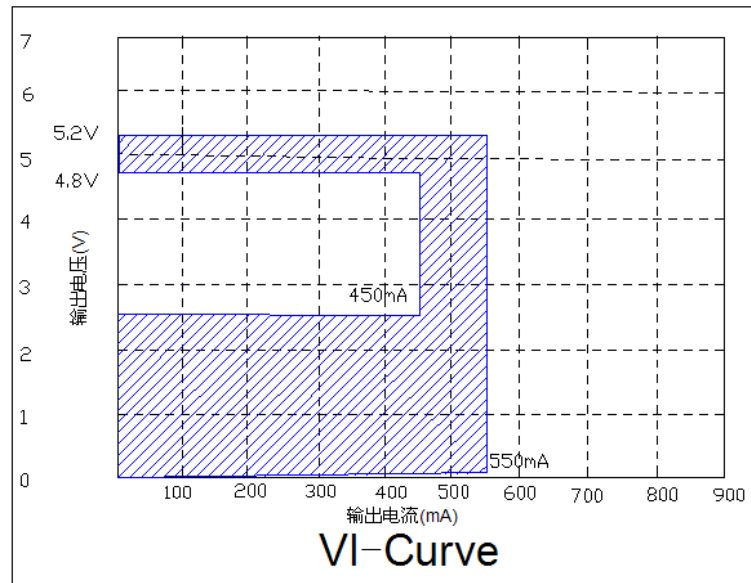
(不同状态下输出功率在 **2.5W**)

5.5 LED Indicate Function (LED 指示功能)

Charging: **Green**

Full: **Green**

5.6 Charger output Voltage/Current characteristics (充电器输出电压/电流特性图)



Note: the test shall be made under the following conditions, unless otherwise specified:
Ambient Temperature 25°C, Relative Humidity 35~85%RH
Air Pressure 86~106kPa

(在无特别指定条件下, 测试温度为 25°C、湿度为 35~85%RH、气压为 86~106kPa)

5.7 Ripple and Noise (输出纹波、噪音)

Ripple voltage is **100 mV p-p** (Full load **450mA**) measured methods:

Performed by 20MHz bandwidth in oscilloscope

Applied 0.1uF ceramic capacitor and 10uF electrolytic capacitor across output connector terminals Measured at the end of DC cable.

(输出端并 0.1uF 与 10uF 电容, 限制示波器带宽 20MHz 时, 测得纹波小于 **100mV p-p**)

5.8 Current Ripple and Noise (输出电流纹波、噪音)

Current ripple is less than **100mA p-p** (I=**450mA**) Measured methods:

(负载为 **450mA** 测得电流纹波小于 **100mA p-p**)

5.9 Turn On Delay Time (启动延时)

The charger is in regulation within **0.1**second after specified rated input voltage had been applied.

(在额定输入电压下充电器应该能正常启动延时时间小于 **0.1** 秒)

5.10 Turn-Off Delay (关断时延)

The voltage reach down to **2V** at CC or CV mode less than 1S after turned off.

(在 CC 或 CV 模式下, 关断后一秒内电压降到 **2V** 以下)

5.11 Overshoot (过冲)

When the charger switches between CC mode and CV mode, the output overshoot current must be stable in normal range (**10%**) within 10mS after charging mode changed.

(充电器在 CV 模式转换时, 充电器在 10ms 内波动范围不得超过正常 10%)

5.12 Counter current (电流倒灌)

Under any condition ,whether the charger is connecting to the power supply the current flow from mobile phone to charger should be less than 5mA.

(在任何情况下, 不论充电器是否插在电源上, 由手持机侧流向充电器的电流应不大于 5mA)

5.13 Protection (保护)

5.13.1 Over Voltage Protection (过压保护)

The charger will be automatically self-limited while any component(s) failure and output voltage will be tripped and protected below 6.8V±0.5V the charger can't work after the protection.

(当元件失效或输出电压超过 6.8V±0.5V 时, 充电器自动保护,保护后不可恢复)

5.13.2 Over Current Protection (过流保护)

Output current will be limited and less than 550mA Max

(输出过流保护电流: 550mA Max)

5.13.3 Short Circuit Protection (短路保护)

The charger is protected that a short happened between the output terminals and shall not result in a fire hazard, any damage to this Charger and will be normal operation automatically while the short is removed. The maximum short current is 550mA Max.

(输出短路后不损坏该制品, 短路恢复正常输出, 输出短路电流 550mA Max)

6. Reliability Items (信赖性项目)

6.1 Electrostatic discharge (静电)

At 150pF: 330Ω, for each point, 10 shots of direct discharge or air discharge (1 MΩ/ SHOT), have no malfunction. Direct discharge: ±8kV, Air discharge: ±15kV

(在接触放电±8kV 和空气中放电±15kV 模式下,各处分别放电 10 次无误动作)

6.2 Hi-Pot Test (高压测试)

After AC 3000V 1min between input plug-DC plug. cutoff current 5mA, the charger have no failures like damages, arch, insulation damage etc. (at 25°C)

(在 25°C 环境下, AC 输入插头与 DC 插头之间加 AC3000V 1 分钟, 电流 5mA 最大, 充电器无损伤、电弧放电、绝缘破坏等异常)

6.3 Insulation Resistance (绝缘电阻)

At 25°C after DC 500V 1min between input plug- DC plug, insulation resistance 7MΩ min)

(在 25°C 环境下, AC 输入插头与 DC 插头之间输入 DC500V1 分钟后绝缘阻抗在 7MΩ 以上)

6.4 Leakage Current (泄漏电流)

0.25mA maximum, at nominal AC input voltage and frequency

(输入时泄漏电流不得 **0.25mA max**)

6.5 Temperature Rise (温升)

At 30°C with the rated input **100-240Vac** charged to the primary a rated load (**Lout=450mA**) on the secondary, every parts of the case surface rise **55°C** or less.

(在常温 30°C 下输入端施加 **100-240Vac** 电压, 输出 **450mA** 负荷的状态下, 外壳表面所有地方 **55°C** 以下)

6.6 Continuous Working (连续工作时间)

With the rated voltage charged to the primary and output current **450mA**, after continuously work 96 hours have no damage.

(在输入额定电压和输出电流 **450mA** 的条件下, 连续工作 **96** 小时, 不损坏充电器。)

6.7 Mean Time Between Failure (平均无故障时间)

The charger shall be designed and produced to have a mean time between failures (MTBF) of 50000 operating hours 90% confidence-level while operating under the following conditions:

80% maximum load at 25°C, nominal input voltage. Standard: MIL-HDBK-217F

(该充电器在 25°C 正常输入时, 输出为 80% 最大负载, 90% 情况下其平均无故障时间为 **50000** 小时)

6.8 EMI Standards (EMI 标准)

Designed to meet EN55022 Class B

7. Environmental Requirement (环境要求)

7.1 Operating Temperature (工作温度)

-5°C TO +40°C

7.2 Storage Temperature (储藏温度)

-25°C TO +70°C

7.3 Operating Humidity (工作湿度)

35~85% RH. Non-condensing

7.4 Storage Humidity (储藏湿度)

5 ~ 95% RH. Non-condensing

8. Mechanical Requirement (机械要求)

8.1 Dimension (尺寸)

59(L) * 27.5(W) * 76(H) mm maximum

8.2 Weight (重量)

50g ± 5g

8.3 Input plug type (输入插头类型)

Wall-mount **EU** type. **2** Conductors, < Live. Neutral > (**欧式 AC 输入 2PIN** 插头)

8.4 USB Plug Type (USB 接口类型)

Plug: Big 4pin USB (大 4pin USB)

8.5 USB Plug Test (USB 接口测试)

Pin 2, 3 Short; Pin2, 1 and Pin 2,4 disconnection (Pin 2, 3 短路; Pin2, 1 and Pin 2,4 断开)

8.6 Drop Test (跌落试验)

Drop the charger from a height of **100cm** onto a hardwood floor, hitting the charger for **6** times, no mechanical damages or other failures, no electrical deterioration and other failures comparing to before test condition.

(制品从 **100cm** 处落下 **6** 次, 落下的方向任意, 落在硬地板上, 实验后与实验前状态比较没有机械破损等不良状况,且不出现在电器性能损坏)

8.7 Vibration Test Requirement (振动试验)

Non-operating, with packing) Reference to IEC publ. 68-2-6

(在包装好不工作的情况下实验,具体参照 IEC publ. 68-2-6 标准)

Test conditions (测试条件)		Acceptance Criteria (规格)
Frequency (振动频率)	10~55Hz	Nominal functional test should be satisfied after the test (不发生功能损坏的异常情况)
Sweep (振动方式)	2hours, For each axis(X,Y, Z)	
Acceleration (加速度)	5.0G (5~50Hz, peak-peak)	
Displacement (振幅)	0.35 mm(10~55Hz)	

8.8 Plug in and out Test (插拔实验)

After plug the connector in(**30N** max) and out(**10-50N**) the female-connector for 10 times, then plug in and out for **3000** times, light damage in the mechanic characteristic, but no abnormality in electric characteristic.

(插头与连接器经正常插拔 **10** 次, 插头每次插入力度不大于 **30N**, 拔出在 **10-50N** 之间后持续拔插 **3000** 次, 外观允许有轻度损伤, 但导通性能良好)

8.9 Salty Fog Test for Metal part (五金件盐雾实验)

Experiment condition, Salty water thickness: **5%**, Equipment Temperature: **35~40°C**, put the charger(unpacking)in the test equipment for **48h**, after **48h** recovery at **25°C** checking the appearance, the metal parts have no erode and rust.

(盐雾试验要求: 调制(工业盐)盐水的浓度为 **5%**, 设备温度设置为 **35~40°C**, 充电器不包装, 放入盐雾试验设备中持续喷雾 **48** 小时, 试验结束后取出, 在常温下搁置 **48** 小时, 再检查充电器外观; 要求外露金属及电镀件不生锈。)

9. Mechanical Characteristics (机械性能)

9.1 Appearance (外观)

Visual inspection the case have no visual abnormality, no obvious nick, burr and other mechanical damage, outer metal have no rust. Use limit sample to check for any failures.

(目视检查, 无外观异常, 表面无明显划痕、毛刺及其它机械损伤, 外露金属部分无锈, 其它限度根据样品确认。)

9.2 Case/Resin materials (外壳材质)

Flame resistance applies to **UL94V-0** or more (耐燃性遵循 **UL94V-0** 以上)

10. Environmental Performances(环境性能)

10.1 Operating at the lower temperature (低温工作实验)

At **$-5\pm 3^{\circ}\text{C}$** , with the rated voltage **100V~240Vac** charged to the primary and unloaded and full load on the secondary **4 hours**, no abnormality in electric and mechanical characteristic.
(环境温度 **$-5\pm 3^{\circ}\text{C}$** , 在输入端施加额定电压 **100V~240Vac** 输出端空载与满载状态下工作 **4 小时**, 无特性异常)

10.2 Operating at the high temperature (高温工作实验)

At **$40\pm 2^{\circ}\text{C}$** , with the rated voltage **100V~240Vac** charged to the primary and unloaded and full load on the secondary **4 hours**,. No abnormality in electric and mechanical characteristic.
(环境温度 **$40\pm 2^{\circ}\text{C}$** , 在输入端施加额定电压 **100V~240Vac** 输出端空载与满载状态下工作 **4 小时**, 无特性异常)

10.3 Storage at the lower temperature (低温存储)

At **$-25\pm 3^{\circ}\text{C}$** , test of non-operated **16 hours**, No abnormality in electric and mechanical characteristic after **2 hours** recovery at the room temperature.
(在 **$-25\pm 3^{\circ}\text{C}$** 非工作状态下进行试验 **16 小时**, 试验后常温放置 **2 小时** 后测试无异常)

10.4 Storage at the higher temperature (高温存储)

At **$70\pm 2^{\circ}\text{C}$** , test of non-operated **16 hours**, No abnormality in electric and mechanical characteristic after **2 hours** recovery at the room temperature.
(在 **$70\pm 2^{\circ}\text{C}$** 非工作状态下进行试验 **16 小时**, 试验后常温放置 **2 小时** 后测试无异常)

10.5 Operating at the invariable temperature and invariable humidity (恒温恒湿工作)

At **$40^{\circ}\text{C}, 90\sim 95\%RH$** , test of operating **48 hours**, no abnormality in electric and mechanical characteristic.
(在 **$40^{\circ}\text{C}, 90\sim 95\%RH$** , 非工作状态下进行试验 **48 小时**, 无特性异常)