

QI2 MPP模组测试报告

QI2 MPP Module test report

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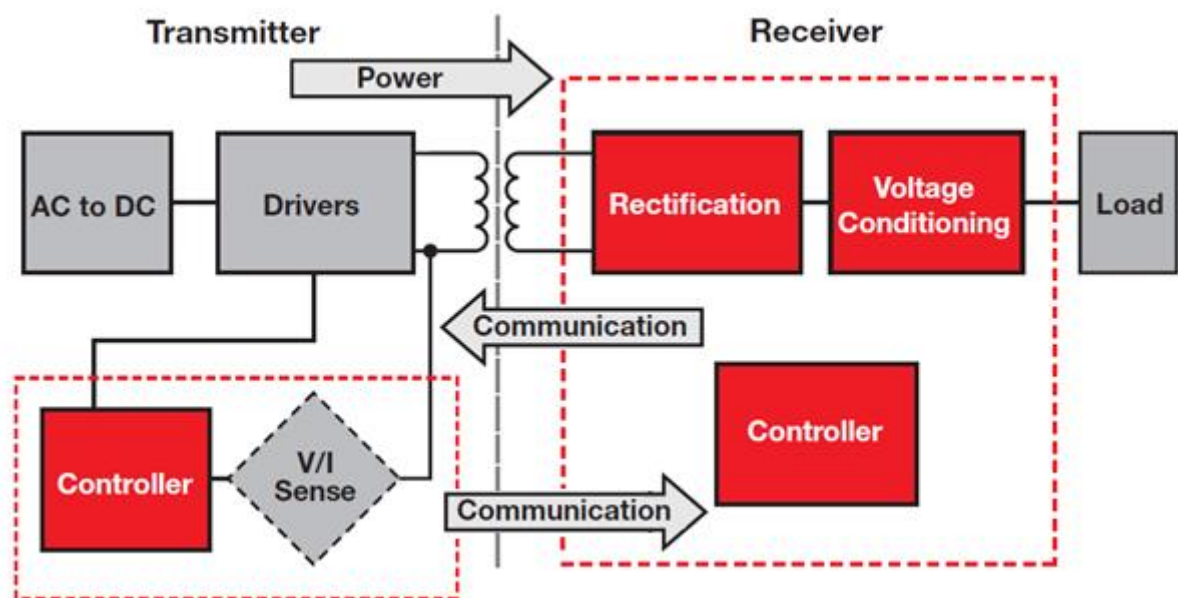
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1. 概要 General

此承认书详细描述了一款 iPhone MPP 数字解调无线快充发射器的物理、功能和电气特性，该发射器具备 QC2.0/QC3.0/PD 识别功能，兼容 WPC-Qi V1.2.4/WPC-Qi V1.3/WPC-Qi V2.0 标准，支持发射至接收的双向通讯，支持 iPhone 5W/7.5W/15W 充电。工作频率 110KHz-205KHz、360KHz。

This admission describes the physical, functional and electrical characteristics of a iPhone MPP digital demodulation wireless fast charging transmitter, which has QC2.0/QC3.0/PD recognition function, is compatible with WPC-Qi V1.2.4/WPC-Qi V1.3/WPC-Qi V2.0 standard, supports two-way communication from transmission to reception, and supports iPhone 5W/7.5W/15W charging. The operating frequency is 110 KHz-205 KHz and 360 KHz.

1.1 应用框图 The application block diagram



1.2 充电范围 Charging range

发射器线圈表面到 MPP 手机距离必需保持 2mm-7mm（如带保护壳，那保护壳需要加磁铁）。

发射器线圈表面到非 MPP 手机距离必需保持 2mm-9mm。

The distance between the transmitter coil surface and the MPP mobile phone must be kept 2mm-7mm (if there is a protective shell, the protective shell needs to add a magnet).

The distance between the transmitter coil surface and the non-MPP mobile phone must be kept 2mm-9mm.

2. 输入特性 Input Characteristics

2.1 输入电压 Input Voltage

输入电压范围：5V±5%、9V±5%。

Input Voltage range: 5V±5%、9V±5%.

2.2 输入电流 Input Current

输入 5V 满载下最大输入电流 1.7Arms。

In the case of full load, Input 5V the highest input current 1.7Arms.

输入 9V 满载下最大输入电流 2.4Arms。

In the case of full load, Input 9V the highest input current 2.4Arms.

2.3 待机功耗 Stand-by Power Consumption

待机功耗低于 450mW。

Standby power consumption is less than 450mW.

3. 输出特性 Output Characteristics

3.1 输出特性 Output Characteristics

输出电压、输出电流符合下列标准：

The output voltage, output current meets the following criteria:

项目 Item			性能 Performance	备注 Remarks
输出电压 Output Voltage	输入电压 5V Input Voltage 5V	5W	+5Vdc	
	输入电压 9V Input Voltage 9V	5W	+5Vdc	
		iPhone7. 5W	+7. 5Vdc	QC2. 0/QC3. 0/PD
		iPhone15W	+14Vdc	QC2. 0/QC3. 0/PD
输出公差 Output Tolerance			±5%	
最大输出电流 Max. Load	输入电压 5V Input Voltage 5V	5W	1A	
	输入电压 9V Input Voltage 9V	5W	1A	
		iPhone7. 5W	1A	QC2. 0/QC3. 0/PD
		iPhone15W	1. 07A	QC2. 0/QC3. 0/PD
最小输出电流 Min. Load	输入电压 5V Input Voltage 5V	5W	0A	
	输入电压 9V Input Voltage 9V	5W	0A	
		iPhone7. 5W	0A	QC2. 0/QC3. 0/PD
		iPhone15W	0A	QC2. 0/QC3. 0/PD

3.2 输出保护 Output Protection

3.2.1 输出短路保护 Short Circuit Protection

在接收器输出短路情况下，发射器停止工作，当接收器移除后，发射器将恢复正常工作。

In the case of receiver output short circuit, the transmitter stops working, when the receiver is removed, the transmitter will return to normal work.

3.2.2 输出过流保护 Over Current Protection

触发过流保护后，发射器停止工作，当接收器移除后，发射器将恢复正常工作。

After triggering the over current protection, the transmitter stops working and the transmitter will return to normal operation when the receiver is removed.

3.2.3 过温保护 Over Temperature Protection

发射器的控制芯片 D9516 温度高于 80℃ 或外置 NTC 温度高于 60℃ 时，发射器停止工作，温度降低到正常状况，接收器移除后，发射器恢复正常工作。

The control D9516 temperature of the transmitter is above 80℃ or external NTC temperature above 60℃, the transmitter to stop working, when the receiver is removed and the temperature dropped to normal conditions, the transmitter back to normal work.

3.2.4 金属检测 Parasitic Metal Object Detect

当发射器线圈上探测到大于硬币大小金属物，发射器停止工作，金属物移除后，发射器恢复正常工作。

When the transmitter coil is detected the metal larger than the coin size , the transmitter stops working, and the transmitter returns to normal working after the metal is removed.

3.2.5 异物检测 Foreign Object Detect

发射器、接收器正常工作下，发射线圈和接收线圈间插入硬币大小金属物，2 分钟内发射器必须能停止工作（接收器协议版本需要 WPC1.1 以上）。

In the case of the normal work of the transmitters and receivers, the coin size metal is inserted between the transmitting coil and the receiving coil. The transmitter must be stopped within 2 minutes (the receiver protocol version requires WPC1.1 or above).

3.2.6 顶点关断 Vertex Shutdown

发射器、接收器正常工作下，接收器线圈位置相对发射器线圈偏移，导致发射线圈电压过高，发射器必须能进入限流模式，以保护发射器。

In the case of the normal work of the transmitters and receivers, receiver coil position relative to the transmitter coil displacement , causes transmitter coil over voltage, and transmitter must enter the current limit mode, in order to protect the transmitter.

4. 环境条件 Environmental Conditions

4.1 温度 Temperature

4.1.1 工作温度 Operating Temperature: 0°C to 40°C

4.1.2 储存温度 Storage Temperature: -20°C to 80°C

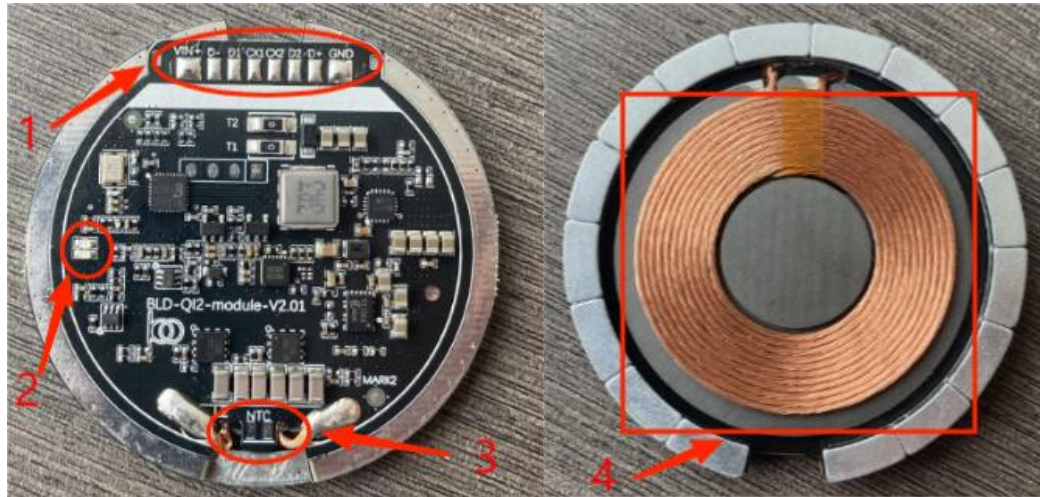
4.2 湿度 Humidity

4.2.1 工作湿度 Operating Humidity: 10% to 70% RH

4.2.2 储存湿度 Storage Humidity: 10% to 80% RH

5. 结构特性 Mechanical Characteristics

5.1 PCB



1. 电源输入接口 Power source input interface

2. LED 指示灯 Led indicator

3. 外置 NTC 接口 External NTC interface

4. 线圈感应区域 Coil induction region

注：充电完成指示功能，仅支持充满后会主动向发射器发送充满指令的手机。

Note: charging indicator function only supports mobile phones that will actively send charging instructions to the transmitter after charging.

LED 灯指示状态 Led indicator state						
项目 Item	LED	运行状态 Working state				
		待机	发送电源	充电完成	故障	异物检测
		Standby	Power transfer	Charging complete	Fault	FOD
通用	Blue LED	OFF	ON	ON	OFF	OFF
	Red LED	OFF	OFF	ON	ON	Flash

5.2 线圈 Coils

电气规格@25℃

ELECTRICAL SPECIFICATION@25℃

测试条件：空气中，单线圈

Test conditions: in the air, with a single coil

参数 PARAMETERS		单位 UNIT	线圈 1 Coil1	线圈 2 Coil2
电感（11 圈） Inductance（11Turns）	100KHz/1.0V	uH	7.9±5%	8.4 ±5%
	360KHz/1.0V	uH	7.9±5%	8.4 ±5%
直流阻抗 DCR		mΩ	80 Max(Typ.)	70 Max(Typ.)
交流阻抗 ACR	100KHz/1.0V	mΩ	70 Max(Typ.)	80 Max(Typ.)
	360KHz/1.0V	mΩ	120 Max(Typ.)	150 Max(Typ.)

测试条件：线圈贴板，单线圈

Test conditions: coil patch panel, single coil

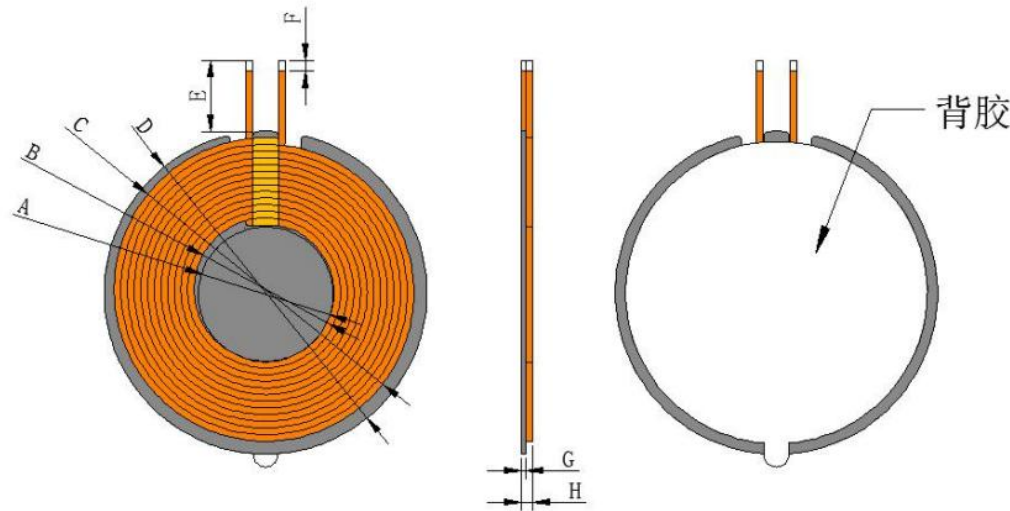
参数 PARAMETERS		单位 UNIT	线圈 1 Coil1	线圈 2 Coil2
电感（11 圈） Inductance（11Turns）	100KHz/1.0V	uH	7.3±5%	7.8±5%
	360KHz/1.0V	uH	7.2±5%	7.7±5%
直流阻抗 DCR		mΩ	80 Max(Typ.)	70 Max(Typ.)
交流阻抗 ACR	100KHz/1.0V	mΩ	190 Max(Typ.)	180 Max(Typ.)
	360KHz/1.0V	mΩ	450 Max(Typ.)	460 Max(Typ.)

5.2.1 线圈 1 Coil 1

DIMENSIONS (外形尺寸) : (Unit: mm)

单位（Unit）：毫米（mm）.

A	B	C	D	E	F	G	H
20±0.3	20.5±0.5	39±1	42.5±0.5	11±1	3±1	0.8±0.1	2.3max



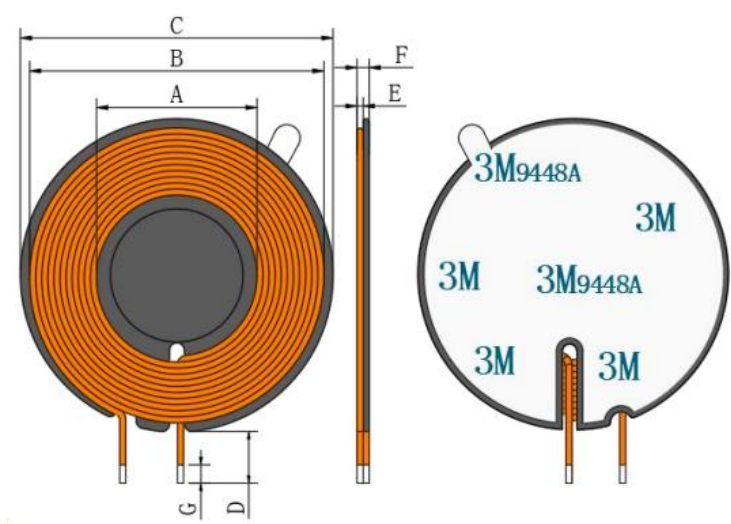
注：1. 背胶为白色双面胶。 2. 线圈贴合位置居中。
Note : 1. The backing tape is white double-sided tape.
2. Coil fitting position is centered.

5.2.2 线圈 2 Coil 2

DIMENSIONS (外形尺寸) : (Unit: mm)

单位 (Unit) : 毫米 (mm)

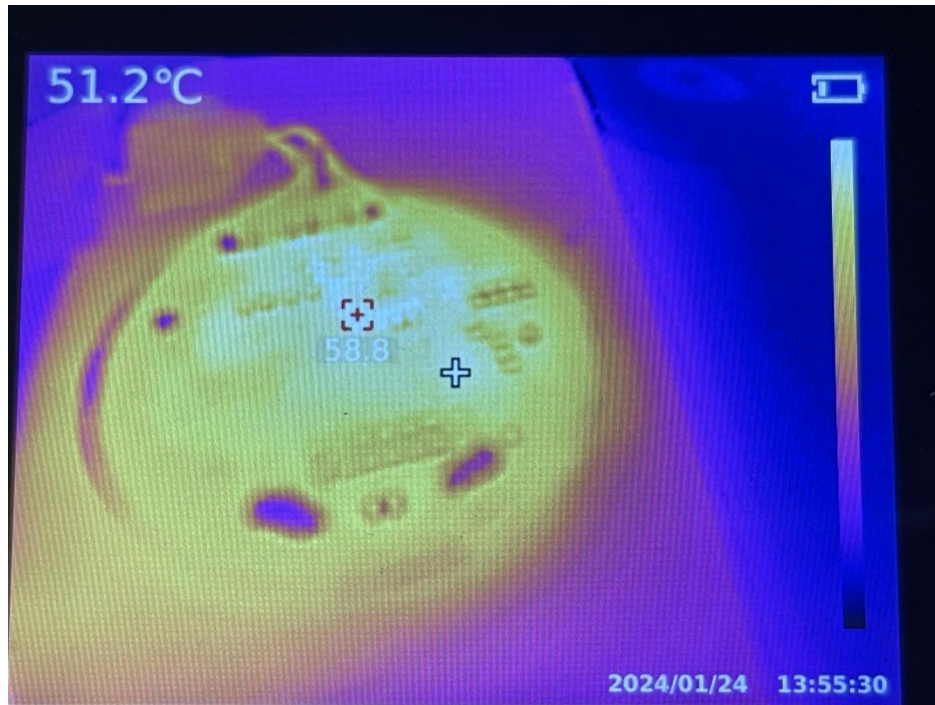
A	B	C	D	E	F	G
21.46±0.5	39.3±0.5	42.4±0.4	25±1.5	1.03±0.05	2.5Max (不含离型纸厚度 No separation paper thickness)	2.5Max (不带黄胶 No yellow gum)



6. 器件最高温升 The most high temperature of the device rises

15W 快充下模组器件的最高温升 35.8° C (环境温度: 23°C, 最高温度: 58.8°C)

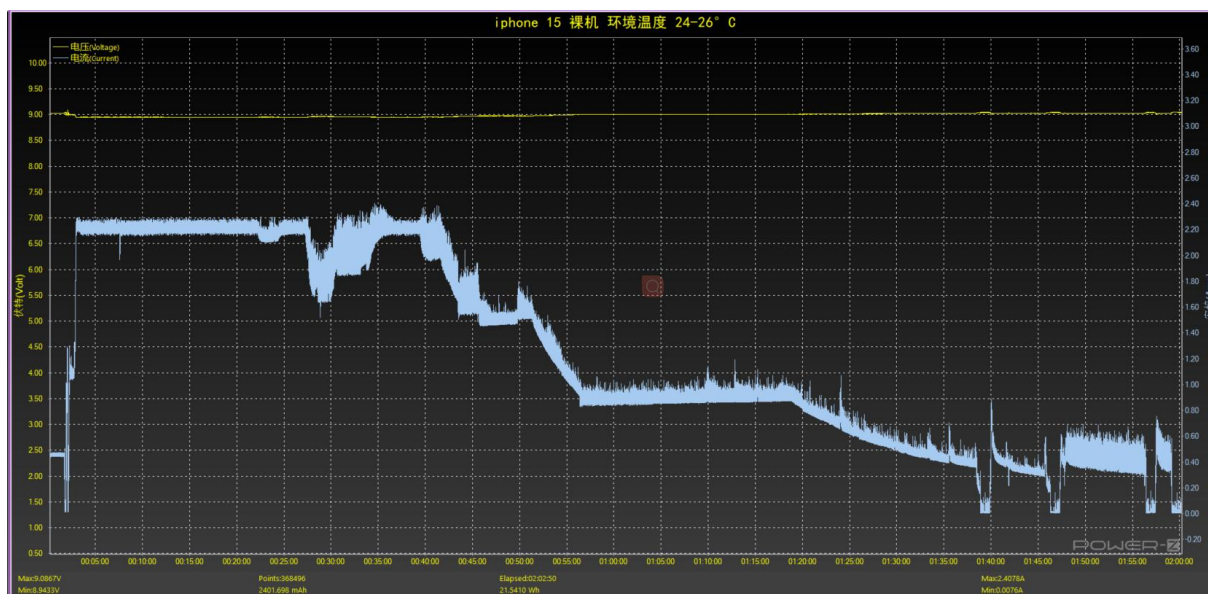
Maximum temperature rise of 15W charging module device 35.8° C (ambient temperature: 23°C, maximum temperature: 58.8°C)



7. 充电过程曲线 Charging process curve

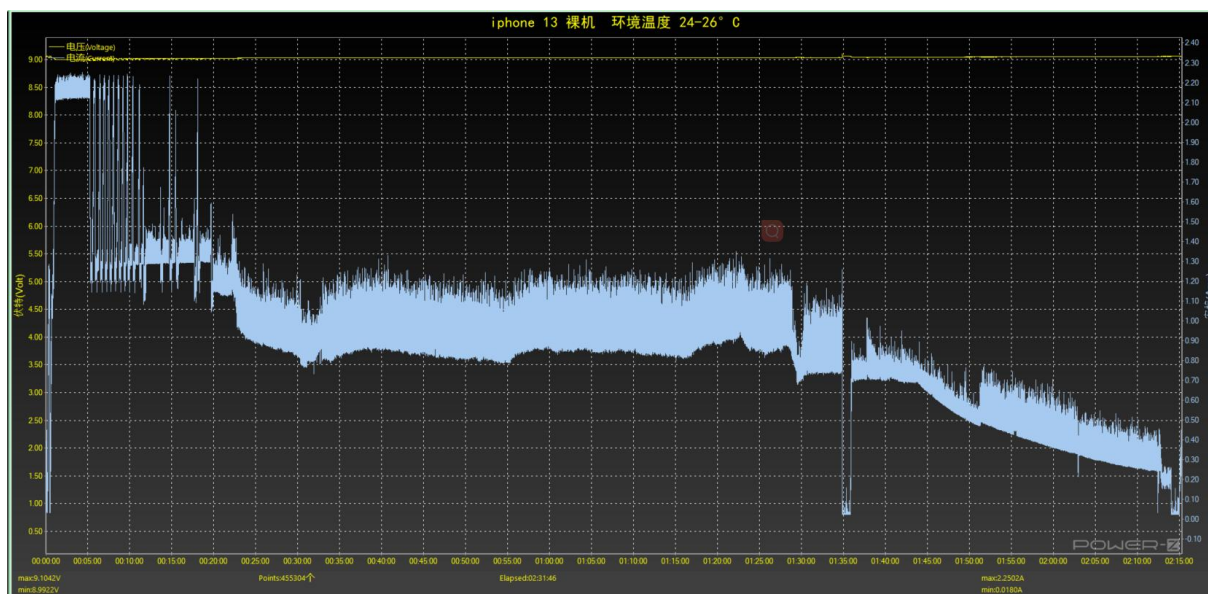
7.1 iPhone15, 苹果手机裸机（不带原装手机壳），环境温度：24-26° C，充电时长：1 小时 59 分钟。

IPhone15, Apple mobile phone bare machine (without the original mobile phone case),
Ambient temperature: 24-26° C, Charging time: 1 hours and 59 minutes.



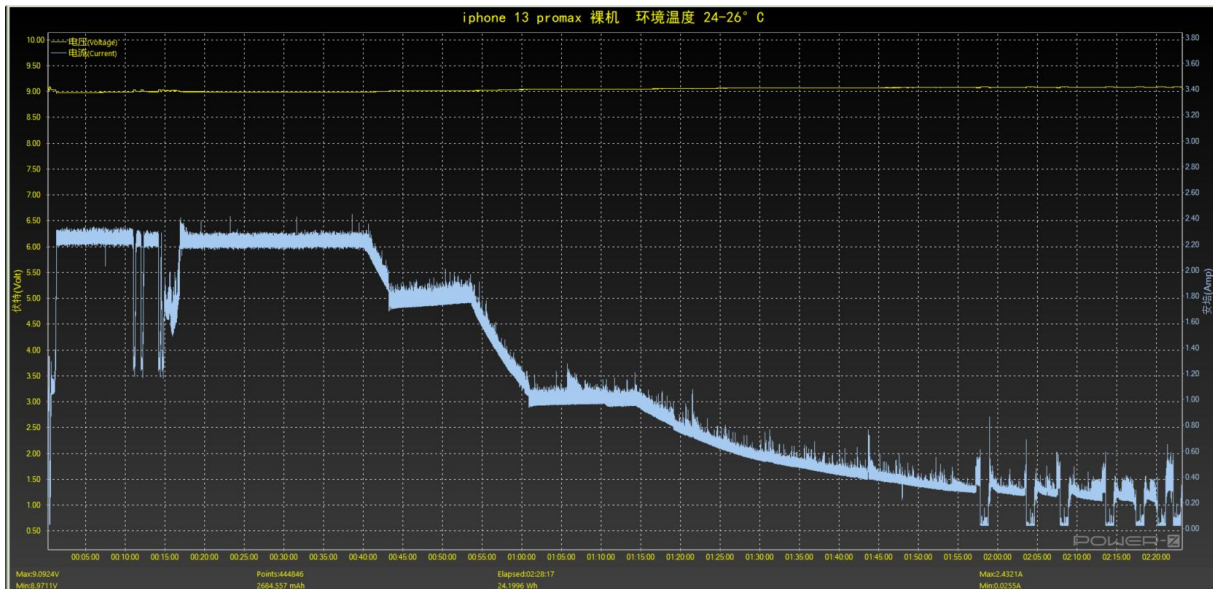
7.2 iPhone13 , 苹果手机裸机（不带原装手机壳），环境温度：24-26° C，充电时长：2 小时 15 分钟。

IPhone13, Apple mobile phone bare machine (without the original mobile phone case),
Ambient temperature: 24-26° C, Charging time: 2 hours and 15 minutes.



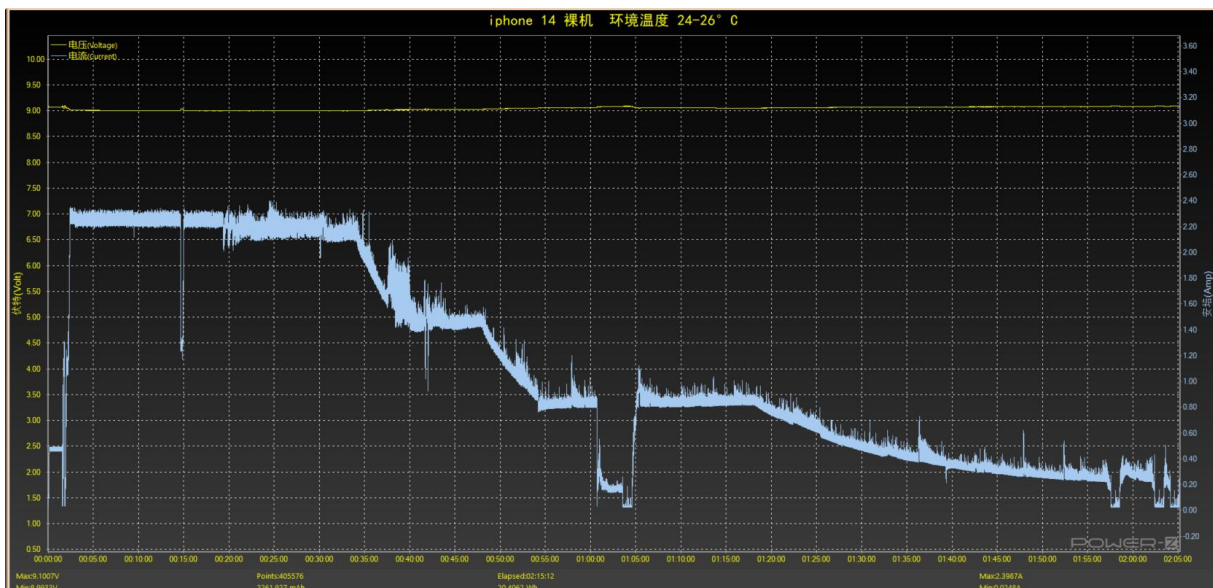
7.3 iPhone13 promax, 苹果手机裸机（不带原装手机壳），环境温度：24-26° C，充电时长：2 小时 20 分钟。

IPhone13 promax, Apple mobile phone bare machine (without the original mobile phone case), Ambient temperature: 24-26° C, Charging time: 2 hours and 20 minutes.



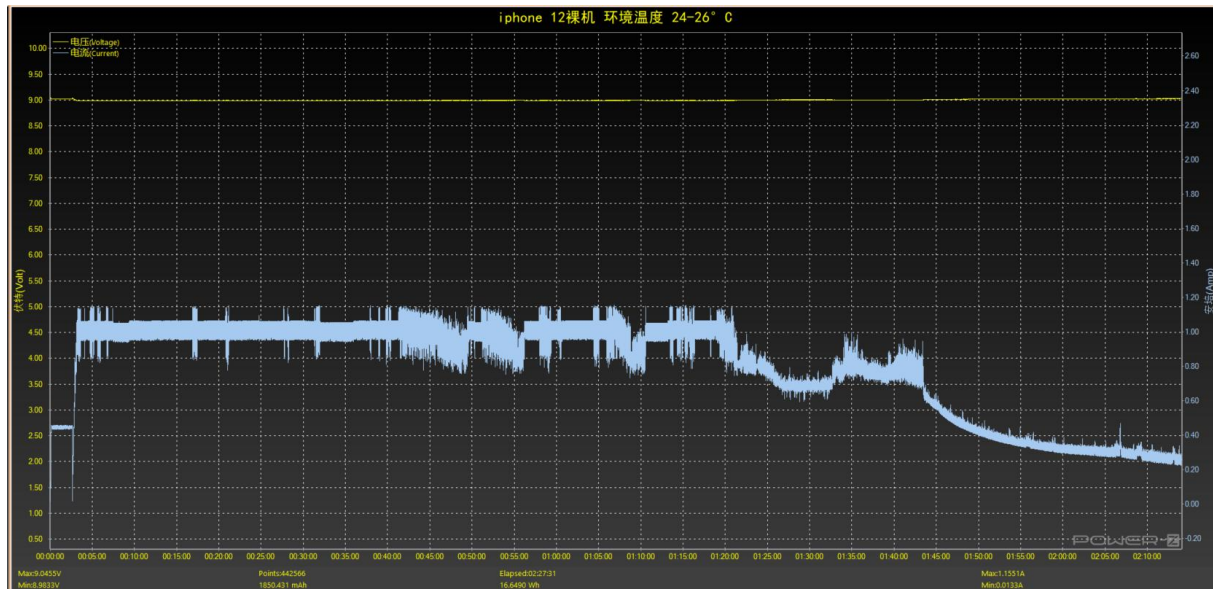
7.4 iPhone14, 苹果手机裸机（不带原装手机壳），环境温度：24-26° C，充电时长：2 小时 05 分钟

IPhone14, Apple mobile phone bare machine (without the original mobile phone case), Ambient temperature: 24-26° C, Charging time: 2 hours and 05 minutes.



7.5 iPhone12, 苹果手机裸机（不带手机壳），环境温度：24-26° C，充电时长：2 小时 10 分钟

IPhone15, Apple mobile phone bare machine (without the original mobile phone case), Ambient temperature: 24-26° C, Charging time: 2 hours and 10 minutes.



8. Qi2 MPP 认证证书 Qi2 MPP certification certificate

Qi Certificate for QI-ID 20618



The product MPP module_MAB1 by Blande with manufacturing part number MAB1 is licensed to use the Qi logo on the product, on the product's packaging, and in the product's user manual.

The product passed the tests defined in the Qi wireless power specification and works correctly when used in combination with other products that are licensed to use the Qi logo.

Paul Struhsaker

26 January 2024

Paul Struhsaker

Executive Director

Wireless Power Consortium



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