LoRaWAN Smart Meter Reading and Solution
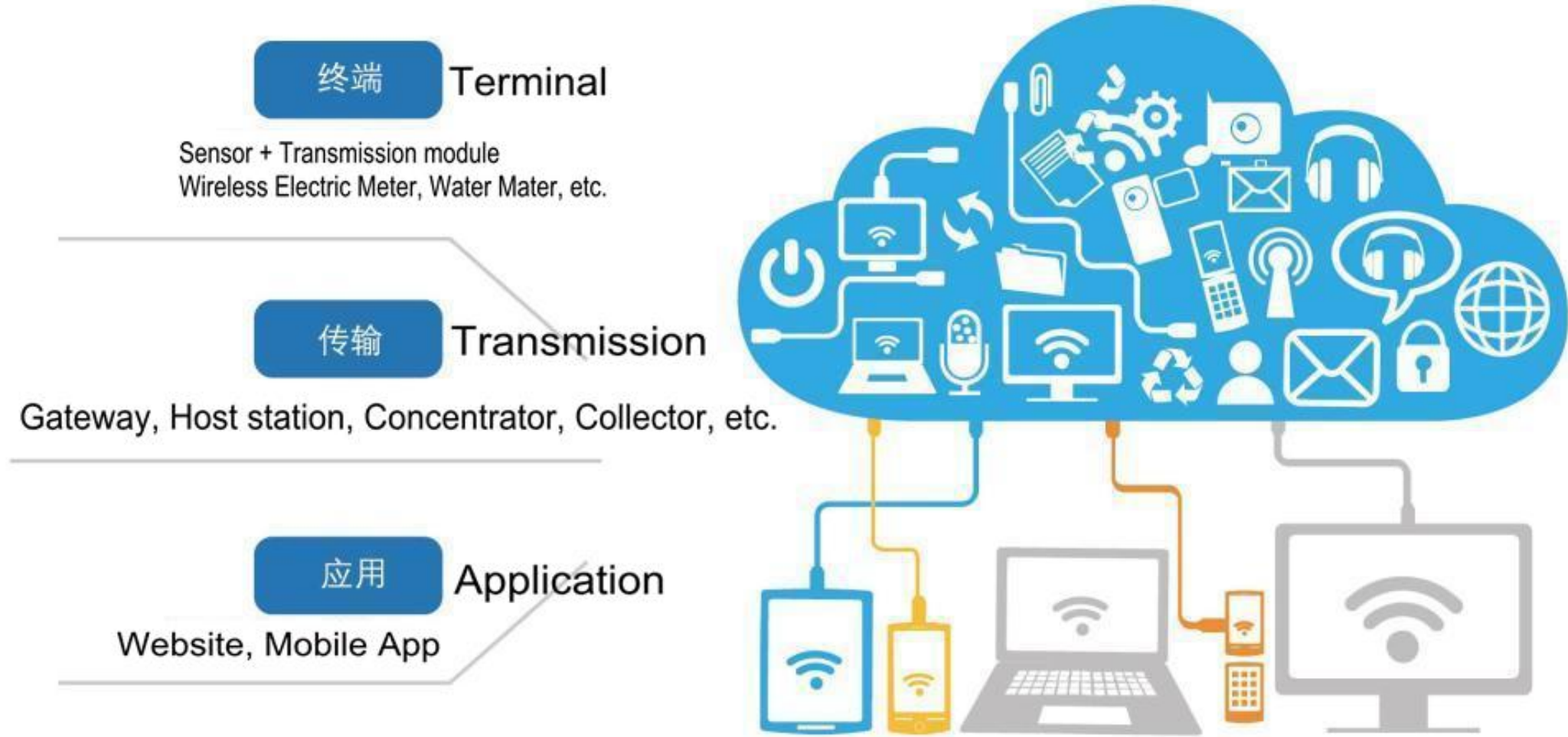
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WUHAN RADARKING ELECTRONICS CORP.

Chapter 1：Introduction of LoRaWAN AMI Solution

1.1 LoRaWAN IoT System Composition

终端 Terminal

Sensor + Transmission module
Wireless Electric Meter, Water Mater, etc.

传输 Transmission

Gateway, Host station, Concentrator, Collector, etc.

应用 Application

Website, Mobile App

IoT System = Sensing (Terminal) + Transmission + Application

1.2 LoRaWAN Smart Meter Reading System Architecture
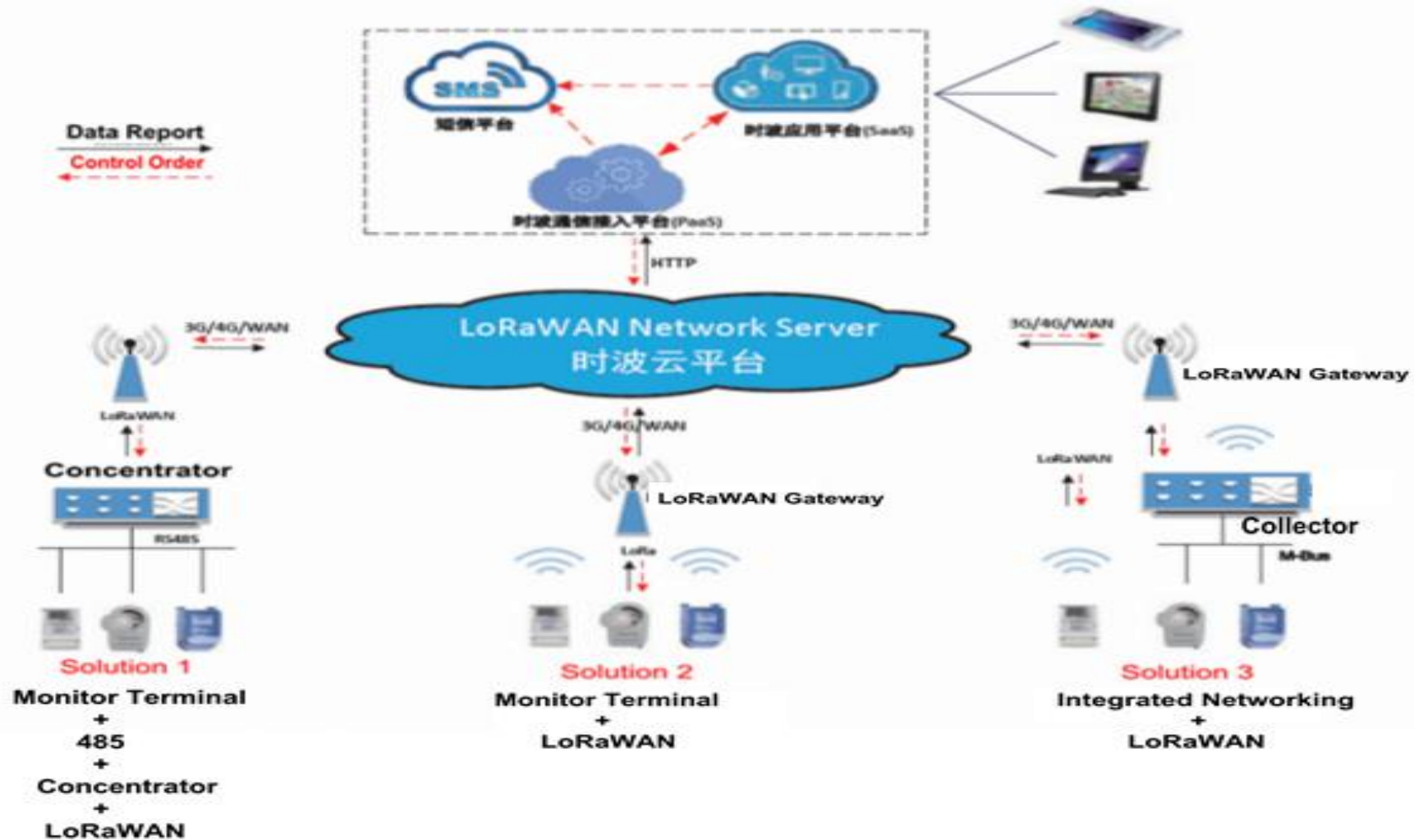
1.3 Features of LoRaWAN Smart Meter Reading

01 **Wide Coverage**
15km（Signt distance）

02 **Large Node Capacity**
A single gateway can support 100,000 nodes of access.

03 **Ultra High Sensitivity**
Sensitivity up to -143dBm, thousands of times over GPRS, 4G.

04 **Strong Network Stability**
The node can enter the network through the neighbor gateway when a gateway is abnormal.

05 **Many Availability**
The network can be connected to various terminals such as electricity meters, water meters, smoke, bracelets, door locks, etc.

1.4 Frequency of LoRa meter

Area	Frequency
Europe	EU868 868.1MHz 868.5MHz 868.3MHz
Asia	AS923 923.2MHz 923.4MHz
Korea	KR920 922.1MHz 922.5MHz 922.3MHz
India	IND865 865.0625MHz 865.985MHz 865.4025MHz
USA	US915 902.3MHz 903.1MHz 902.5MHz 903.3MHz 902.7MHz 903.5MHz 902.9MHz 903.7MHz
China	EU433

Chapter 1：Introduction of Products

2.1 LoRaWAN Smart Electric Meter

Single/Three Phase Smart Electric Meter

The single/three phase fee control smart electric energy meter is an intelligent electric energy metering product developed and produced by our company. It is suitable for measuring the single/three phase AC active energy with rated voltage of 220V, 3×220V/380V and frequency of 50Hz. With independent modulation infrared, RS485 and module communication port and IC bayonet, it can support LoRaWAN remote monitoring or local cost control function; This meter has the advantages of high reliability, high precision, wide range and long life. It can be widely used in the measurement of three-phase alternating current in urban, rural or factory enterprises.

| Single Phase Electric Meter | Three Phase Electric Meter |

2.1.1 LoRaWAN--DDS155

Description:

DDS155(LoRaWAN) single-phase electronic energy meter is a fully digital power meter developed by our company. It adopts SOC highly integrated V9821S chip, which has functions of active energy metering, online power display, intelligent anti-tampering, overload control, remote centralized meter reading and etc. It transmits data to the appropriate gateway through LoRaWAN wireless ad hoc networks. It has high precision, low power consumption, good stability, and can be widely used in city, country or school and any enterprises.

Features:

1. Using SOC microcontroller V9821S: enhanced 8052MCU core, energy metering capabilities, integrated analog front end, RTC module, LCD driver, FLASH, accurate measurement and display of active energy.
2. Remote disconnection and power transmission function: According to the specific power situation, power off command can be issued at the master station to cut off the user load circuit. Or send a power transmission command and turn on the user load circuit.
3. With LoRaWAN wireless ad hoc network to send data to the appropriate gateway, it can take the initiative to upload data, and the default interval of 10 minutes to upload data (time can be set).
4. The communication protocol complies with DL/T645-2007.

2.1.2 LoRaWAN--DTS150

Description:

DTS150 (LoRaWAN) three-phase electronic energy meter is a new generation of intelligent high-tech long-distance energy metering products developed by our company. It is based on MCU+ metering chip technology, adopts the latest integrated circuit technology, and is designed according to the IEC standard of electric energy meter and China's electric power standard GB/T645-2007, GB/T 17215.321-2008, supplemented by LoRaWan communication module. Solve communication distance and networking problems. It has high precision, low power consumption, good stability, and can realize the modernization of power distribution management without complicated wiring.

BR: LoRaWAN, built-in switch. LCD: 6+2

Features:

1. Based on the MCU+ metering module, supplemented by 485 and LoRaWan communication modules for flexible long-distance communication.
The measurement accuracy is a level 1 table.
2. Remote power off and power transmission function: According to the specific power consumption condition, the power failure command can be issued at the primary station to cut off the user load circuit; Or the power transmission command is issued to turn on the user load circuit.
3. The communication protocol is in accordance with DL/T645-2007.
4. Wireless communication, automatic networking, easy and fast installation, eliminating the need for complicated wiring work.

2.2 LoRaWAN Smart Water Meter

The wireless intelligent water meter consists of remote basic water meter, wireless communication modules and other components. This product can complete the data collection of point-to-point through the gateway with low power consumption, long life and two-way data transmission. It provides reliable protection for the accurate collection of real-time data; Wireless water meter uploads data to the gateway everyday automatically, then the gateway uploads data to the network platform automatically; This product is simple in structure, easy to maintain and replace, and connect with no cables. So, it is easy to install.

DIMENSION 尺寸

DN (mm)	Length (mm)	Height (mm)	Thread D
15	165	86	G3/4B
20	195	86	G1B
25	225	86	G11/4B

LXZ型

2.2.2 LoRaWAN LXZ--WL/R(LoRaWAN)

Specification:

1. Operating environment:

Water temperature: 0.1℃～30℃

Protection grade: IP68

2. Operation water pressure: 0.03MPa~1.0MPa

3. Pressure loss: ≤0.1MPa

4. Main parameters

Power Consumption	Static current consumption (wireless module doesn't include counting sensor)	≤10μA
	Wireless current receiving power consumption	≤18mA
	Wireless current emission power consumption	About 120mA
Wireless Performance Parameter	RF center frequency	433MHz
	Modulation	LORA
	Frequency bandwidth	125KHz,250KHz can be optional
	RF power	20dbm(100mW) (Typical)
	Transmission rate	0.25-50kbps (LoRaWAN)
	Receiver sensitivity	-143dBm @SF12/BW 125KHz
Power supply	3.6V lithium battery	More than 10 years
Sampling Method	Hall sensor, double pulse	Pointer sampling at 0.01, addend when positive rotation, subtrahend when inverse rotation.

2.2.2 LoRaWAN LXZ--WL/R(LoRaWAN)

Specification:

5. Range ratio and flow range.

(DN) mm	Q3 /Q1	Overload Flow Q4	Common Flow Q3	Demarcation Flow Q2	Min Flow Q1	Display	
						Min m3	Max m3
		m3/h				m3	
15	80	3.125	2.5	0.05	0.031	0.0001	9999.9999
	100			0.04	0.025		
20	80	5	4	0.08	0.05		
	100			0.064	0.04		
25	80	7.875	6.3	0.126	0.079		
	100			0.10	0.063		

6. Electromechanical Conversion Error ≤±0.5m3.

7. Allowable Maximum Error:
From the minimum flow to the low zone that does not include the demarcation flow: ±5%;
From the demarcation flow to the high zone including the overload flow: ±2%.

8. Communication Distance: City transmission distance: About 2km
　　　　　　　　　　　　　　The number of floors crossed: About 15 floors

9. Power Supply: The gateway needs an external 220V power supply.

10. All prepaid costs are stored in the meter reading system. Based on the collected data of water consumption, it is determined whether the user owes fees.

2.3 LoRaWAN Smart Gas Meter

Description:

The smart gas meter is a collection and metering gas meter terminal developed by our company. It is suitable for the flow metering of natural gas, liquefied petroleum gas, artificial gas and other gases. It integrates gas metering, remote reading and monitoring, and the meter has high Reliability, high precision and low power consumption. The parameters meet the technical requirements of GB/T6968-1997 Membrane Gas Meter, and the communication parameters are in line with the CJ/T188-2004 "User Metering Instrument Transmission Technical Conditions". This product complies with the corresponding provisions of GB3836.1-2000 and GB3836.4-2000 standards.

功能特点

➢Convenient installation: using non-polar two-wire bus technology in line with international standards and national standards, making communication reliable and wiring simple.

➢Safety protection: High non-magnetic components, magnetic interference will not have any impact on metering data; Full waterproof potting with IP65.

➢Stable and reliable: the character wheel and sensor are in different chambers, suitable for different installation environments, ensuring long-term stable operation.

➢Display mode: mechanical reading, can work normally in a variety of harsh environments.

➢Working mode: using photoelectric direct reading technology, usually the watch does not need power supply, directly read the word wheel data to ensure the consistency of electromechanical data

➢Communication method: M-Bus, LoRaWAN

主要技术指标

✓Operating temperature: 0~40°C

✓Use humidity: ≤ 85%

✓Working voltage: system voltage 3.6V, total voltage 39V

✓Working current: dynamic ≤ 20mA, static ≤ 2mA

✓Working years: > 10 years

✓Explosion-proof mark: Exib IIBT 3

✓Measurement level: Class B

✓Working pressure range: 0.5kPa ~ 10kPa

✓Total pressure loss: ≤ 250pa

✓Meter joint thread: M30×2

G1.6YW
G2.5YW
G4.0YW

2.4 LoRaWAN Gateway

LoRaWAN Gateway is an IoT gateway with ultra-penetrating and easy-to-deploy designed. it is specifically design for environments with complex buildings and demanding network penetration, such as parks and large buildings.

Parameter	Specification
Working Frequency	433MHz/470MHz/780MHz/868MHz/920MHz
Channel Bandwidth	62.5kHz/125kHz/250kHz/500kHz
Transmit Power	Max 23dBm
Transmission Distance	15km（Signt distance）
Uplink Interface	3G/4G/Ethernet
Operating Voltage	12 ~ 36VDC
Power Consumption	<5W
Weight	900g
Standard	LoRaWAN™

2.5 LoRaWAN Transmission Module
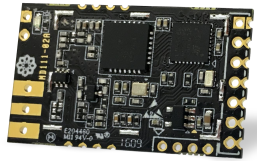
LoRaWAN Module

LoRaWAN
Meter Reading Module

485 to LoRaWAN

485 to LoRaWAN

# Chapter 3 : Platform Introduction

3.1 LoRaWAN Smart Meter Reading and Monitoring Platform

Introduction:

LoRaWAN smart meter reading and monitoring platform system integrates four kinds of information collection of electricity, water, heat and gas through the collection system, and collects it into the local server or cloud server through remote collection, then realizes the function of charge management. At the same time, it provides users with complete, timely and accurate energy usage information and diversified payment services, improves customer service experience, promotes the transformation of customers' energy consumption concepts, and promotes the construction of "Internet + Energy" . The information collection (meter reading) charging system consists of measuring instruments, data collection and transmission, metering and charging, file management, personnel management, payment recharge, abnormal alarm, energy consumption analysis, data sharing and mobile app.
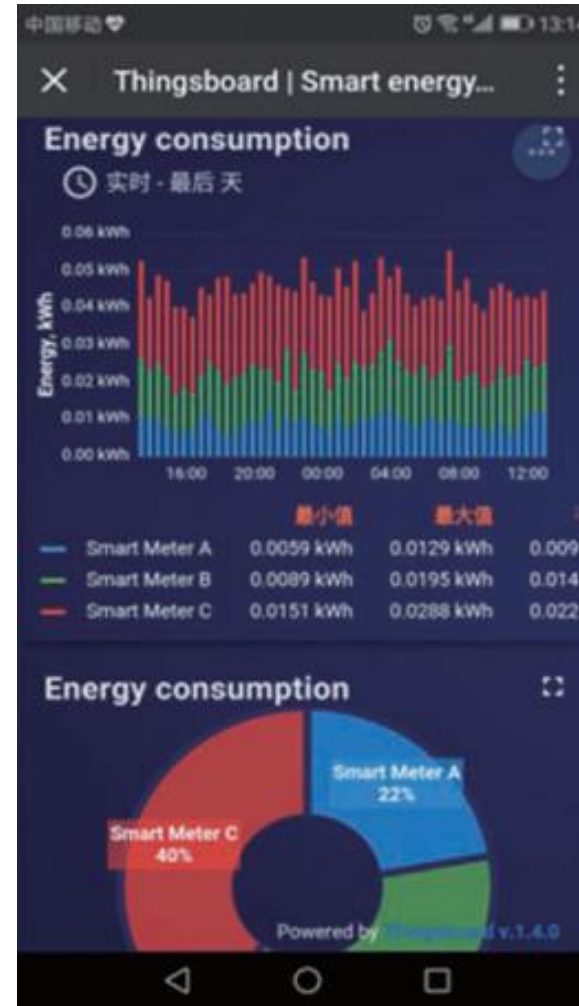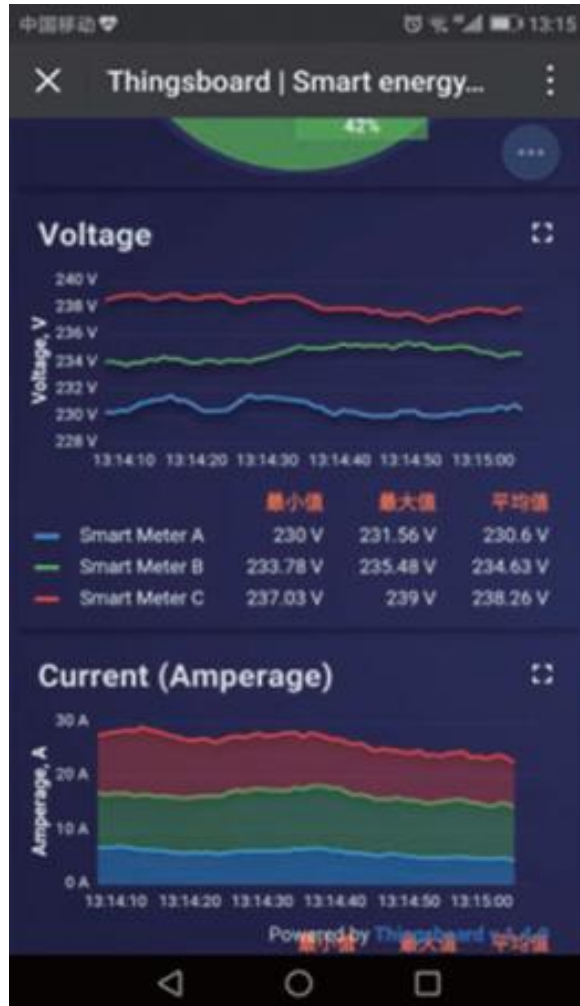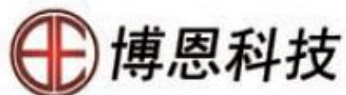
3.2 PaaS Platform
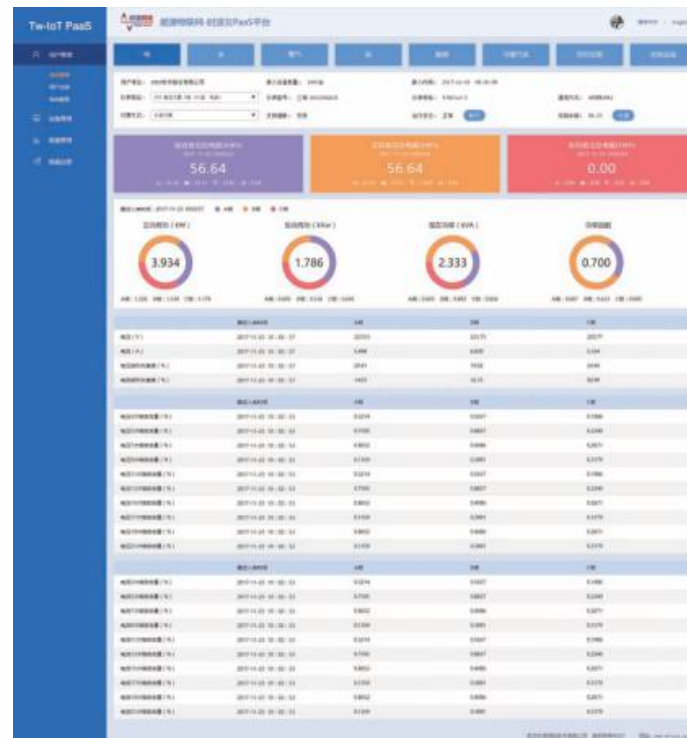
3.3 SaaS Application Platform

3.4 Mobile APP

Company Certificate

Business Partner

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