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## F8916-L Series IP MODEM Technical Specification

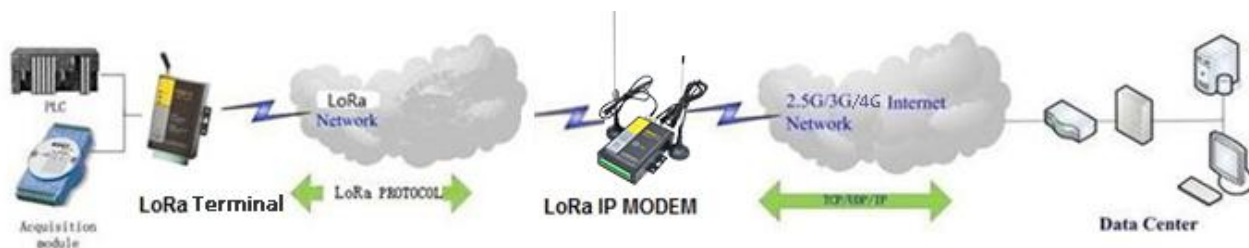


### General

F8916-L Series IP MODEM is a kind of cellular terminal device that provides data transfer by public cellular network. At the same time using LoRa wireless transmission technology for short distance data transmission.

It adopts high-powered industrial 32 bits CPU and embedded real time operating system. It supports RS232 and RS485 (or RS422) port that can conveniently and transparently connect one device to a cellular network, allowing you to connect to your existing serial devices with only basic configuration. It has low power consumption states in which the power consumption could be lower than 5mA@12VDC. It has compatible digital I/O channel, ADC, input pulse counter and pulse wave output function.

It has been widely used on M2M fields, such as intelligent transportation, smart grid, industrial automation, telemetry, finance, POS, water supply, environment protection, post, weather, and so on.



### Product Feature

#### Design for Industrial Application

- ◆ High-powered industrial LoRa module
- ◆ High-powered industrial cellular module
- ◆ High-powered industrial 32 bits CPU
- ◆ Support low power consumption mode, including multi-sleep and trigger modes to reduce the power dissipation farthest
- ◆ Housing: iron, providing IP30 protection.
- ◆ Power range: DC 5~36V

#### Stability and Reliability

- ◆ Support hardware and software WDT

- ◆ Support auto recovery mechanism, including online detect, auto redial when offline to make router always online
- ◆ RS232/RS485/RS422 port: 15KV ESD protection
- ◆ SIM/UIM port: 15KV ESD protection
- ◆ Power port: reverse-voltage and overvoltage protection
- ◆ Antenna port: lightning protection(optional)

### Standard and Convenience

- ◆ Adopt terminal block interface, convenient for industrial application
- ◆ Support standard RS232 and RS485(or RS422) port that can connect to serial devices directly
- ◆ TTL logic level RS232 interface can be customized
- ◆ Support intellectual mode, enter into communication state automatically when powered
- ◆ Provide management software for remote management
- ◆ Support several work modes
- ◆ Convenient configuration and maintenance interface

### High-performance

- ◆ Support TCP server and support multi TCP client connection(optional)

- ◆ Support double data centers, one main and another backup
- ◆ Supply 2 I/O channels, compatible 2 pulse wave output channels, 2 analog inputs and one pulse input counters.
- ◆ Support multi data centers and it can support 5 data centers at the same time
- ◆ Support multi online trigger ways, including SMS, ring and data. Support link disconnection when timeout
- ◆ Support dynamic domain name(DDNS) and IP access to data center
- ◆ Design with standard TCP/IP protocol stack
- ◆ Support APN/VPDN
- ◆ Support transferring data via LoRa

## Product Specification

### Cellular Specification

Item	Content
<b>F8916-L-G LoRa+GPRS IP MODEM</b>	
Standard and Band	EGSM 900/GSM 1800MHz, GSM 850/900/1800/1900MHz(optional) Compliant to GSM phase 2/2+ GPRS class 10, class 12(optional)
Bandwidth	85.6Kbps
TX power	GSM850/900:<33dBm GSM1800/1900:<30dBm
RX sensitivity	<-107dBm
<b>F8916-L-C LoRa+CDMA IP MODEM</b>	
Standard and Band	CDMA2000 1xRTT 800MHz, 450MHz(optional)
Bandwidth	153.6Kbps
TX power	<30dBm
RX sensitivity	<-104dBm
<b>F8916-L-W LoRa+WCDMA IP MODEM</b>	
Standard and Band	UMTS/WCDMA/HSDPA/HSUPA/HSPA+ 850/1900/2100MHz, 850/900/1900/2100MHz(optional) GSM 850/900/1800/1900MHz GPRS/EDGE CLASS 12
Bandwidth	DC-HSPA+: Download speed 42Mbps, Upload speed 5.76Mbps HSPA+: Download speed 21Mbps, Upload speed 5.76Mbps HSDPA: Download speed 7.2Mbps, HSUPA: Upload speed 5.76Mbps UMTS: 384Kbps

TX power	<24dBm
RX sensitivity	<-109dBm
<b>F8916-L-V LoRa+EVDO IP MODEM</b>	
Standard and Band	CDMA2000 1X EVDO Rev A 800MHz, 800/1900MHz(optional), 450MHz(optional) CDMA2000 1X EVDO Rev B 800/1900MHz(optional) CDMA2000 1X RTT, IS-95 A/B
Bandwidth	EVDO Rev. A: Download speed 3.1Mbps, Upload speed 1.8Mbps EVDO Rev. B: Download speed 14.7Mbps, Upload speed 5.4Mbps (optional)
TX power	<23dBm
RX sensitivity	<-104dBm
<b>F8916-L-TL LoRa+TDD LTE IP MODEM</b>	
Standard and Band	LTE TDD 2600/1900/2300MHz(Band 38/39/40), 800/1400/1800MHz(Band 27/61/62)(optional) TD-SCDMA 2010/1900MHz(A/F frequency band, Band 34/39) GSM /GPRS/EDGE 900/1800/1900MHz
Bandwidth	LTE TDD: Download speed 61Mbps, Upload speed 18Mbps TD-HSPA+: Download speed 4.2Mbps, Upload speed 2.2Mbps TD-HSPA: Download speed 2.2Mbps, Upload speed 2.2Mbps
TX power	<23dBm
RX sensitivity	<-97dBm
<b>F8916-L-FL LoRa+FDD LTE IP MODEM</b>	
Standard and Band	LTE FDD 2600/2100/1800/900/800MHz, 700/1700/2100MHz(optional) DC-HSPA+/HSPA+/HSDPA/HSUPA/UMTS 850/900/2100MHz, 800/850/1900/2100MHz(optional) EDGE/GPRS/GSM 850/900/1800/1900MHz GPRS CLASS 10 GPRS CLASS 12
Bandwidth	LTE FDD: Download speed 100Mbps, Upload speed 50Mbps DC-HSPA+: Download speed 42Mbps, Upload speed 5.76Mbps HSPA+: Download speed 21Mbps, Upload speed 5.76Mbps HSDPA: Download speed 7.2Mbps, HSUPA: Upload speed 5.76Mbps UMTS: 384Kbps
TX power	<23dBm
RX sensitivity	<-97dBm
<b>F8916-L-L LoRa+LTE IP MODEM</b>	
Standard and Band	LTE FDD,LTE TDD,EVDO,WCDMA,TD-SCDMA,CDMA1X,GPRS/EDGE
Bandwidth	LTE FDD: Download speed 100Mbps, Upload speed 50Mbps LTE TDD: Download speed 61Mbps, Upload speed 18Mbps DC-HSPA+: Download speed 42Mbps, Upload speed 5.76Mbps TD-HSPA+: Download speed 4.2Mbps, Upload speed 2.2Mbps EVDO Rev. A: Download speed 3.1Mbps, Upload speed 1.8Mbps
TX power	<23dBm
RX sensitivity	<-97dBm

## LoRa Specification

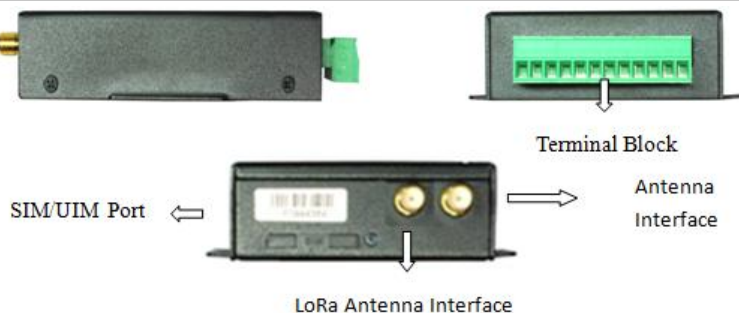
Item	Content
Communication Frequency Band	410MHz - 441MHz, 1000KHz Step, Recommend 433±5MHz, Factory Setting 433 MHz
Indoor/Urban Communication Distance	2km
Outdoor/Visual Communication Distance	9km
TX Power	<30dBm
RX Sensitivity	<-140dBm
Bandwidth	6 level adjustable (0.3、0.6、1.0、1.8、3.1、5.5Kbps)
Channel Number	32

## Hardware System

Item	Content
CPU	Industrial 32bits CPU
FLASH	512KB(Extendable)
SRAM	256KB

## Interface type

Item	Content
Serial	2 RS232 port and 1 RS485(orRS422) port, 15KV ESD protection Data bits: 5, 6, 7, 8 Stop bits: 1, 1.5, 2 Parity: none, even, odd, space, mark Baud rate: 110~230400 bps
Indicator	"Power", "ACT", "Online", "LoRa"
Antenna	Cellular :Standard SMA female interface, 50 ohm, lightning protection(optional) LoRa : Standard SMA female interface, 50 ohm, lightning protection(optional)
SIM/UIIM	Standard 3V/1.8V user card interface, 15KV ESD protection
Power	Terminal block interface, reverse-voltage and overvoltage protection



**Note: There may be different components and interfaces in different model, please in kind prevail.**

### Power supply

Item	Content
Standard Power	DC 12V/0.5A
Power range	DC 5~36V

### Consumption

Working condition	Consumption
Standby	35~50 mA@12VDC    55~105 mA@5VDC
Communication	45~165mA@12VDC(2G:45~55 mA    3G:80~165 mA    4G:75~95mA ) 105~365mA@5VDC(2G:105~115 mA    3G:165~365 mA    4G:150~200mA )
Sleep	3mA@12VDC    6mA@5VDC

### Physical Characteristics

Item	Content
Housing	Iron, providing IP30 protection
Dimensions	91x58.5x22 mm
Weight	210g

### Environmental Limits

Item	Content
Operating Temperature	-35~+75°C(-31~+167°F)
Storage Temperature	-40~+85°C (-40~+185°F)
Operating Humidity	95% ( unfreezing)

### Ordering Information

Model No.	Description
F8916-L-G	LoRa+GPRS IP MODEM
F8916-L-C	LoRa+CDMA IP MODEM
F8916-L-W	LoRa+WCDMA IP MODEM
F8916-L-V	LoRa+EVDO IP MODEM
F8916-L-TL	LoRa+TDD LTE IP MODEM
F8916-L-FL	LoRa+FDD LTE IP MODEM
F8916-L-L	LoRa+LTE IP MODEM