User Manual

For the

JG-H

Trailer Tracking Device

July10, 2017

Spireon®

R1.2

| Author	Revision	Changes	Date
Hao	1.1	Initial version	2017-07-10
Ewing	1.2	Edits	2017-07-20

Contents

1 Introduction

TheJG-His a self-contained trailer tracking device that combines GPS location with WCDMA/GSM/GPRSconnectivity.It is primarily a location reporting device that responds to requests (user, server) and events (timers, geo-fences). Data reports consist of a single record that contains all location data and system status.

The device comes pre-configured from the factory, ready to use.TheJG-H appears to a user or a server application as a single endpoint device. It can be queried, updated and configured either through a serial connection, an over the air IP connection, or through SMS messaging. TheJG-Hpresents itself over these connections as an enhanced cellular modem with attached functional elements. These elements include:

- GPS
- Accelerometer
- I/O pins and tamper alert
- Serial UART port for management and for cargo sensor
- Status LEDs
- Timers
- Watchdog lockup protection
- Power Management
- Power Output
- Solar panel power supply

Access to these elements and general purpose interfaces is done through an extended AT command set as defined herein.Configuration parameters are stored to flash memory and are automatically used on the next power up event. For more details, please reference the AT Command document.

Diagram
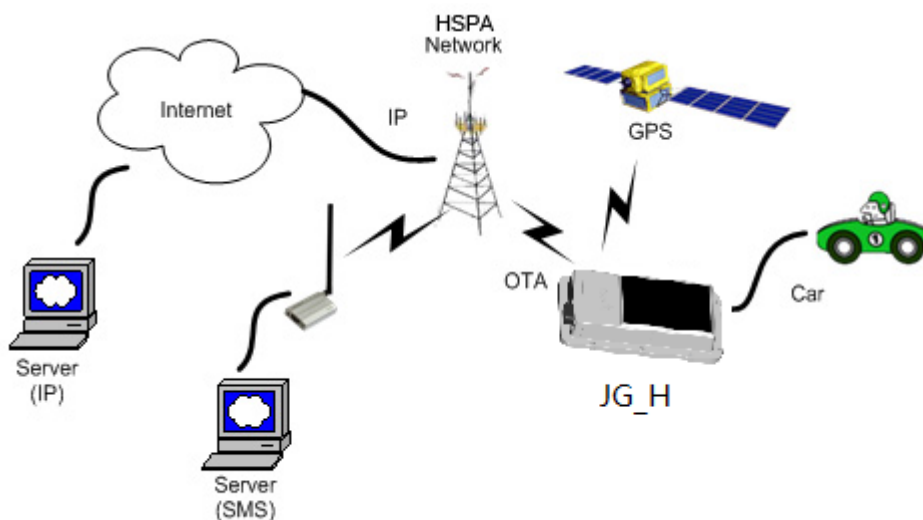
This product is designed based on the MT6276 Baseband chipset, supporting WCDMAand GPRS protocol for wirelessdata; using an internal dual band antenna（GSM850&PCS 1900）. The device also includes stand-alone GPS functionality, an accelerometer for motion detection, as well as support for solar panel power supply. The JG-H can operate from an internal rechargeable battery or an external power source. The battery is recharging via the solar panel or external power.

2 Hardware Design

2.1 Basic Hardware

Items	Requirement
Baseband Chipset	MT6276A
RF 2G Transceiver	RF3235
RF 3G Transceiver	RF7411TR7
Memory	MCP_NAND 1Gb(x16) / mobile DDR 512Mb(x16)
Cellular Network	Supportfor WCDMA Class 12 GPRS, GPS
Frequency	2G band support : 850MHz & 1.8GHz
	Support for 12 class GPRS
	3G band support : Band2 and Band5
Antenna	Internal Antenna[850M&1900M]
GPS Antenna	Dedicate high performance ceramic antenna
UIM requirement	No-UIM mode, SIM card connector
Interface	Main PWR – 12V DC（1.5A current）
	Aux PWR – 12V DC（1.5A current）
	Solar PWR (battery charge)
	GND
	PWR OUT (3.3V, 300mA current)
	UART TX
	UART RX
	Relay Drive Output (12V, 500mA current)
	1-Wire
	GPIO1
	Tamper
Power Monitor	internal analog input scaled – battery, external power, solar
Build in battery manager	Supported
Dedicate Timers	Yes
Watchdog	Supported
Motion Detect	Accelerometer
LED	3 status LEDs (Green, Red, and Orange)

Battery	Built in rechargeable batteryfor up to 6 months of typical operation
Power Switch	No
Power Cable connector type	23 - pin
Power Out	Yes
Solar Panel	Yes
Power Consumption	<20 Watts

The JG-Hprovides support for specialized hardware features through extended AT commands. The features supported include the following.

GPS

GPS location functionality is provided by the device GPS receiver. Warm start from sleep is supported.

GPIO

One general purpose GPIO and three additional multiplexed IO's are presented to the external environment on the main connector. They are capable of providing system interrupts to generate a report or drive logic levels to external devices. These lines are 2.8V logic level and are 16V tolerant. The multiplexed IO's are typically configured as Ignition, Relay and Tamper.

LED's

Three LED status indicators are provided to verify correct installation and operation. The status LEDs are color coded and directly convey the status of the cellular and GPS subsystems, as well as the power input; described in the table below. Their valid operation also indicates operational status and power.

LED	Function	Status
Red	GPS	**On:** GPS satellites acquired and locked **Flash Slow**: GPS satellite search is in progress **Off:** GPS is turned off
Green	Cellular Connection	**On:** Indicates cellulardata connection is available **Flash Slow**: cellular subsystem initialized but no connection **Flash Fast**: cellular initialization in process **Off:** Cellular sub-system is off
Orange	Battery charging	**On:** Indicates external power and battery is fully charged **Flash**: Indicates external power and battery is charging **Off**: Indicates running from battery. Blinks shortly every 30sec.

The JG-H provides user control allowing the LEDs to be extinguished once installation is verified. This feature reduces power and further conceals the JG-H Tracker from untrained parties wishing to defeat its operation.

Accelerometer

The accelerometer is used for motion start detection to wake the unit up from a sleep mode and driving behavior monitoring.

UART

A UART port is provided for AT command and data interaction. The UART can also serve to attach other accessories, such as cargo sensor.

1-Wire

A 1-Wire interface is supported to attach external sensors, such as temperature sensor, etc.

Relay Driver

A 500mA sink capable output pin is provided. This pin is meant to drive a relay coil indented to interrupt the starter solenoid relay for the ignition circuit to a car.

Ignition Monitor

One of the GPIO's can be wired to vehicle ignition to monitor and trigger event upon ignition start and stop.

Power Out

The JG-H provides a power out option at 3.3V and up to 300mA to enable powering up external devices. The power out is turned off by default and is controlled by software.

Tamper

Tamper detection pin is available on the external connector. The Tamper pin can trigger an alert when disconnected from ground.

Solar Panel

The JG-H includes an integrated solar panel that constantly charges the battery when exposed to light.

Power Monitor

The internal power monitor circuitry allows to measure the voltage on all possible power sources: Main, Auxiliary, Battery, Solar.

Timers

Timers resident on the baseband chip generate periodic interrupts for power down, wakeup, report generation and other timer related functions.

2.2   Basic RF Performance

Items	Requirements	Remark
TRP free space	>= 20 dBm	TRP free space

TIS free space	<= -104dBm	TIS free space
Antenna loss	<= -3dB	TRP-TX Power Conducted
Antenna Loss	<= -3dB	RX receive sensitivity conducted – TIS

Board RF Specification	
Cellular Band RX	
2G Frequency range	935MHz～960MHz
Sensitivity	-108dBm (FER≤0.5%)
Dynamic range	-25～-108dBm (FER≤0.5%)
Single tone Desensitization	-102.4dBm(FER≤1%,-30dBm@±900KHz)
Intermediation Spurious Response Attenuation	-102.4dBm(FER≤1%,-43dBm@±900 KHz/±1800KHz)
	-91.4dBm(FER≤1%,-32dBm @±900 KHz/±1800KHz)
	-80.4dBm(FER≤1%,-21dBm @±900 KHz/±1800KHz)
Conducted Spurious Emission	<-76dBm/1MHz（RX band）
	<-61dBm/1MHz（TX band）
	<-47dBm/30KHz（other frequency）
Cellular Band TX	
2G Frequency range	890MHz～915MHz
Maximum Frequency error	±200KHz
Maximum output power	21～32dBm
Minimum controlled output power	<-50dBm
Standby output power	<-61dBm
Code domain power	The code domain power in each inactive code channel shall be 23 dB or more below the total output power measured on both the I and Q data channel combined.
Time reference	±1.0uS
Waveform quality	>0.944
Range of open loop output power	（test1：－25dBm/1.23MHz）－47.7±9.5dBm
	（test2：－60dBm/1.23MHz）－7.7±9.5dBm
	（test3：－93.5dBm/1.23MHz）20.3±9.5dBm
Conducted spurious emission	-42dBc/30Khzor-54dBm/1.23MHz （|Δf|:1.25MHz~1.98MHz）
	-50dBc/30Khzor-54dBm/1.23MHz （|Δf|: 1.98MHz~4.00MHz）
	<-36dBm/1kHz （|Δf| > 4MHz, 9KHz < f < 150KHz,）
	<-36dBm/10kHz （|Δf| > 4MHz, 150kHz<f<30MHz,）
	<-36dBm/100kHz （|Δf| > 4MHz, 30MHz<f<1GHz）
	<-30dBm/1MHz

	（|Δf| > 4MHz, 1GHz<f<12.75GHz）
WCDMA Band1 RX	
3G Frequency range	2110MHz~2170MHz
Maximum Frequency error	±200KHz
Maximum output power	21～24dBm
Minimum controlled output power	<-50dBm
Standby output power	<-61dBm
Error Vector Magnitude	<17.5%
WCDMA Band1 TX	
3G Frequency range	1920MHz~1980MHz
Maximum Frequency error	±200KHz
Maximum output power	21～24dBm
Minimum controlled output power	<-50dBm
Standby output power	<-61dBm
Error Vector Magnitude	<17.5%
DCS Band RX	
Frequency range	1805MHz ~ 1880MHz
Sensitivity	-108dBm (FER≤0.5%)
Dynamic range	-25 ~ -108dBm (FER≤0.5%)
Single tone Desensitization	-102.4dBm(FER≤1%,-40dBm@±1250KHz)
Intermediation Spurious Response Attenuation	-102.4dBm(FER≤1%,-43dBm@±1250KHz/±2050KHz)
Conducted Spurious Emission	<-76dBm/1MHz（RX band）
	<-61dBm/1MHz（ TX band）
	<-47dBm/30KHz（other frequency）
PCS Band TX	
Frequency range	1710MHz ~ 1785MHz
Maximum Frequency error	±200KHz
Maximum output power	23 ~ 30dBm
Minimum controlled output power	<-50dBm
Standby output power	<-61dBm
Code domain power	The code domain power in each inactive code channel shall be 23 dB or more below the total output power measured on both I and Q data channel combined.
Time reference	±1.0uS
Waveform quality	>0.944
Range of open loop output power	(test1: -25dBm/1.23MHz) -50.7±9.5dBm
Conducted spurious emission	(test2: -60dBm/1.23MHz) -10.7±9.5dBm

	(test3: -91.3dBm/1.23MHz) 20.3±9.5dBm
	-42dBc/30Khzor-54dBm/1.23MHz (|Δf|:885KHz~1.98MHz)
	-54dBc/30Khzor-54dBm/1.23MHz (|Δf|: 1.98MHz~4.00MHz)
	<-36dBm/1kHz (|Δf| > 4MHz, 9KHz < f < 150KHz)
	<-36dBm/10kHz (|Δf| > 4MHz, 150kHz<f<30MHz)
	<-36dBm/100kHz (|Δf| > 4MHz, 30MHz<f<1GHz)
	<-30dBm/1MHz (|Δf| > 4MHz, 1GHz<f<12.75GHz)
GPS	
Frequency Support	L1-band (1.57542GHz) Channels: 210 PRN, 66 Search, 22 Simultaneous tracking
Sensitivity	Sensitivity (UHIS): Tracking: -156dBm Reacquisition: -153dBm Acquisition: -144dBm
Tracking Time Requirement	Acquisition time: Hot: <2s Warm: <15s Cold: <60s Reacquisition: 2s - 10s Depends on signal level

2.3 Certification and Safety

Items	Requirement
Drop Design	1.2meter 6 direction standard drop test
Temperature Range	-20 to 65C Operation -40 to +85° C Storage
Humidity:	20% to 90% Operation 10% to 95% Storage
Altitude:	-500 to +18,000m
Vehicle ISO Test	ISO7637-2-2004; ISO7637-3-2007; ISO10605-2008; ISO16750-2-2010
FCC Certification	FCC 47 CFR Part 15 ,Part 2,Part 22,Part 24
Others Operator Requirement	Industry Canada/ AT&T (optional)
ESD Requirement	10KV non-Conductive

3 Software Features

3.1 Basic Software

Items	Requirement
Network Interface	GSM 900/1800MHz/WCDMA(Band1); GPS
GPRS Data	Supported
IP Stack	Ipv4/IPV6
Upgrade Method	Remote update/ PC tool
Remote Update	Supported
Power Modes	Supported
AT Command	Supported
Report	Supported
Driver	GPIO，LED，GPS，UART，3.3V out, Accelerometer
GPIOs	Interrupt for Cargo Sensor, Ignition Status, Tamper
LEDs	GPS Status, WCDMA Status, Battery Charging
Watch Dog	Supported
Reset	Soft reset, hard reset, GPS reset, RF reset
Startup Banner	Supported

3.2 Remote Update

The JG-Hsupports OTA field upgrades of the JG-Hresident application. An over the air TFTP (Trivial File Transfer Protocol) connection is made over a UDP/IP connection. A replacement file is then transferred from a server to the JG-Hand that file replaces the previous application image.

3.3 Power Modes

The JG-H device supports several power modes that are set by AT commands. In full power mode the GPS is active and the cellular subsystem will maintain a persistent cellular connection whenever service is available. IP connection is maintained according to the configuration of the device.

The device can be put in a sleep mode whenever it runs on an internal battery, if the external battery is low or if the device is not moving. In low power mode the GPS is not running and the LED's are off. The device would return to full power whenever an event occurs that triggers a report. Those events include:

- GPIO change
- Battery threshold
- Heartbeat
- Power-up
- Accelerometer
- Tamper

Any hardware or software reset will return the device to full power mode.

3.4 AT Command

JG-Hcommands are AT extensions specific to JG-H devices. They are closely based on commands that are as similar as possible to other industry common devices. Native AT commands supported by the baseband modem are also available via the serial interface.

Command Summary

The following commands are specific to the JG-H. They are organized by categories.

Event Setting Commands

The following set of commands enables/disables reporting of the various events and state transitions that take place in the system. The event setting commands typically include trigger(s) that indicate what event or state transition would cause an event report to be sent. Often state transitions also qualified with "debounce" time to prevent various flickers and intermittent state transitions. Examples are: (1) state change of an input pin; (2) crossing a geo-fence line for a brief period of time and then crossing it back.

As a general rule every event and state transition has its own unique event ID that is reflected in the report triggered by the said event. Refer to Table 2 – Events for the complete list of event ID's. Those default event ID's can be changed by the user to accommodate specific server implementations, by explicitly specifying what they are in the respective commands. As an example, all trip related events can be mapped to the same event ID, so there is no need to parse the specific event trigger. Following is a list of event setting commands:

1. AT+XBTLE — Battery Low Event
2. AT+XBUBE — Backup Battery Events
3. AT+XCCLE — Cellular Connection Lost/Lock Events
4. AT+XDRI — Drive Report Intervals
5. AT+XDTS — Drive Trip Start/Stop
6. AT+XGFE — Geo-Fence Enable
7. AT+XGME — G-sensor Motion Events
8. AT+XGPL — GPS Lost/Lock
9. AT+XHB — Heart Beat
10. AT+XIA — Idle Alert
11. AT+XIGN — Ignition
12. AT+XIOE — I/O Event
13. AT+XIPC — IP Changed
14. AT+XPUP — Power Up
15. AT+XPWE — Power Events

16. AT+XRLYE	Relay Event
17. AT+XSLPE	Sleep Events
18. AT+XRSTE	Reset Event
19. AT+XSPD	Speeding
20. AT+XTA	Tow Alert
21. AT+XTMPRE	Tamper Event
22. AT+XVTOE	Virtual Trip Odometer Event

Action Commands

Action commands instigate an immediate action. They cannot be included in configuration files. Following is a list of action commands:

23. AT+XBUBX	Back-Up Battery eXit
24. AT+XCC	Clear Counters
25. AT+XCSRN	Cargo Sensor Report Now
26. AT+XFDR	Factory DefaultsRestore
27. AT+XFDU	Factory DefaultsUpdate
28. AT+XMRN	Maintenance Report Now
29. AT+XRN	Report Now
30. AT+XRNE	Report Now Echo
31. AT+XRPQD	Report Queue Dump
32. AT+XRST	Reset - soft/hard
33. AT+XVEGH	Virtual Engine-Hours
34. AT+XVO	Virtual Odometer
35. AT+XVTO	Virtual Trip Odometer
36. AT+XUMA	Unauthorized Motion Alert

File Update Commands

37. AT+XUAPP	Update Application file OTA
38. AT+XUFW	Update Firmware file OTA
39. AT+XUIO	Update IO controller file OTA (Battery powered devices only)
40. AT+XUUC	Update User Configuration file OTA

Periodic Action Commands (with Events)

Periodic Action commands trigger time based periodic action, such as reset, data session renewal, etc. Some actions can trigger an event report to indicate the respective action took place.   Following is a list of event setting commands:

41. AT+XKA   Keep Alive

42. AT+XPST   Packet Session Timeout

43. AT+XRSTP   Reset Periodically

Configuration Commands

Configuration commands control various parameter settings of the device. For convenience they are grouped into topical settings. Following is a list of configuration commands:

Communication related settings

44. AT+XAPN   Set APN (GSM devices only)

45. AT+XCSW   Cellular Session Watchdog

46. AT+XIP   Set target server IP address and port number

47. AT+XLPORT   Set Local IP port number

48. AT+XMIP   Set Maintenance server IP address and port number

49. AT+XPRP   PxP Renewal Policy

50. AT+XSMSD   SMS Destination

51. AT+XSMSS   SMS Source

52. AT+XSPIP   Set Serial Port (A-UART) IP address and port number

53. AT+XUIP   Set Update server IP address and port number

Protocol related settings

54. AT+XCRA   Command Response Appendix

55. AT+XITM   Item Mask

56. AT+XRPA   Report Acknowledge

57. AT+XRPF   Report Format

58. AT+XRPM   Report Mask

59. AT+XRPQ   Report Queue length

60. AT+XRPSF   Report Start Frame

Drive Trip related settings

61. AT+XDDI   Drive Distance Interval

62. AT+XDHC   Drive Heading Change

63.	AT+XDMED	Drive Motion End Distance
64.	AT+XDMES	Drive Motion End Speed
65.	AT+XDMSD	Drive Motion start Distance
66.	AT+XDMSS	Drive Motion Start Speed
67.	AT+XDMST	Drive Motion Start Trigger
68.	AT+XDMET	Drive Motion End Trigger
69.	AT+XDTT	Drive Trip Trigger
70.	AT+XUMSD	Unauthorized Motion start Distance
71.	AT+XUMSS	Unauthorized Motion Start Speed
72.	AT+XUMST	Unauthorized Motion Start Trigger

Peripheral related settings

73.	AT+XBTL	Battery Low
74.	AT+XBUB	Back-Up Battery
75.	AT+EGHM	Engine Hours Mode
76.	AT+XGMTH	G-sensor Motion Threshold
77.	AT+XGPLP	GPS Lock Parameters
78.	AT+XGPLT	GPS Lock Timeout
79.	AT+XIGM	Ignition Mode
80.	AT+XIGV	Ignition Voltage
81.	AT+XIOD	I/ODirection
82.	AT+XIOW	I/O Write
83.	AT+XLEDO	LED's Off
84.	AT+XODM	Odometer Mode
85.	AT+XOWM	One-Wire Mode
86.	AT+XPWET	Power Event Threshold
87.	AT+XPWSMM	Power State-Mode Mobile
88.	AT+XPWSMS	Power State-Mode Stationary
89.	AT+XPWST	Power State Threshold
90.	AT+XPWSRC	Power Source Configuration (Puma, Jaguar only)
91.	AT+XRLY	Set Relay
92.	AT+XRLYO	Relay Override Policy

93. AT+XSPC   Serial Port Configuration

94. AT+XTMPRM   Tamper Mode

Maintenance report settings

95. AT+XMHB   Maintenance Report Heart Beat

96. AT+XMITM   Maintenance Item Mask

97. AT+XMRC   Maintenance Report Clone

98. AT+XMRPM   Maintenance Report Mask

Miscellaneous settings

99. AT+XCIN   Configuration Id Number

100. AT+XCIV   Configuration Id Version

101. AT+XEVIT   Event Items

102. AT+XEVITD   Event Item Default

103. AT+XGF   Geo-Fence

104. AT+XGFH   Geo-Fence Here

105. AT+XLW   Listening Window

106. AT+XSLCK   SIM Lock

Information Commands

Information commands simply output various data regarding the current status of the device. They are mostly useful for troubleshooting. Following is a list of information commands:

107. AT+XGFR   Geo-Fence Read

108. AT+XIOR   I/O Read

Configuration reading commands

109. AT+XCFD   Configuration file – Default

110. AT+XCFU   Configuration file – User

Information commands

111. AT+XINCEL   Info: Cellular

112. AT+XINDAT   Info: Data

113. AT+XINEVT   Info: Events

114. AT+XINGPS   Info: GPS

115. AT+XINNET   Info: Network

116. AT+XINPWR   Info: Power

117.   AT+XINVER   Info: Versions

118.   AT+XEVITR   Event-Item Read

Report

The JG-H captures data and forms a report record with that data. A report is a data structure containing all of the sensory and other typically useful data on the device. Reports are generated in response to specified events, such as periodic timeout, speed threshold, geo-fence crossing, etc., or in response to a Report Now command (AT+XRN).

Report Queuing

If a report trigger occurs while UDP connection is unavailable, it will be queued until connection becomes available and transmitted at such time. The only way report(s) can be lost is if too many reports are queued and the report-queue is overflowing. In such case the earliest report(s) will be discarded. The size of the queue can be configured via the Report Queue (AT+XRPQ) command.

Ack'ed Mode

UDP is not a 100% reliable connection and occasional reports or command/responses may be lost. Since all commands have responses, the server can repeat any command to which there is no response. In order to assure reliable reception of reports, the device can be configured either in Normal or Ack'ed mode to send the reports. In the Normal mode the reports are simply sent "as is" with no acknowledgment from the server. In the Ack'ed mode every report sent is expected to be acknowledged by the server by sending back an ACK message back. If acknowledgement is not received within the specified timeout, the report is re-sent. If the report is not acknowledged after the specified number of attempts, it is queued. If acknowledgement is received after the report is queued (i.e. past timeout of the last attempt), it is ignored.

Report is not considered "complete" until its acknowledgement is received. Thus, if report X is sent and report X+1 is triggered while waiting for acknowledgement of X, report X+1 will be queued until such acknowledgement is received and only then sent. The JG-H will attempt to re-send queued report(s) every time a new report is triggered. If there is more than one report queued, the reports will attempt to be sent in the order of triggering and only once the report is acknowledged, the next report is attempted. This assures that reports are sent and received in order.

Ack'ed mode assures that all reports are received, but adds overhead in time and data. Report that is not acknowledged is sent again and eventually will be queued and sent again. The number and frequency of re-tries is configurable via the Report Acknowledgement command (AT+XRPA).

Event Report Format

Reports are encoded as binary hex.

3.5 Reset

There are a number of resets available on the device. Soft reset only restarts the baseband on the device. Hard reset is caused by resetting the whole baseband module via a reset pin. There is also an option to reset the cellular and GPS sub-systemsindividially.

3.5.1 Context Preservation

When a self-initiated reset is performed due to Network Watchdog or by the Reset command (modes 0,1), the context of the system is being preserved and is restored after the reset. The context includes all the periodic timers, the report queue, the odometer, etc. This allows to reset the unit as a troubleshooting or preventive measure without losing reports that are already in the queue or are pending on running timers. Note that the reset process may cause 1-2min of inaccuracy in the timers and should not be considered as very precise.

3.6 Startup Banner

After a reset a startup banner is printed through the UART only.

Test Method

3.7 Hardware

| Test Item	Description
Baseband Function Test	• Power Input Test • Power Consumption and Current Test • Heat Dissipation Test • UART Stability Test • GPIO Level Test • LED Stability Test • Drop Down Test • ESD Test • High/Low Temperature Test • Humidity Test
RF Test	• RF Performance Test • GPS Performance Test • Antenna Performance Test

3.8 Software Test

Test Environment Construct

➢ Message Test environment

1. USB dongle and PC as message server

2. Send message to JG-H

➢ UDP Test environment

1. Connect dongle to PC and create dialup as ip server

2. JG-H create IP connection to server

➢ UART Test environment

1. Connect JG-H to pc with com serial cable

2. Open Terminal tool and send at command

3. Response can be shown at terminal window
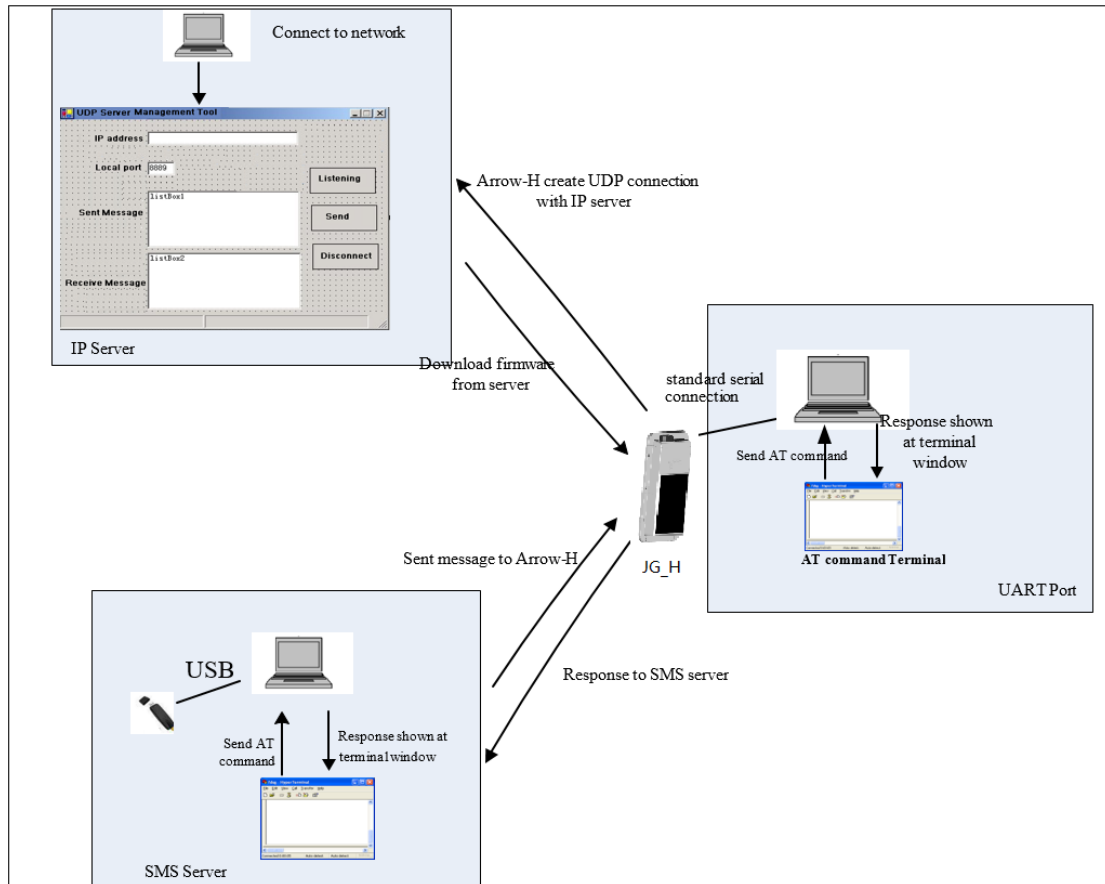
Mechanical Structure(mm)
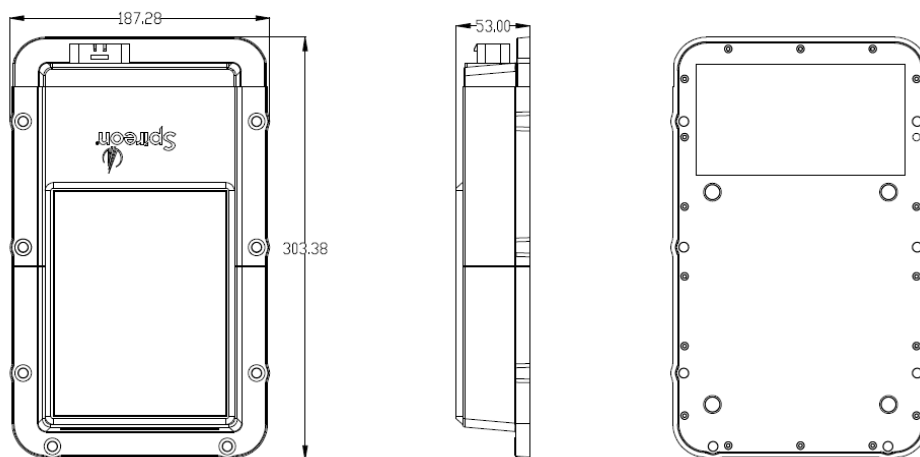
FCC Statement

RF Exposure Warning Statements:

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons during the normal operations.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC STATEMENT

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présentappareilestconforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitationestautorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareildoit accepter tout brouillageradioélectriquesubi, mêmesi le brouillageest susceptible d'encompromettre le fonctionnement.

In order to avoid the possibility of exceeding the IC radio frequency exposure limits, human

proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

Afind'éviter la possibilité de dépasser les limitesd'exposition aux fréquences radio de la IC CNR102, la proximitéhumaine à l'antenne ne doit pas êtreinférieure à 20 cm (8 pouces) pendant le fonctionnement normal.