Communication Protocol Development Document V1.34

V1.31 Location report format : (AVL115 old Protocol Tatal 86 bytes)
V1.34 Location report format : (K7 & AVL115 Total 102 byte)

Command Format use ASCII code

LEAD CODE	COMMAND CODE	CONNECTING SESSION	SERIAL No.	Parameter	Check sum
#	CC	CCCCCC	CCCCC	(command string)	CCC
		[0..999999]	(0..99999)		(0..255)
		6 bytes	5 bytes	Please refer to every commands.	
1 BYTE	2 BYTE	(Dispatching by the Server)	(Cumulating the numbers)		The length of the parameter must be transferred to HEX format.
			*Server →1.3.5.7.9.11		
			*Tracker →2.4.6.8.10.12		

Function		Command	Description
CONNECT (S COMMAND)	Login (SA) (Tracker -> Server)	SA	IMEI No. + Firmware Version Type: 0-9, Length :15byte (without **Connecting Session** No & Serial No.) **Exp** #SA000000**00000**353419032733755**00**AVL115.Standard.20110923.FLEET.206.615056 **#SA = command** **000000 = Connecting Session** **00000 =SERIAL N0** **52352025153767 = IMEI** **00 = reserve** **AVL115.Standard.20110923.FLEET.206.615 = Firmware Version** **056 = check sum 56 byte without connecting session & Serial No**
	Login response (SB) (Server- > Tracker)	SB	IMEI No + Firmware Version Type: 0-9, Length :15 BYTE **Exp** #SB**000001****00001**353419032733755**0000**AVL115.Standard.20110923.FLEET.206.615056 **#SB = command** **000001 = Assign Connecting Session to Tracker** **00001 =SERIAL N0** **52352025153767 = IMEI** **00 = reserve** **AVL115.Standard.20110923.FLEET.206.615 = Firmware Version** **056 = check sum 56 byte without connecting session & Serial No**
	Logout (SC) (Tracker -> Server)	SC	IMEI No. Type: 0-9, Length :15 BYTE **Exp** #SC**000012****00002****352352025153767015**
	Check connection (SE) (Tracker -> Server)	SE	IMEI No. Type: 0-9, Length :15 BYTE **Exp** #SE**000012****00004****352352025153767015**

	Operator & APN report **(Tracker -> Server)**	SI	Operator Name Length : Depend on operator APN Name Length : Depend on APN setting
LOACATION REPORT (R COMMAND)	Interval time setting (RC) **(Server- > Tracker)**	RC	HH MM SS Type : 0-9, Hours(0-99),Min(0-59),Sec(0-59) **Exp** **#RC000012000090000300006** **#RC =command** **000012 = Connecting Session** **00009 =SERIAL N0** **000030=00 hours, 00 min , 30 sec** **006 = check sum, 6 bytes**
	Location report (RD) **(Tracker -> Server)**	RD	**Exp** **#RD000012000081112080254122232.0729N11356.0030E000.02100000A00000000000000000000000000000078** **#RD = command** **000012 = Connecting Session** **000008 =SERIAL N0** **111208 =2008/12/11** **025412= UTC time 2:54:12** **2232.0729N = Latitude** **11356.0030E = Longitude** **000.0 = Speed Over Ground** **21 = Course Over Ground** **00000 = Reserve** **A = GPS status** **0000000 = 8 bytes reserve** **000000000000000000000000 = 24 bytes reserve** **078 = check sum 78 bytes without connecting session & Serial No**
	Location address request **(Tracker -> Server)**	RH	1. When users check the location by sending SMS command 111 or call device and hand up or When any alarm occurs , the tracker sends RH command to Server for gathering the address. Example: ● Users long press the SOS key on the Tracker for 2 sec., the tracker sends RH command to Server for gathering the address, ● Users switch on the Park key on the Tracker, the tracker sends RH command to Server for gathering the address while the tracker shakes 30 times continuously. **Exp** **#RH000012000081112080254122232.0729N113 56.0030E000.02100000A00000000+886918782957067** **#RH command** **000012 = Connecting Session** **000008 =SERIAL N0** **111208 =2008/12/11** **025412= UTC time 2:54:12** **2232.0729N = Latitude** **11356.0030E = Longitude** **000.0 = Speed Over Ground** **21 = Course Over Ground** **00000 = Reserve** **A = GPS status** **0000000 = 8 bytes reserve** **+886918782957 = Tracking phone no.**

	Location address response **(Server -> Tracker)**	RG	ASCII , Type : 0-9 / A-F While the server receives RH command from the tracker, the server will check with Google map the address and transfer it into Unicode. The server will transfer the Unicode into HEX ASCII code then. And then send RG command to tracker. **Exp** **#RG000012000130004E006F002E002000310039002C0020004C0061006E006500200039003900 2C00200053006500630074006900 6F006E00200033002C0020004B0061002D006E00670020004E00690027006E006700200052006400 2C0020004E0065006900680075002000440069007300740072006900630074002C00200054006100690070006500690020004300690074007900 2C00200054006100690077006100 6E00200031003100340332** No. 19, Lane 99, Section 3, Ka-ng Ni'ng Rd, Neihu District, Taipei City, Taiwan 114 No. = 004E006F002E0020 19, =00310039002C 332 = Check sum
OTHER (O COMMAND)	SMS Password & SOS Phone No. setting **(Server- > Tracker)**	OC	SMS Password Type: 0-9, Length :4 BYTE. SOS PHONE NO. SETTING , 3 PHONE NO Type : 0-9, Length: no limitation, interval by , and 3 sets of phone numbers allowed **Exp** **#OC000012000140000+886918782957,+886933078553,,028** **#OC COMMAND** **000012 = Connecting Session** **00014 =SERIAL N0** **0000 = define Tracker SMS password** **+886918782957 = the First setting for SOS & PARK PHONE NO.** **+886933078553 = the Second setting for SOS & PARK PHONE NO.** **Null = the third setting**
	SOS Phone No. setting response **(Tracker -> Server)**	OD	Type : 0-9, Length: no limitation, interval by , and 3 sets of phone numbers allowed **Exp** **# OD 000012000158967321 1,89672515,0968123456028** **(Tracker S/N:12, Command S/N:15, Number: 89673211 , 89672515 , 0968123456)**

RD command reference

V1.31 Location report format : (AVL115 Total 86 bytes)

USE $GPRMC format

Data	UTC Time	Latitude	Longitude	Speed Over Groun	Course Over Ground	Reserve	GPS Status	Alram	Reserve	LAC Cell
nnnnnn DDMMYY	nnnnnn HHMMSS	nn nn.nnnn N/S	nnn nn.nnnn E/W	nnn.n	nn	nnnnn	A=data valid V=data not valid	00000000 (P1)	000000000000000000000000 (P2)	00000000
6 bytes	6 bytes	10 bytes	11 bytes	5 bytes	2 bytes	5 bytes	1 byte	8 bytes	24 bytes	8 bytes

V1.34 Location report format： (K7 & AVL115 Total 102 byte)

USE $GPRMC format

Data	UTC Time	Latitude	Longitude	Speed Over Groun	Course Over Ground	Reserve	GPS Status	Alram	Reserve	LAC Cell
nnnnnn DDMMYY	nnnnnn HHMMSS	nn nn.nnnn N/S	nnn nn.nnnn E/W	nnn.n	nn	nnnnn	A=data valid V=data not valid	00000000 00000000 00000	000000000000000000000000 000	00000000
6 bytes	6 bytes	10 bytes	11 bytes	5 bytes	2 bytes	5 bytes	1 byte	21 bytes	27 bytes	8 bytes

#RD000099254780910111000012504.1885N12135.5372E002.203000013V0413D302A0504020H0D0C0Q0P070N0800597C2ED086

Data		Example
#RD	LEAD CODE + command code	
000099	CONNECTING SESSION	
25478	SERIAL No	
091011	Data	**2011/10/09**
100001	UTC Time	
2504.1885N	Latitude	
12135.5372E	Longitude	
002.2	Speed Over Ground	2.2 Knots x 1.852 = 4.0744 Km
03	Course Over Ground	03 x 6 = 18°
00013	Move Distance (By meters)	13 meters
V	GPS Status	
0413D302	Alram	
A0504020H0D0C0Q0P070N080	**Reserve**	
0597	LAC	0000-FFFF 4 byte (CHAR)
C2ED	Cell ID	0000-FFFF 4 byte (CHAR)

SOS Alarm	1st byte Detection SOS button
Status	0
0	Default
1	SOS on
2	SOS off
PARK Alarm	2nd byte Detection PARK button
Status	4
0	Default (PARK off) & Car moving
1	PARK on & Car stop
2	PARK on & Car moving
3	PARK off
4	PARK off & Car moving
GSM / GPRS Signal	3rd & 4th byte
Status	13
0~99	CSQ :0~99

For example : 13 GSM/GPRS signal is Level 2

4> CSQ = 99 No signal
4 < CSQ <10 Level 1
10 < CSQ <16 Level 2
16 <CSQ <22 Level 3
22 < CSQ <28 Level 4
28 < CSQ Level 5

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	I	J	K	L	M	N
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

O	P	Q	R	S	T	U
24	25	26	27	28	29	30

Car Voltage detection **5th byte**	
Status	
0~z	SAMPLE: The car voltage is 13.45 V , Byte 5 = d SAMPLE: The car voltage is 26.78V, byte 5 =q
For example : 5th + 6th +7th =D30 the mean is 13.30 Voltage	
Car Voltage detection **6th & 7th byte**	
Status	
00~99	SAMPLE: The car voltage is 13.30 V , Byte 6-7 = 30 SAMPLE: The car voltage is 26.78V, byte 5 =Q , byte 6-7 = 78
Voltage Status **8th byte**	
Status	
0	Default
1	Only use Li-ion battery
2	No battery , use car power
3	Use car power , and charging
4	Use car power , and battery is full
5	No battery, only use car power & ACC on
6	No battery, only use car power & ACC off
7	Use Li-ion battery & ACC on
8	Use Li-ion battery & ACC off

SMS command

- Send 001#0000 to get the current software version.
  (001 means command , # means interval , 0000 is the default password of the Tracker.)
- Send 111#0000 to check the address. (depend on if the server supports such function)
- Send 410#0000 to get the Tracker IMEI.
- 510#0000 #APN/IP/PORT EX: 510#0000# INTERNET/IP/PORT (for example , APN=internet)
- Send 520#0000 to get the current APN/IP/PORT.

Procedure of Program Development

Preparation

1. Please full charge the battery
2. Please use your mobile phone to cancel the pin lock.
3. Please make sure the SIM card APN.
4. Please make sure the IP & Port.

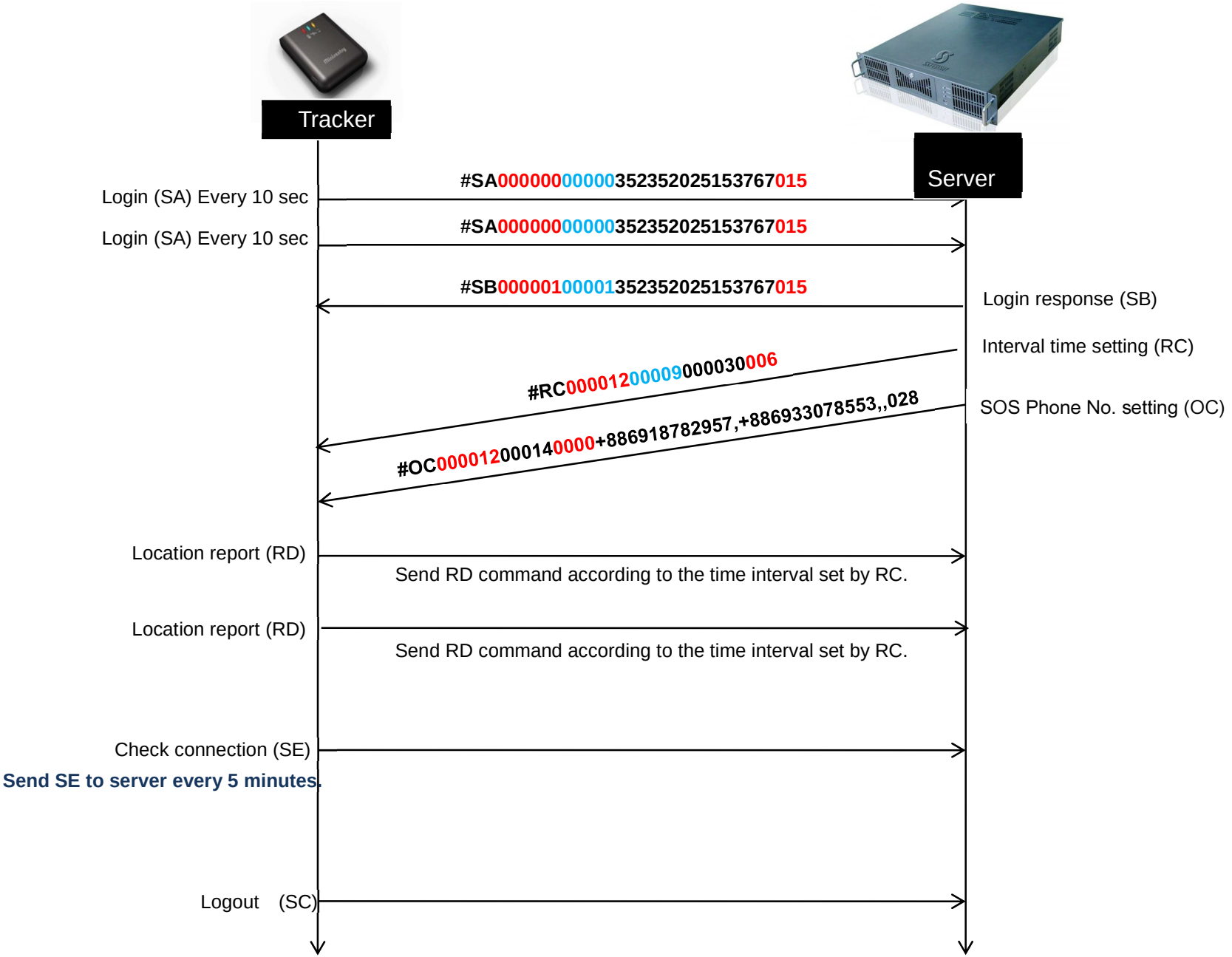
Set the APN/IP/Port

1. Please insert the SIM card.
2. Press the Power button for 2 sec.
3. Send a command to Tracker by SMS. The content is 510#0000#APN/IP/PORT.

For example, 510#0000#internet/59.120.198.206/6868.

LED Indication Table

LED Status			Description
POWER	**GPS**	**GSM**	
3 LED blink simultaneously			Low power and switch off automatically
3 LED shine one by one			●GSM login fails ●The 3G (CDMA or WCDMA) SIM card does not support GPRS.
3 LED shine simultaneously			●Without SIM card ●GPS position fails/GPRS login fails/Charging
Power LED shines			Charging
Power LED turns off			Full charged
Power LED blinks 3 times per sec.			Low power, the voltage is lower than 3.6V
GPS LED shines			GPS position fails
GPS LED shines every 2 sec.			GPS position succeeds
GPRS LED shines			GPRS login fails.
GPRS LED shines every 3 sec.			GPRS login succeeds.


Tracker
Server
Login (SA) Every 10 sec
#SA000000000003523520251537670 15
Login (SA) Every 10 sec
#SA000000000003523520251537670 15
#SB000001000013523520251537670 15
Login response (SB)
Interval time setting (RC)
#RC000012000090000300 06
SOS Phone No. setting (OC)
#OC000012000140000+886918782957,+886933078553,,028
Location report (RD)
Send RD command according to the time interval set by RC.
Location report (RD)
Send RD command according to the time interval set by RC.
Check connection (SE)
Send SE to server every 5 minutes.
Logout (SC)

Turn On

Press Power key to turn on the device.The Power indication (Red LED), GPS indication (Blue LED) and GSM indication (Orange LED) will be on simultaneously.Other LED indications please refer to the LED indication table.

Turn Off

Press Power key to turn off the device. The Power indication (Red LED), GPS indication (Blue LED) and GSM indication (Orange LED) will be on and then off simultaneously.

SOS Button

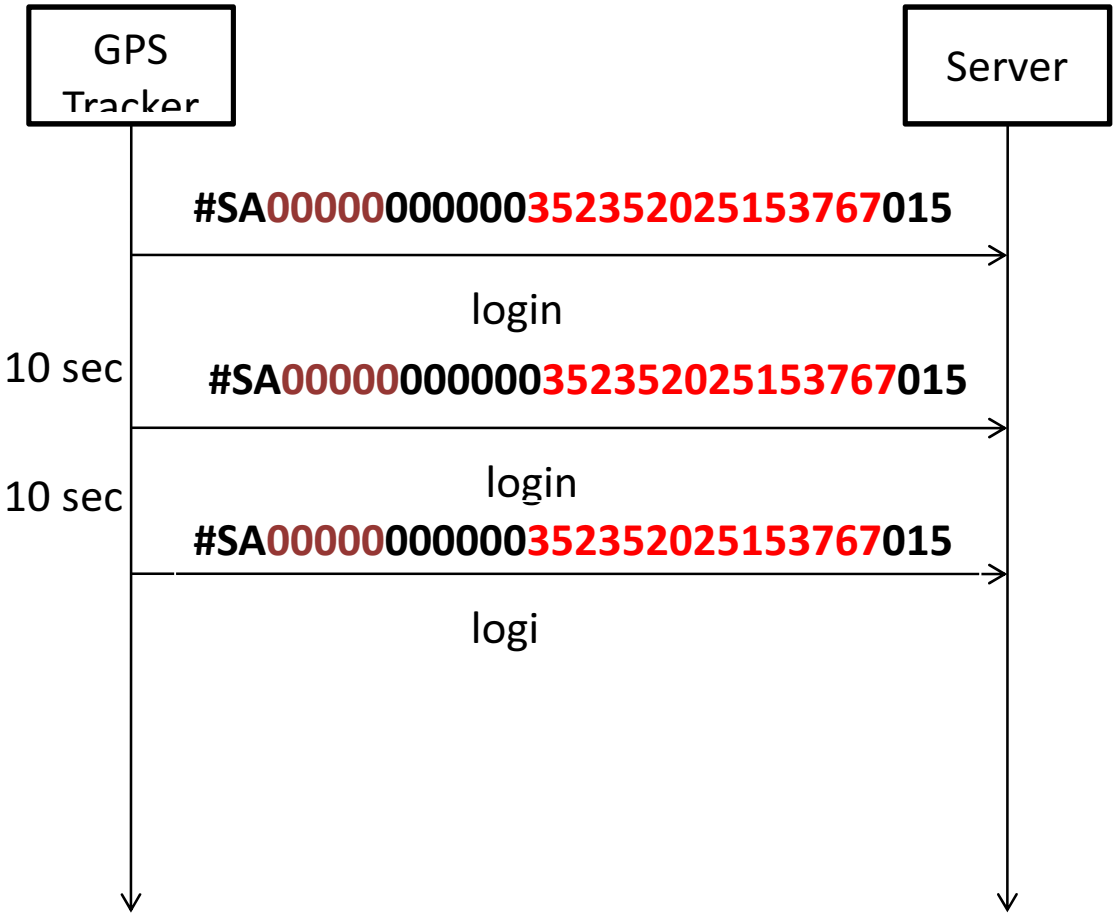
When any emergency occurs, user is able to press the “SOS” button (long press SOS button for around 2 seconds). The device will send a SOS SMS to the authorized mobile phone numbers and get into monitoring mode. Then user is able to dial up the SIM number for monitoring by the three authorized phone numbers. The location is able to be traced continuously through the service platform as well. (Please refer to the manual of service platform for related setting)

Park Button

After 1 Min when you switch on the Park Button for Parking Alert mode immediately. Whenever the shocking or moving occurs continuously for 15 seconds or above, the device will send a Park Alert SMS to the first SOS authorized number (first Number) and the monitoring center. Switch off the Park Button to cease the Park Alert. (Please refer to the manual of service platform for related setting)

LOGIN

1. When switch on the GPS Tracker, the Tracker will send login message (SA command)to the server every 10 sec.



Login response (SB)

When the Server receives the login SA command from the Tracker, the server will response SB command. RC command and OC command to the Tracker. SB command is to allow the login. RC command is to set the time interval of RD command and OC command is to set 3 mobile phone numbers for SOS alert.

Flower chart

1. When you setup APN / IP /Port & Turn on GPS Tracker
2. Tracker will send login in massage to server , This command we call SA command (login)
3. When Server receive SA command , will response SB command

4. AND server also sent RC & OC command to Tracker,
5. When GPS Tracker receive SB /RC /OC command , will sent RD command to server , if you don't want setup RC & OC , is ok,

- **Tracker ←======→ Server message reference**

2011/10/11 17:53:39	RD	#RD00009925454111011095448250 4.1885N12135.5372E002.20300032V0014D502A0405020H0D0C0Q0P0N070800597C2ED086
2011/10/11 17:53:10	RD	#RD00009925452111011095418250 4.1885N12135.5372E002.20300022V0015C702A0405020H0D0C0Q0P0N070000597C2ED086
2011/10/11 17:52:39	RD	#RD00009925450111011095348250 4.1885N12135.5372E002.20300001V0016C802A0405020H0D0C0Q0P0N070000597C2ED086
2011/10/11 17:52:35	RD	#RD00009925448111011095331250 4.1885N12135.5372E002.20300005V0016C802A0405020H0D0C0Q0P0N070000597C2ED086
2011/10/11 17:52:17	RD	#RD00011025446111011095308250 4.1885N12135.5372E002.203000 Server send to Tracker)P0N0700000000000086
2011/10/11 17:52:17	RD	#RD00011025444111011095143250 4.1885N12135.5372E002.20300041V0004D502A0405E20H0D0CDQCP0N070000597C2ED086
2011/10/11 17:52:16	SI	#SI00009925442Far EasTone,FLEET017 Tracker send to Server
2011/10/11 17:52:16	OD	#OD000099254400000+886918782957,,019 Tracker send to Server
2011/10/11 17:52:10	OC	#OC000099000050000+886918782957,,019 Server send to Tracker
2011/10/11 17:52:10	RC	#RC00009900003000030000000000016 Server send to Tracker
2011/10/11 17:52:10	SB	#SB00009900001353419032733755000 17 Server send to Tracker
2011/10/11 17:52:10	SA	#SA00000025438353419032733755F3AVL115C.Standard.20110923.FLEET.206.615056 Tracker send to Server

SE & SF connect check

Every 5 min will sent 1 time to server

2011/10/11 18:02:20	RD	#RD00009925482111011100328250 4.1885N12135.5372E002.20300191V0014C802A0502040H0D0C0Q0P070N0800597C2ED086	接收
2011/10/11 18:01:52	SF	#SF000099000113534190327337550 15	發送
2011/10/11 18:01:52	SE	#SE000099254803534190327337550 15	接收
2011/10/11 17:58:53	RD	#RD00009925478111011100001250 4.1885N12135.5372E002.20300013V0413D302A0504020H0D0C0Q0P070N0800597C2ED086	接收
2011/10/11 17:58:40	RD	#RD00009925476111011095948250 4.1885N12135.5372E002.20300032V0013D302A0504020H0D0C0Q0P070N0800597C2ED086	接收
2011/10/11 17:58:11	RD	#RD00009925474111011095918250 4.1885N12135.5372E002.20300022V0013D702A0504020H0D0C0Q0P070N0800597C2ED086	接收
2011/10/11 17:57:40	RD	#RD00009925472111011095848250 4.1885N12135.5372E002.20300030V0014D502A0504020H0D0C0Q0P070N0800597C2ED086	接收
2011/10/11 17:57:10	RD	#RD00009925470111011095818250 4.1885N12135.5372E002.20300022V0014D502A0405020H0D0C0Q0P0N070800597C2ED086	接收
2011/10/11 17:56:52	SF	#SF000099000093534190327337550 15	發送
2011/10/11 17:56:52	SE	#SE000099254683534190327337550 15	接收
2011/10/11 17:56:39	RD	#RD00009925466111011095748250 4.1885N12135.5372E002.20300032V0014D302A0405020H0D0C0Q0P0N070800597C2ED086	接收

RH & RG command

When users check the location by

1. sending SMS command 111
2. call device and hand up
3. When any alarm occurs

the tracker sends RH command to Server for gathering the address.
Server must response RG command to Device, if Device haven't receiver RG command , resent RH command every 1 min.

Example:

- Users long press the SOS key on the Tracker for 2 sec., the tracker sends RH command to Server for gathering the address,
- Users switch on the Park key on the Tracker, the tracker sends RH command to Server for gathering the address while the tracker shakes 30 times continuously.