TR-203
Development Document
Version 2.0_110223

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CONTENT

1 Introduction

TR-203 is a tracker that can track the location of the elderly, children, pets, and vehicles.
It can apply for fleet management, looking for lost children, elderly care, and lost pets.

This document describes the communication protocol between TR-203 tracker and server, the built-in behavior modes of TR-203, and the function of each parameter.

It can help system integration developer to develop back-end system in the shortest time.

2 Protocol Summary

2.1 General Format

GSx,IMEI,[T,S,]Field1,Field2,……,FieldN*Checksum!		
Format	**Description**	**Note**
GSx	”GSS” :Write setting ”GSs” :Report setting ”GSG” :Write Geo-fence parameter ”GSg” :Report Geo-fence parameter ”GSC” :Action command ”GSr” :Position and status report (format 0) ”GSh” :Position and status report (format 1)	Command head
IMEI	(The IMEI number)	GSM device ID
T	‘0’ : Middle of message ‘1’ : Start of message ‘2’ : End of message ‘3’ : Start and End of message, i.e., only one packet for message	Message packet control
S	‘0’,’1’,’2’,’3’,…,’9’,’10’,’11’,…,’99’	Sequence number
Field	Field1 ~ FieldN	Refer to “TR-203 configure parameters” for detail definition
*	*	End of field
Checksum	The checksum value is derived by the same method of NMEA standard. It is calculated by ‘exclusive OR’ the 8 data bits of each character before “*” in the sentence, but excluding “*”. The hexadecimal value of the most significant and least significant 4 bits of the result are converted to two ASCII characters (0-9, A-F) for transmission. The most significant character is transmitted first.	
!	!	Message delimiter

2.2 Setup Format

2.2.1 Server -> Device

GSS,IMEI,T,S,x1=y1,x2=y2,x3=y3,……*Check Sum!

x1,x2,x3… are code words for configuration parameters.
y1,y2,y3… are their respective settings.

2.2.2 Device -> Server

GSs,IMEI,T,S,x1=y1,x2=y2,x3=y3,……*Check Sum!

2.3 Geo-fence Format

2.3.1 Server -> Device

GSG,IMEI,T,S,1=(type,upper_left_Lon,upper_left_Lat,right_bottom_Lon,right_bottom_Lat[,gxxx][,startTime,endTime,weekday]),2=(…),3=(…),…*Check sum!

2.3.2 Device -> Server

GSg,IMEI,T,S,1=(type,upper_left_Lon,upper_left_Lat,right_bottom_Lon,right_bottom_Lat[,gxxx][,startTime,endTime,weekday]),2=(…),3=(…),…*Check sum!

2.3.3 Geo-fence area definition format

(type,upper_left_Lon,upper_left_Lat,right_bottom_Lon,right_bottom_Lat[,gxxx][,startTime,endTime,weekday])

type	**1=get in area** **2=get out of area** **3=cross over the boundary** **4=stay in area** **5=stay out of area**
upper_left_Lon,upper_left_Lat,right_bottom_Lon,right_bottom_Lat	**Coordinate of specified area**
gxxx	**Optional field for describing this area belong to area group xxx.**
startTime,endTime,weekday	**Optional field which specify the effective time frame of this geo-fence area. startTime and endTime are in seconds. Weekday is in hex-digit format which specifies applicable day in a week, where bit 0 represents Sunday, bit1 represents Monday, etc.**

2.4 Command Format

GSC,IMEI,c1(option1),c2(option2),…….*checksum!

c1,c2…are code words of commands.

option1, option2… are their respective parameters. Please refer to 2.7.

2.5 Report Messages Format

There are two types of report message format, “format 0” and “format 1”. (Refer to “11. Report” for detail definition)

Example:

TR-203 -> Server (format 0)

GSr,IMEI,Device_Mode,Report_Type,Alarm_Status,Geofence_status,GPS_Fix,UTC_Date,UTC_Time,Longitude,Latitude,Altitude,Speed,Heading,Number_of_Satellites,HDOP,Battery_capacity*checksum!

TR-203 -> Server (format 1)

GSh, IMEI,Alarm_Status,GPS_Fix,Battery_capacity*checksum!

2.6 Parameters of Report Messages

Parameters of Report Message		
Codeword	Parameters	Description
A	GPS fixing mode	1=not fix 2=2D fix 3=3D fix
B	UTC Date, Time	ddmmyy,hhmmss
C	Local Date, Time	ddmmyy,hhmmss
1	Longitude	(E or W)ddd.dddddd
2	Longitude	(E or W)dddmm.mmmm
3	Longitude	(+ or -)ddddddddd unit: 0.000001 degree
6	Latitude	(N or S)dd.dddddd
7	Latitude	(N or S)ddmm.mmmm
8	Latitude	(+ or -)ddddddddd unit: 0.000001 degree
G	Altitude	xxxxx.x Unit: meter
H	Speed	xxx.xx unit: knots (1.852km/hr)
I	Speed	xxx unit: km/hr
J	Speed	xxx unit: mile/hr
K	Heading	xxx unit: degree
L	Number of satellite in use	xx
M	HDOP	xx.x
N	Battery capacity	xx unit: percent capacity
O	Operation mode	1=Sleeping 2=Periodic 3=On-line 4=Motion

		6=Parking 7=Standby 8=Off
P	Alarm status	xx(hex digits) bit0=SOS alarm bit1=Parking alarm bit2=Sleeping alarm bit4=Geo-fence alarm bit5=Speed alarm bit7=Battery low alarm
Z	Geo-fence status	Empty field: no geo-fence alarm Ixxx: get in area xxx Oxxx: get out area xxx IGxxx: get in group xxx OGxxx: get out group xxx
Q	Report Media	xx(hex digits) bit0=SMS bit1=TCP bit2=UDP bit6=Acton[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
R	Report type	1=Ping report 2=Periodic mode report 3=On-line mode report 4=Motion mode static report 5=Motion mode moving report 6=Motion mode static to moving report 7=Motion mode moving to static report C=Parking mode report D=Parking mode alarm report E=Sleeping mode report

		F=Sleeping mode alarm report G=Geo-fence alarm report H=Autonomous Geo-fence alarm report I=SOS alarm report J=Low battery alarm report K=Speed alarm report L=Timer 0 report M=Timer 1 report N=Timer 2 report O=Timer 3 report P=L4 report
S	IMEI	
T	Device ID	
U	Checksum	The checksum value is derived by the same method of NMEA standard. It is calculated by 'exclusive OR' the 8 data bits of each character before "*" in the sentence, but excluding "*". The hexadecimal value of the most significant and least significant 4 bits of the result are converted to two ASCII characters (0-9, A-F) for transmission. The most significant character is transmitted first.
p	Temperature	degree Celsius
#		
*		
?		
!	!	Message delimiter

2.7 Configuration Parameters

Most behaviors of TR-203 could be changed by Configuration Parameters. You could change the setting of configuration parameters by the following methods.

1. **Connect TR-203 to personal computer via USB cable and then set the configuration parameters by "TR203 Config Tool."**
2. **Send the "GSS,….!" setting with the configuration parameters to TR-203**
3. **Send the "GSC,….!" command with the configuration parameters to TR-203**

All the settings or commands could be sent by SMS or TCP or UDP.
You could also send L1 command to read the present setting of TR-203.

Configure Parameters					
		Code words	Parameters	Type	Description
Main	Device	O5	Device ID	char(16)	
		O7	Firmware Version	char(28)	Read only
		O6	Time Zone Offset	s32, in seconds	-43200 ~ 46800
		O4	Power on operating mode	u8	1=Sleeping 2=Periodic 3=On-line 4=Motion 6=Parking 7=Standby
	SIM	B0	PIN code	char(4)	
		B1	Phone number of SIM card	char(20)	
		B2	IMEI number	char(16)	Read only
	Vibrator	I2	Enable/ disable TR-203 to vibrate after pressing SOS key	1/0	0=disable 1=enable
	B	J0	The power capacity for	u8,	15 ~ 100

			sending out battery low alarm report	percent	
		J1	The power capacity for power off TR-203	u8, percent	10 ~ 100
		J6	Battery low alarm report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
		J7	The power capacity for clear battery low alarm flag	u8, percent	10 ~ 100
		J8	Enable/disable TR-203 to automatically power on when power capacity is charged to the capacity of J1	1/0	0=disable 1=enable
	Data logger	O2	Data logger interval	u16, in seconds	0 ~ 65535 0=disable
		OH	Data logger distance	u32, in meters	0 ~ 4Giga 0=disable
	Other setting	O1	Motion sensor sensitivity	u16	0 ~ 100
		O3	Report format 0	char(32)	Default=SORPZAB27GHKLMN*U!
		ON	Report format 1	char(32)	Default=SARN*U!
		OG	Enable/ disable data buffer function	1/0	Default=1
		O8	Enable/ disable TR-203 to report “cell ID” if it	1/0	Default=0. The report format will

			does not get GPS fix		automatically switch from format 0 to format 2 when TR-203 does not get GPS fix.
		OO	Report media for reading configuration	Media type	bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
GPS	GPS	C0	GPS always on	1/0	0=disable 1=enable Applicable to all modes except Sleeping and Off mode
		C1	The time for starting to get GPS fix before the next report time if TR-203 does not get GPS fix in last report, or got GPS fix for 1 hour ago	u16, in seconds	60 ~ 600 **Note: TR-203 will send out the report whether it gets GPS fix or not when C1 time ends.**
		C2	The time for starting to get GPS fix before the next report time if TR-203 got GPS fix within 1 hour	u16, in seconds	10 ~ 120 **Note: TR-203 will send out the report whether it gets GPS fix or not when C2 time ends.**
		C3	GPS fix time before sending out the first report	u16, in seconds	0 ~ 600 If "C3"=0, disable first report message.
		C7	Choose to use C8 or C9+CA	1/0	0=use C8 1=use C9+CA Applicable for standby, periodic and on-line mode
		C8	Interval for starting to get GPS fix	u16, in seconds	0 ~ 65535 Applicable if C7=0
		C9	Interval for starting to	u16, in	0 ~ 65535

			get GPS fix when speed is lower than 10 KM/H	seconds	Applicable if C7=1 and speed<10 Km/H
		CA	Interval for starting to get GPS fix when speed is higher than 10 KM/H	u32	0 ~ 4Giga Applicable if C7=1 and speed>=10 Km/H You have to take the value to divide the speed to get the interval. For example, if you set the value as 54000 and the speed is 60 KM/H. The interval will be 54000/60=900 seconds
Communication	GPRS	D1	APN	char(32)	
		D2	User Name	char(32)	
		D3	Password	char(32)	
		D4	DNS 1	char(32)	
		D5	DNS 2	char(32)	
		D8	GPRS mode for L4 command	Media type	02=TCP 04=UDP
		OR	Shortly click SOS key to make TR-203 connect to server	1/0	0=disable 1=enable
		E0	Host IP or domain name 1	char(32)	
		E1	Host Port number 1	u16	
		E2	Host IP or domain name 2	char(32)	
		E3	Host Port number 2	u16	
		E9	GSM operating band	u8	0=auto, 1=900/1800, 2=850/1900, 3=1800, 4=1900
	SMS	F0	SMS return phone number	char(20)	
		A0	Send confirmation to server after receiving	1/0	0=disable 1=enable

			command from server		Confirmation message="ACK\r\n"
		A1	Wait confirmation from server after sending message to server	1/0	0=disable 1=enable Confirmation message="ACK\r"
		A2	Timeout of waiting confirmation from server	u8	0~255
		A3	Device Ack with ID string	1/0	0=disable 1=enable
		A4	ID string is IMEI or device ID	1/0	0=Device id 1=IMEI Available when A3=1
		A5	Enable Simple Command	1/0	0=disable 1=enable
		OM	Enable voice call to connect to server	1/0	0=disable 1=enable
Security	SOS	G0	SMS Phone number 1	char(20)	
		G1	SMS Phone number 2	char(20)	
		G2	SMS Phone number 3	char(20)	
		G3	SMS Phone number 4	char(20)	
		G4	SMS Phone number 5	char(20)	
		G5	SMS Phone number 6	char(20)	
		H0	Report media	Media Type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
		H1	Report number	u16	0 ~ 65535 SMS→ 0 or 1=1 SOS alarm report;2~65535=2~65535 SOS alarm report

					GPRS→ 0 =1 SOS alarm report ;1~65535= continue send SOS alarm report till receive stop command
		H2	report interval	u16, in seconds	0 ~ 65535
Alert	Parking	T0	Report interval in alert state	u32, in seconds	0 ~ 4Giga
		T1	Report interval in alarm state	u32, in seconds	0 ~ 4Giga
		T2	Report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
		T3	Traveled distance for sending report	u32, in meters	0 ~ 4Giga 0=disable
	Sleeping	U0	Report interval in alert state	u32, in seconds	0 ~ 4Giga
		U1	Report interval in alarm state	u32, in seconds	0 ~ 4Giga
		U2	Report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:

	Speed Limit	OI	Upper limit of speed alarm	u8, in Km/h	0 ~ 255 0=disable
		OJ	Lower limit of speed alarm	u8, in Km/h	0 ~ 255 0=disable
		OP	Hysteresis for speed alarm	u8, in Km/h	0 ~ 255
		OL	Report Media for speed alarm	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
	Geo-fence	K0	Geo-fence enable	1/0	0=disable 1=enable
		K3	Geo-fence alarm report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
		K4	Report media for reading Geo-fence data	Media type	bit1=TCP bit2=UDP

Tracking	Ping	OD	Report media for ping	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
		OS	GPS fix time between receiving ping command and sending out ping report	u16, in seconds	For N1 & L4 command. If OS=0, GPS fix time=C3
	Periodic	P0	Report interval	u32, in seconds	0 ~ 4Giga
		P2	Report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
		P3	Traveled distance for sending report	u32, in meters	0 ~4Giga 0=disable
	On-line	Q0	Report interval	u32, in seconds	0 ~ 4Giga
		Q2	Report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1]

					Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
		Q3	Traveled distance for sending report	u32, in meters	0 ~ 4Giga 0=disable
		E4	Interval in on-line state for disconnecting and then re-connecting	u16, in seconds	0=disable
		E5	Interval for checking if GPRS connection is on-line. If GPRS connection is cut, TR-203 will try to connect to server for one time.	u16, in seconds	0=disable
		E6	Enable/disable TR-203 to send “OK” to server after GPRS connection is re-built.	1/0	0=disable 1=enable Available when E5 is not 0
	Motion	R0	Report interval in static state	u32, in seconds	0 ~ 4Giga
		R1	Report interval in motion state	u32, in seconds	0 ~ 4Giga
		R2	Report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
		R3	Traveled distance for sending report	u32, in meters	0 ~ 4Giga 0=disable

		R7	Automatic change from motion mode to on-line mode	1/0	0=disable 1=enable
		R9	Minimum distance to be judged as moving state	u16, in meters	0 ~ 65535
		RA	Turn off GSM module in static state	1/0	0=turn on GSM module 1=turn off GSM module
		RB	Keep GPRS on-line in static state	1/0	Available when RA=0 0=disable 1=enable
		RC	Keep GPRS on-line in moving state	1/0	0=disable 1=enable
		E4	Interval in on-line state for disconnecting and then re-connecting	u16, in seconds	0=disable
		E5	Interval for checking if GPRS connection is on-line. If GPRS connection is cut, TR-203 will try to connect to server for one time.	u16, in seconds	0=disable
		E6	Enable/disable TR-203 to send “OK” to server after GPRS connection is re-built.	1/0	0=disable 1=enable Available when E5 is not 0
		RD	Interval for switching from validation to static state if no motion detected	u16, in seconds	0=Interval is the same with R1
		RE	Traveled distance to be judged as keep in moving state	u16, Unit: meter	
		RF	Interval for switching from moving to static state if no motion detected	u16, in seconds	0=Interval is the same with R1

		RG	Check GPS off time setting (C7, C8, C9, CA	1/0	0=disable 1=enable
		RH	GPS always on in moving state	1/0	0=disable 1=enable
Timer	Timer 0	W0	Start time	u32, in seconds	0 ~ 86400
		W1	End time	u32, in seconds	0 ~ 86400
		W2	Report interval	u16, in seconds	1 ~ 65535
		W3	Weekday mask	u8, xx(hex digits)	00 ~ 7f Weekday is in hex-digit format which specifies applicable day in a week, where bit 0 represents Sunday, bit1 represents Monday, etc.
		W4	Report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
	Timer 1	X0	Start time	u32, in seconds	0 ~ 86400
		X1	End time	u32, in seconds	0 ~86400
		X2	Report interval	u16, in seconds	1 ~ 65535
		X3	Weekday mask	u8, xx(hex digits)	00 ~ 7f Weekday is in hex-digit format which specifies applicable day in

					a week, where bit 0 represents Sunday, bit1 represents Monday, etc.
		X4	Report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
	Timer 2	Y0	Start time	u32, in seconds	0 ~ 86400
		Y1	End time	u32, in seconds	0 ~ 86400
		Y2	Report interval	u16, in seconds	1 ~ 65535
		Y3	Weekday mask	u8, xx(hex digits)	00 ~ 7f Weekday is in hex-digit format which specifies applicable day in a week, where bit 0 represents Sunday, bit1 represents Monday, etc.
		Y4	Report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:
	T	Z0	Start time	u32, in	0 ~ 86400

				seconds	
		Z1	End time	u32, in seconds	0 ~ 86400
		Z2	Report interval	u16, in seconds	1 ~ 65535
		Z3	Weekday mask	u8, xx(hex digits)	00 ~ 7f Weekday is in hex-digit format which specifies applicable day in a week, where bit 0 represents Sunday, bit1 represents Monday, etc.
		Z4	Report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:

2.8 Command's Codeword

Command's Codeword		
Codeword	Parameters	Description
M7	Set Standby Mode	
M2	Set Periodic Mode	
M3	Set On-Line mode	
M4	Set Motion mode	
M6	Set Parking mode	
M1	Set Sleeping mode	
M8	Set Off mode	
N0	Set Timer	
N1	Ping device	
N6	Enable Geo-fence	
N7	Disable Geo-fence	
N8	Enable Data logger	
N9	Disable Data logger	
Na	Dismiss SOS alarm	
Nb	Dismiss parking alarm	
Nc	Dismiss sleeping alarm	
Ne	Dismiss Geo-fence alarm	
Nh	Dismiss low battery alarm	
Ni	Dismiss All alarm	
L1	Read Configuration	Adding up to 1-5 parameters. If parameter=(ALL), then all user configuration data will be reported.
L3	Read Geo-fence	
L4	Make TR-203 connect to Server	
L5	Disconnect from Server	
LA	Restore default configuration	Restore all parameters to factory

		value (W)for writing current configuration to default setting.
LB	Download data of data logger	
LC	Clear data logger	
LH	Re-Set device	
LJ	Send SMS message	(phone_number,"SMS message") SMS message are enclosed by quotation marks.

2.9 Report Media

Report media is the method that TR-203 sends report. No matter you send the command by SMS or TCP or UDP, TR-203 will send the report via the report media.

Report Media	Media type	bit0=SMS bit1=TCP bit2=UDP bit5=USB bit6=Action[0] bit7=Action[1] Action=00: report format 0 Action=01: report format 1 Action=10: GPS on Action=11:

	Action		Media Type					
bit	7	6	5=USB	4	3	2=UDP	1=TCP	0=SMS
Ex 1 TCP	0	0	0	0	0	0	1	0
Ex 2 UDP	0	1	0	0	0	1	0	0
Ex 3 GPS on	1	0	0	0	0	0	0	0

Example 1: Ask TR-203 to send on-line report with report interval of 5 minutes (Q0=300) and report format 0 to TCP server (Q2=02).
GSC,011412000010789,M3(Q0=300,Q2=02)*07!

Example 2: Ask TR-203 to enter motion mode with static report interval of 7 minutes (R0=420) and moving report interval of 40 seconds (R1=40), report format 1 to UDP server (R2=44).
GSC,011412000010789,M4(R0=420,R1=40,R2=44)*71!

Example 3: Set Timer 1 to turn on GPS without sending report (X4=80), Start time:

09:00 AM (X0=32400), End time: 06:00 PM (X1=64800), Report interval: 1 hour (X2=3600), Report day: from Monday ~Friday (X3=3E)
GSS,011412000012789,3,0,X0=32400,X1=64800,X2=3600,X3=3E,X4=80*53!

2.10 Checksum

The checksum value is derived by the same method of NMEA standard. It is calculated by 'exclusive OR' the 8 data bits of each character before "*" in the sentence, but excluding "*". The hexadecimal value of the most significant and least significant 4 bits of the result are converted to two ASCII characters (0-9, A-F) for transmission. The most significant character is transmitted first.

Example1: set the device whose IMEI is 011412000011274, the APN is internet, the user name and password are not necessary, the server type is TCP, the server IP is 220.128.207.75, the server port number 3000.
The setup command is
GSS,011412000011274,3,1,D1=internet,D2=,D3=,D8=02,E0=220.128.207.75,E1=3000*5E!
The checksum is 5E.

Example2: Set TR-203 periodic report and ask it to report based on traveled distance (P3) of 500 meters
The setup command is
GSC,011412000010789,M2(P3=500)*72!
The checksum is 72.

Example3: Set TR-203 parking mode with report interval of 3600 seconds for alert state (T0), report interval of 30 for alarm state (T1), report's traveled distance of 700 meters (T3) and report media (T2) TCP
GSC,011412000010789,M6(T0=3600,T1=30,T2=02,T3=700)*02!
The checksum is 02.

3 Configuration

You could read or set TR-203 configuration parameters by USB, SMS, TCP, UDP communication protocol.

3.1 Read parameters of configuration

Command's format:

GSC,IMEI,L1(x1,x2,x3,x4,x5)*Checksum!
GSC,IMEI,L1(ALL)*Checksum!

Add up to 1-5 parameters.
If parameter =(ALL), then all user configuration data will be generated.

Report format:

GSs,IMEI,T,S,x1=y1,x2=y2,x3=y3,……*Checksum!

x1,x2,x3… are code words for configuration parameters.
y1,y2,y3… are their respective settings.

Example 1:

Ask TR-203 report parameters of Motion mode(R0,R1,R2,R3)
GSC,136489586301578,L1(R0,R1,R2,R3)*35!

Report parameters R0,R1,R2 and R3 form TR-203
GSs,136489586301578,3,0,R0=3600,R1=30,R2=02,R3=0*4E!

Example 2:

Ask TR-203 report all parameters

GSC,135485956301257,L1(ALL)*5C!

Report all parameters from TR-203

GSs,135485956301257,1,0,O5=TR203,O7=F-ORT-203-08120421.0.0.0.0,O6=28800,O4=7,B0=,B1=,B2=,I2=1,J0=20,J1=15,J6=02*02!

GSs,135485956301257,0,1,O1=5,O3=STRPAB27GHKLMN*U!,ON=SPAN*!,OO=02,C0=0,C1=300,C2=30,C3=10*18!

GSs,135485956301257,0,2,D1=,D2=,D3=,D4=,D5=,D6=1,E0=,E1=5000,F0=,F1=5,A0=1,A1=0,A2=5,A3=0,A4=1,OM=1*28!

GSs,135485956301257,0,3,G0=,G1=,G2=,G3=,G4=,G5=,H0=02,H1=3,H2=30,V1=600,V0=1,V4=,V5=300*13!

GSs,135485956301257,0,4,T0=3600,T1=30,T2=02,T3=0,U0=3600,U1=30,U3=02,OI=100,OJ=60,OL=02,OP=5,OQ=30*2C!

GSs,135485956301257,0,5,K3=02,K4=02,K5=30,OD=02,P0=60,P2=02,P3=0,Q0=60,Q2=02,Q3=0*0A!

GSs,135485956301257,0,6,R0=3600,R1=180,R2=02,R3=0,W0=0,W1=86400,W2=60,W3=40,W4=02*0D!

GSs,135485956301257,2,7,Y0=,Y1=,Y2=3600,Y3=,Y4=02,Z0=,Z1=,Z2=30,Z3=,Z4=02,X4=02,Z0=,Z1=,Z2=30,Z3=,Z4*43!

3.2 Set parameters of configuration

Commands format:

GSS,IMEI,T,S,x1=y1,x2=y2,x3=y3,……,*Checksum!

x1,x2,x3… are code words for configuration parameters.
y1,y2,y3… are their respective settings.

Example 1:

Set parameters of GPRS setting (D1,E0,E1)

Codeword	Parameters	Value
D1	APN	Internet
E0	Host IP 1	201.89.56.207
E1	Host Port number 1	5000

GSS,138785469589531,3,0,D1=internet,E0=201.89.56.207,E1=5000*01!

Example 2:

Set parameters of Timer 1: Start time: 09:00 AM (X0=32400), End time: 06:00 PM (X1=64800), Report interval: 1 hour (X2=3600), Report day: from Monday ~Friday (X3=3E)

GSS,011412000012789,3,0,X0=32400,X1=64800,X2=3600,X3=3E*26!

4 GSM & GPRS

4.1 GSM & GPRS Setting

In order to activate the communication between server and device, the GPRS parameter is necessary to set at the beginning. The GPRS parameters are included as the table below. Please contact with your telecom operator for the APN, user name, and password. Please contact your ISP provider for DNS1 and DNS2.
You could also set the tracker to use specific GSM frequency band by the parameter E9. If you set E9 to be 0, tracker will search the frequency itself.

Codeword	Parameters	Value	Description
D1	APN	char(32)	
D2	User Name	char(32)	
D3	Password	char(32)	
D4	DNS 1	char(32)	
D5	DNS 2	char(32)	
D8	GPRS mode for L4 command	Server type	02=TCP 04=UDP
E0	Host IP 1 or domain name	char(32)	
E1	Host Port number 1	u16	
E9	GSM frequency band	u8	0=auto, 1=900/1800, 2=850/1900, 3=1800, 4=1900

Note:

1. If user name and password are not necessary for your telecom operator, please keep D2 and D3 blank.
2. If the value of E0 is IP, you do not have to set D4 and D5. Please skip the fields.

The setup format of GPRS setting is "**GSS,IMEI,T,S,D1=y1,D2=y2,D3=y3,D4=y4, D5=y5, D8=y6,E0=y7,E1=y8,*Checksum!"**

For example, set the device whose IMEI is 011412000010789, the APN is internet, the user name and password are not necessary, the server type is TCP, the server IP is 220.128.207.75, the server port number 5000.
The setup command is
GSS,011412000010789,3,1,D1=internet,D2=,D3=,D8=02,E0=220.128.207.75,E1=5000*5E!

4.2 Acknowledgement

Acknowledgement is the acknowledge receipt used to confirm if server or device receive the command or report from each other.
The following parameters must be set for configuration or sending those parameters by other action command for enable/disable acknowledgement.

Code word	Parameters	Value	Description
A0	Send confirmation to server after receiving command from server	1/0	Confirmation message="ACK\r\n" when A3=0 When A3=1, A4=1, confirmation message=”IMEI, ACK\r\n" When A3=1,A4=0, confirmation message=”Device ID, ACK\r\n"
A1	Wait confirmation from server after sending message to server	1/0	Confirmation message="ACK\r"
A2	Timeout of waiting confirmation from server	u8	0~255
A3	Device Ack with ID string	1/0	
A4	ID string is IMEI or device ID	1/0	1=IMEI, 0=Device ID Available when A3=1

For example, set A0=1, A1=1, A3=1, A4=1, server sends command to TR-203

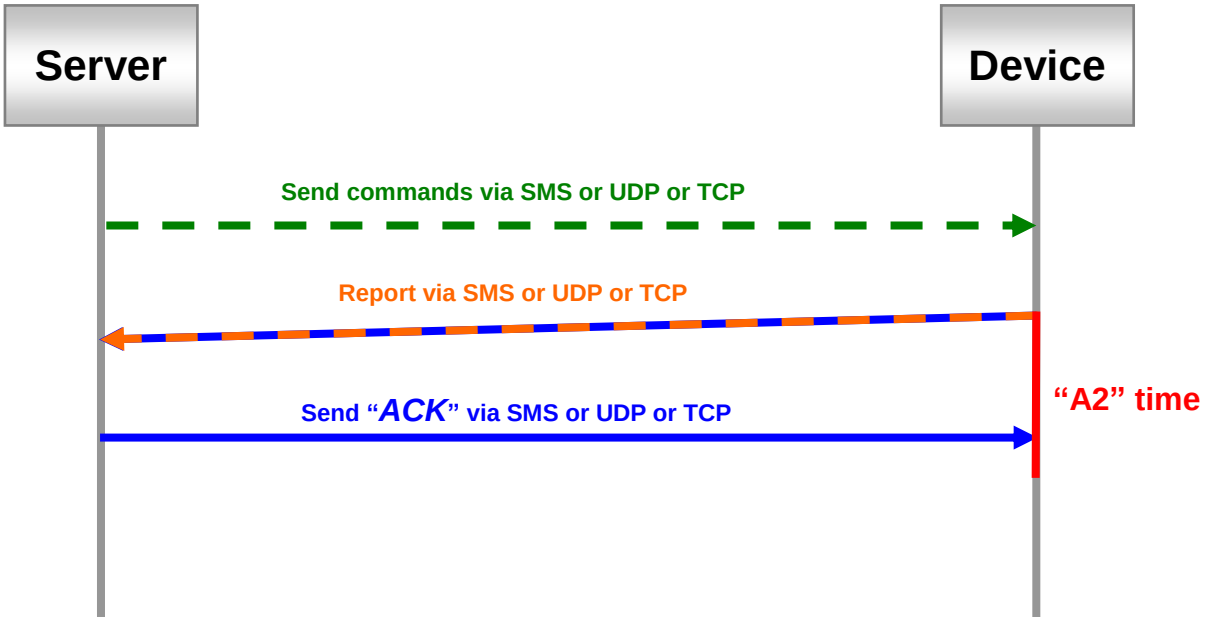
whose IMEI is 011412000010789.
After receiving the command, TR-203 will send acknowledgement receipt as "011412000010789,ACK\r\n"

For example, set A0=1, A1=1, A3=1, A4=0, TR-203 whose device ID is Globalsat, sends report to server.
After receiving the command, TR-203 will send acknowledgement receipt as "Globalsat,ACK\r\n"

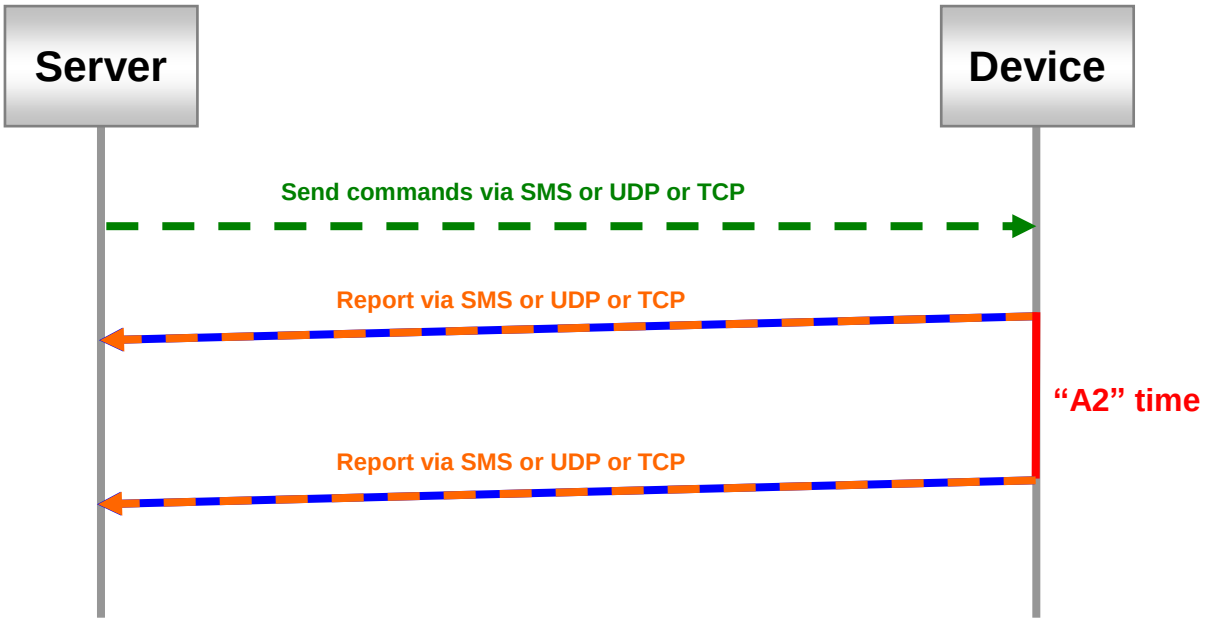
For example, set A0=1, A1=1, A3=0, server sends command to TR-203
After receiving the command, TR-203 will send acknowledgement receipt as "ACK\r\n"

4.2.1 Receive Acknowledgement from Server

Receive ACK from server during "A2" time:

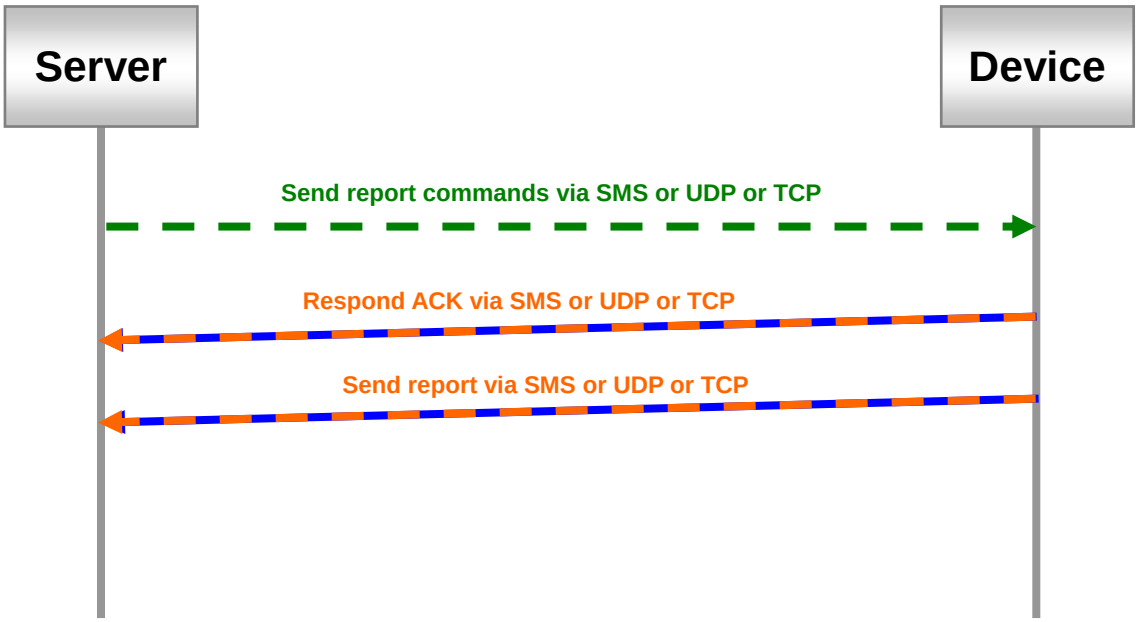


Not receive ACK from server during "A2" time:

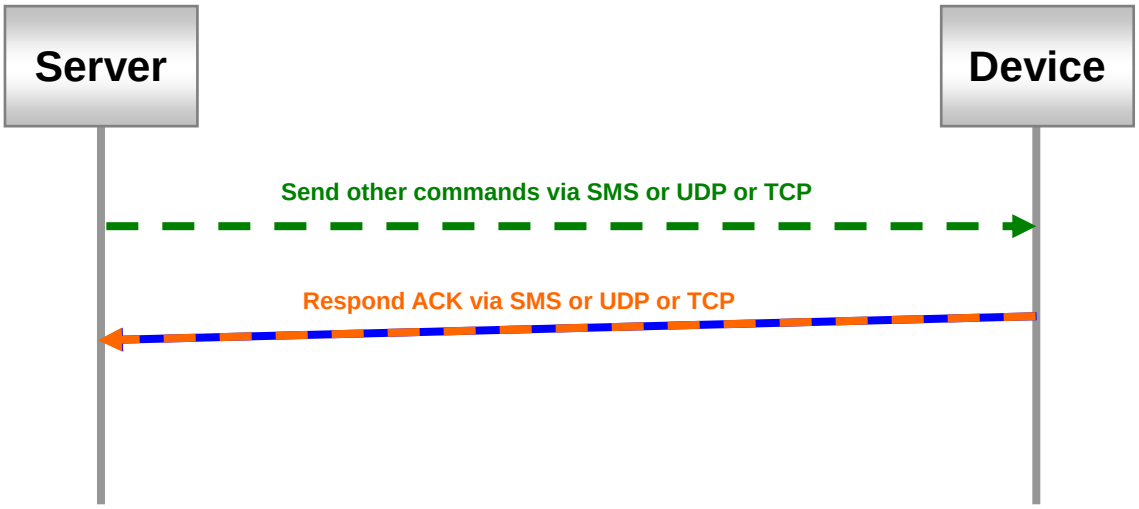


4.2.2 Respond Acknowledgement to Server

Receive report commands from server:



Receive other commands from server:



5 GPS

In the general tracking modes, TR-203 will turn on GPS.
There are some conditions that you have to extra make GPS on.

1. **Report based on traveled distance in the periodic mode, on-line mode, parking mode, motion mode**
2. **Speed limit**
3. **Geo-fence mode**
4. **Data Logger**

There are two ways for turning on GPS, one is to keep GPS always on by parameter C0, and the other is to use timer. Keep GPS always on will make the power run up within 10 hours.
The recommended method of making GPS on is to use timer.
While using timer, you could set the report media (X4 or Y4 or Z4) as 80, then TR-203 will turn on the GPS according to the report interval (X2 or Y2 or Z2)

> **Note:**
> **Using timer to turn on GPS, TR-203 does not turn on GPS all the time during the period from Start Time (X0 or Y0 or Z0) to End Time (X1 or Y1 or Z1). GPS is turn on according to the report interval (X2 or Y2 or Z2) during the period from Start Time to End Time.**

For the details of setting timer, please refer to chapter "10 Timer."

C0	GPS always on	1/0	0=disable 1=enable Applicable to all modes except Sleeping and Off mode
C1	The time for starting to get GPS fix before the next report time if TR-203 does not get GPS fix in last report, or got GPS fix for 1 hour ago	u16, in seconds	60 ~ 600 Note: TR-203 will send out the report whether it gets GPS fix or not when C1 time ends.

C2	The time for starting to get GPS fix before the next report time if TR-203 got GPS fix within 1 hour	u16, in seconds	10 ~ 120 **Note: TR-203 will send out the report whether it gets GPS fix or not when C2 time ends.**
C3	GPS fix time before sending out the first report	u16, in seconds	0 ~ 600 If "C3"=0, disable first report message.
C7	Choose to use C8 or C9+CA	1/0	0=use C8 1=use C9+CA Applicable for standby, periodic and on-line mode
C8	Interval for starting to get GPS fix	u16, in seconds	0 ~ 65535 Applicable if C7=0
C9	Interval for starting to get GPS fix when speed is lower than 10 KM/H	u16, in seconds	0 ~ 65535 Applicable if C7=1 and speed<10 Km/H
CA	Interval for starting to get GPS fix when speed is higher than 10 KM/H	u32	0 ~ 4Giga Applicable if C7=1 and speed>=10 Km/H You have to take the value to divide the speed to get the interval. For example, if you set the value as 54000 and the speed is 60 KM/H. The interval will be 5400/60=900 seconds
RH	GPS always on in moving state	1/0	0=disable 1=enable

C7, C8, C9, and CA is for speeding up the time of getting GPS fix if you set a long report interval in stand-by, periodic and on-line mode. Between the long report interval, C7, C8, C9, and CA will make TR-203 get GPS fix. Then TR-203 can speed up the time of getting GPS fix at the next report.

C1 example, the next report time is 10:00 AM and TR-203 does not get GPS fix in last report, C1 is 180 seconds. TR-203 will start to get GPS fix at 9:57 AM and send out report at 10:00

C2 example, the next report time is 10:00 AM and TR-203 got GPS fix within 1 hour, C2 is 20 seconds. TR-203 will start to get GPS fix at 9:59:40 AM and send out report at 10:00

C3 example, C3=120 seconds, TR-203 is in the motion mode. When TR-203 is moved, it will try to get GPS fix for 120 seconds before sending motion moving report.

6 Tracking

6.1 Ping

Ping is for getting the present location of TR-203 immediately. TR-203 will report its present location and concerning information when getting the ping command.
You can ping TR-203 by L4 command or by N1 command.
The parameters of ping:

Code word	Parameters	Value	Description
D8	Report Media for L4	02=TCP 04=UDP	The connecting method for TR-203 to connect to server after receiving “L4” command.
OD	Report media for ping (N1)		Please refer to 2.9 Report media
OS	GPS fix time between receiving ping command and sending out ping report	u16, in seconds	If OS=0, GPS fix time=C3
C3	u16, in seconds	0 ~ 600 If "C3"=0, disable first report message.	GPS fix time before sending out the first report

Commands format:
GSC,IMEI,N1*Checksum!

Command Codeword	Parameters
N1	Ping device
L4	Connect to server

Example 1:

Ping TR-203 location and ask it to report via SMS (Send command via SMS or TCP or UDP)

GSC,135785412249986,N1(OD=01)*2C!

6.2 Periodic Mode

Periodic mode is for setting an interval for TR-203 to regularly report its location according to the interval. When it reaches the report time, TR-203 will turn on GPS and GPRS connection and report the location and concerning information to server. After sending the information, TR-203 will disconnect from server.

Note of Traveled Distance:
You can also set a traveled distance, and then TR-203 will report by the combination of report interval and traveled distance.
For example, the report interval is 60 seconds, the traveled distance is 800 meters, TR-203 sends 1 report at 10:00:00, and then it detects the traveled distance is over 800 meters at 10:00:50, it will send out one report and re-start to count the report interval and the traveled distance. The next report will be sent out at 10:01:50 or when the traveled distance is over 800 meters.

The parameters of periodic mode:

Code word	Parameter	Value	Description
P0	Report interval	1~4Giga seconds	
P2	Report Media		Please refer to 2.9 Report media
P3	Traveled distance for sending report	0=disable 1~1000000 Unit: meter	If you want TR-203 to send reports according to traveled distance, you have to extra make GPS on. Please refer to "Chapter 4 GPS."

Commands format:
GSC,IMEI,M2*Checksum!

Command Codeword	Parameter
M2	Set periodic mode

Example 1:

Set TR-203 periodic report and ask it to report based on traveled distance (P3) of 500 meters (Send command via SMS or TCP or UDP), turn on GPS by timer 1: Start time:12:00 AM (X0=0), End time:12:00 AM (X1=86400), Report interval:30 seconds (X2=30), Report time: From Monday to Sunday (X3=7F), GPS on (X4=80)

GSC,011412000010789,M2(P3=500,X0=0,X1=86400,X2=30,X3=7F,X4=80)*7F!
Note: You have to turn GPS on. Please refer to chapter 5 GPS.

Example 2:

Set TR-203 periodic report and ask it to report based on report interval (P0) 0f 30 seconds
GSC,135785412249986,M2(P0=30)*45!

6.3 On-Line Mode

In On-Line mode, TR-203 will keep GPRS connection. If TR-203 detects the GPRS connection is cut, it will try to connect to server for one time. If it cannot connect to server, it will re-connect to server when the next report time.

Some telecom operator will kick off the continual GPRS connection. So you could make GPRS connection cut and then make the GPRS connection again according to a regular interval by parameter E4. If E4=0, TR-203 will not cut GPRS connection and then connect again. It will keep GPRS connection. You could also make TR-203 to check if GPRS connection is on-line according to a regular interval by parameter E5. If GPRS connection is cut, TR-203 will try to connect to server for one time.

Note of Traveled Distance:
You can also set a traveled distance, and then TR-203 will report by the combination of report interval and traveled distance.
For example, the report interval is 60 seconds, the traveled distance is 800 meters, TR-203 sends 1 report at 10:00:00, and then it detects the traveled distance is over 800 meters at 10:00:50, it will send out one report and re-start to count the report interval and the traveled distance. The next report will be sent out at 10:01:50 or when the traveled distance is over 800 meters.

You can also set a traveled distance, and then TR-203 will report by the combination of report interval and traveled distance.

You could define the content of report and the report interval of on-line mode.

The parameters of On-Line mode:

Code word	Parameters	Value	Description
Q0	Report interval	1~4Giga seconds	
Q2	Report Media		Please refer to 2.9 Report media
Q3	Traveled distance for sending out report	0=disable 1~1000000 Unit: meter	If you want TR-203 to send reports according to traveled distance, you have to extra make GPS on. Please refer to “Chapter 4 GPS.”
E4	Interval in on-line state for disconnecting and then re-connecting	u16, in seconds	
E5	Interval for checking if GPRS connection is on-line. If GPRS connection is cut, TR-203 will try to connect to server for one time.	u16, in seconds	0=disable
E6	Enable/disable TR-203 to send “OK” to server after GPRS connection is re-built.	1/0	0=disable 1=enable Available when E5 is not 0

Commands format:

GSC,IMEI,M3*Checksum!

Command Codeword	Parameters
M3	On-line mode

Example 1:

Ask TR-203 on-line report (Send command via SMS or TCP or UDP)

GSC,130158974523157,M3*1A!

Example 2:

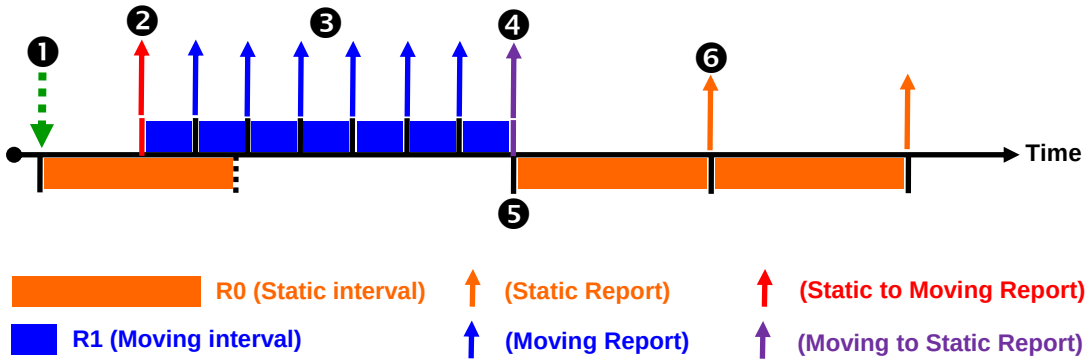
Ask TR-203 set on-line report with interval of 60 seconds and report by UDP

GSC,011412000010789,M3(Q0=60,Q2=04)*34!

6.4 Motion Mode

Motion mode is an economic report mode. Under motion mode, TR-203 will report its location with high frequency when TR-203 detects motion (moving state). When TR-203 is static, it will report its location with low frequency (static state). It can save the report-transmission fee. Between the moving state and static state, there is a validation state for TR-203 not to jump to static state as soon as it does not detect motion. You could set TR-203 keep in moving state by setting a traveled distance (RE) within a defined interval (RF).

There are 2 report frequency of motion mode, one is when TR-203 detects motion, and the other is when TR-203 is static. The behavior is as following:



❶	Receive command and then enter motion static mode.
❷	When TR-203 detects motion, it will enter motion moving mode and send “static to moving” report.
❸	Motion Moving Report.
❹	When TR-203 is static, it will send “moving to static” report and then return to the motion static mode.
❺	Re-start timer for motion static interval.
❻	Motion Static Report.

Note of Traveled Distance:
You can also set a traveled distance, and then TR-203 will report by the combination of report interval and traveled distance.
For example, the report interval is 60 seconds, the traveled distance is 800 meters, TR-203 sends 1 report at 10:00:00, and then it detects the traveled distance is over 800 meters at 10:00:50, it will send out one report and re-start to count the report interval and the traveled distance. The next report will be sent out at 10:01:50 or when the traveled distance is over 800 meters.

You could define the content of report and the report interval of motion mode.
If you want to save the battery power, you could turn off GSM module in static state by making parameter RA=1.
In motion mode, TR-203 will make GPRS connection while sending static or moving report. After sending report, it will cut the GPRS connection. If you want to keep GPRS on-line, you could set RB=1 to keep GPRS on-line in static interval and set RC=1 to keep GPRS on-line in moving interval. Some telecom operator will kick off the continual GPRS connection. So you could make GPRS connection cut and then make the GPRS connection again according to a regular interval by parameter E4. You could also make TR-203 to check if GPRS connection is on-line according to a regular interval by parameter E5. If GPRS connection is cut, TR-203 will try to connect to server for one time.
In order to avoid TR-203 jump to static state as soon as it does not detect motion, you could set TR-203 keep in moving state by setting a traveled distance (RE) within a defined interval (RF).

The parameters of motion mode:

Code word	Parameters	Value	Description
R0	Report interval in static state	1~4Giga seconds	
R1	Report interval in moving state	1~4Giga seconds	
R2	Report Media		Please refer to 2.9 Report

			media
R3	Traveled distance for sending report	0=disable 1~1000000 Unit: meter	If you want TR-203 to send reports according to traveled distance, you have to extra make GPS on. Please refer to “Chapter 4 GPS.”
R7	Automatic change from motion mode to on-line mode when TR-203 does not detect motion	1/0	0=disable 1=enable
R9	Minimum distance to be judged as moving state	u16, Unit: meter	0 ~ 65535
RA	Turn off GSM module in static state	1/0	0=turn on GSM module 1=turn off GSM module
RB	Keep GPRS on-line in static state	1/0	Available when RA=0 0=disable 1=enable
RC	Keep GPRS on-line in moving state	1/0	0=disable 1=enable
E4	Interval in on-line state for disconnecting and then re-connecting	u16, in seconds	0=disable
E5	Interval for checking if GPRS connection is on-line. If GPRS connection is cut, TR-203 will try to connect to server for one time.	u16, in seconds	0=disable
E6	Enable/disable TR-203 to	1/0	0=disable

	send “OK” to server after GPRS connection is re-built.		1=enable Available when E5 is not 0
RD	Interval for switching from validation to static state if no motion detected	u16, in seconds	0=Interval is the same with R1
RE	Traveled distance to be judged as keep in moving state	u16, Unit: meter	
RF	Interval for switching from moving to static state if no motion detected	u16, in seconds	0=Interval is the same with R1
RG	Check GPS off time setting (C7, C8, C9, CA)	1/0	0=disable 1=enable
RH	GPS always on in moving state	1/0	0=disable 1=enable

Commands format:

GSC,IMEI,M4*Checksum!

Commands Codeword	Parameters
M4	Set motion mode

Example 1:

Ask TR-203 set motion report (Send command via SMS or TCP or UDP)

GSC,136639674520921,M4*1E!

Example 2:

Set TR-203 motion mode with report interval of 3600 seconds for static state (R0), report interval of 30 for moving state (R1) and report media (R2) TCP

GSC,130158974523157,M4(R0=3600,R1=30,R2=02)*44!

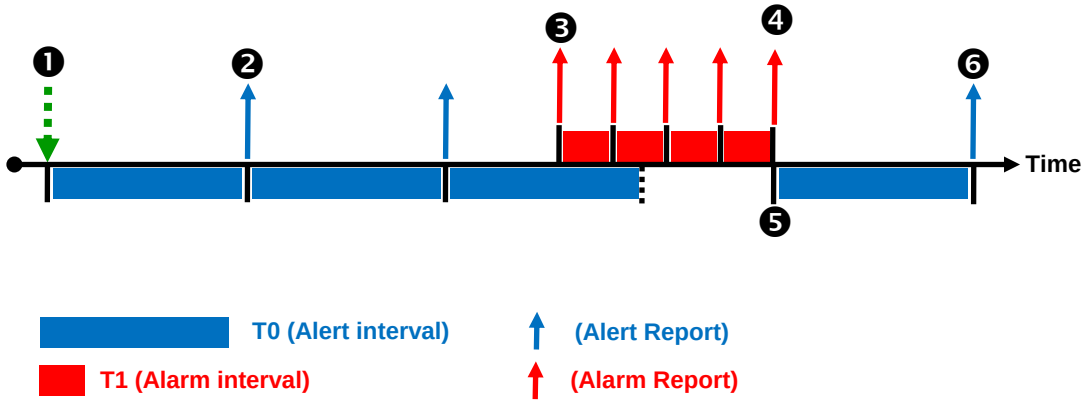
7. Alert

7.1 Parking Mode

Parking mode is for user to make TR-203 send alarm location report when the TR-203 is moved. In addition to the alarm location report, TR-203 will also send regular location report when TR-203 is parked.

You could define the content of report and the report interval of parking mode.

There are 2 report interval of parking mode, one is when TR-203 is static (under alert state), and the other is when TR-203 is moving (under alarm state). The behavior is as following:



❶	Receive command and then enter parking alert mode.
❷	When TR-203 is static, it will send “parking alert” report according to “Alert interval” time.
❸	When TR-203 is moved, it will enter parking alarm mode and send “parking alarm” report.
❹	When TR-203 is not moved, it will return to the parking alert mode.
❺	Re-start timer for parking alert interval.
❻	Parking Alert Report.

Note of Traveled Distance:
You can also set a traveled distance, and then TR-203 will report by the combination of report interval and traveled distance.
For example, the report interval is 60 seconds, the traveled distance is 800 meters, TR-203 sends 1 report at 10:00:00, and then it detects the traveled distance is over 800 meters at 10:00:50, it will send out one report and re-start to count the report interval and the traveled distance. The next report will be sent out at 10:01:50 or when the traveled distance is over 800 meters.

The parameter of parking mode:

Code word	Parameters	Value	Description
T0	Report interval in alert state	1~4Giga seconds	
T1	Report interval in alarm state	1~4Giga seconds	
T2	Report Media		Please refer to 2.9 Report media
T3	Traveled distance for sending report	0=disable 1~1000000 Unit: meter	If you want TR-203 to send reports according to traveled distance, you have to extra make GPS on. Please refer to "Chapter 4 GPS."

Commands format:
GSC,IMEI,M6*Checksum!

Commands Codeword	Parameters
M6	Set parking mode
Nb	Dismiss parking alarm

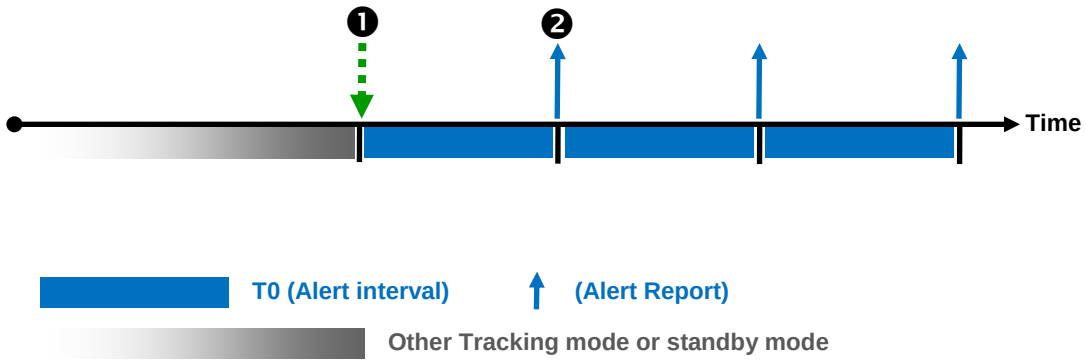
Example 1:

Set TR-203 parking mode with report interval of 3600 seconds

for alert state (T0), report interval of 30 for alarm state (T1), report's traveled distance of 700 meters (T3) and report media (T2) TCP

GSC,011412000010789,M6(T0=3600,T1=30,T2=02,T3=700)*02!

7.1.1 Enter Parking Alert



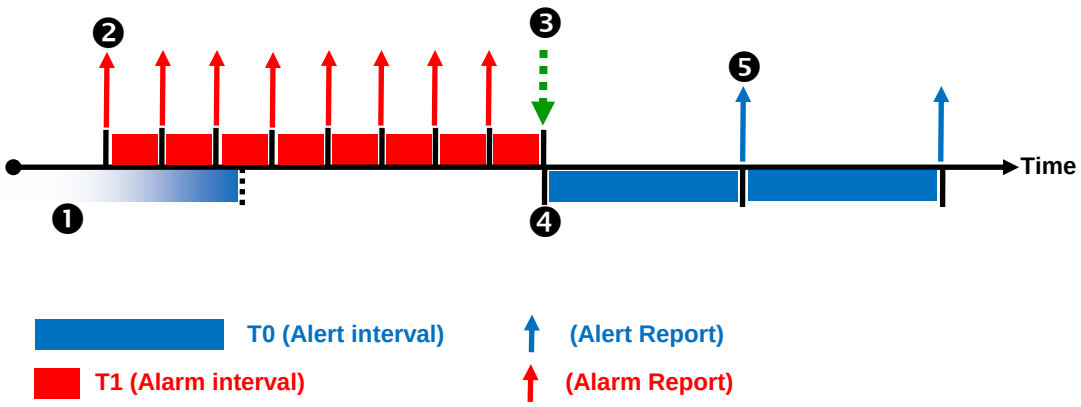
❶	Receive command and then enter parking alert mode.
❷	When TR-203 does not detect motion, it will send "parking alert" report by "Alert interval" time.

Example 1:

Set TR-203 enter parking alert (Send command via SMS or TCP or UDP)

GSC,136639674520921,M6*1C!

7.1.2 Dismiss Parking Alarm



Note:
TR-203 will not switch to parking alert state if it still detects motion after receiving the dismiss command. It will switch to parking alert mode when it does not detect motion.

❶	**Under parking alert mode**
❷	**When TR-203 detects motion, it will enter parking alarm state and send "parking alarm" report.**
❸	**When receive dismiss command, TR-203 will dismiss the parking alarm.**
❹	**Re-start timer for parking alert interval.**
❺	**Parking Alert Report.**

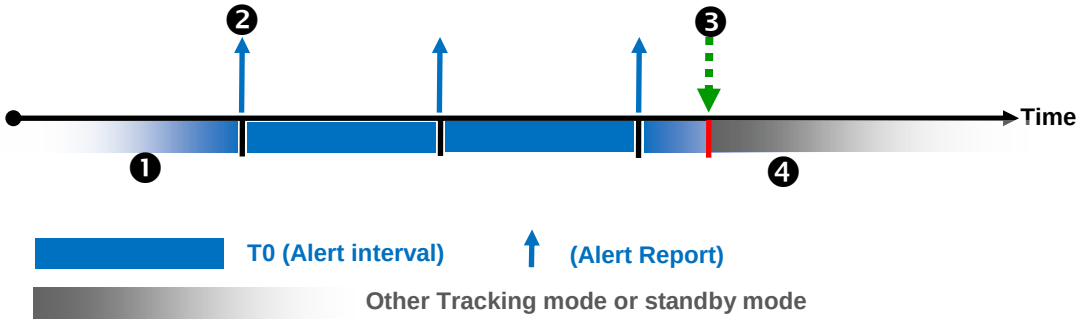
Example 1:

Dismiss TR-203 parking alarm status (Send command via SMS or TCP or UDP)

GSC,136639674520921,Nb*4B!

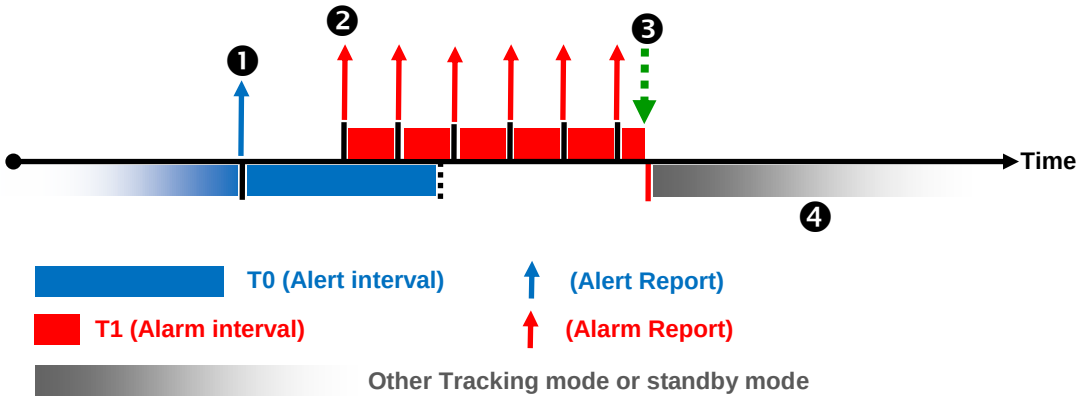
7.1.3 Stop Parking Mode

Under Parking Alert State



❶	Under parking alert state.
❷	Parking alert report.
❸	When receive other tracking or standby commands, the device will enter other tracking or standby mode.
❹	Other Tracking mode or standby mode.

Under Parking Alarm State



❶	Parking alert report.
❷	When TR-203 detects motion, it will enter parking alarm mode and send alarm report by parking alarm interval.
❸	Under parking alarm state, tracker receives other tracking or standby command, the device will enter the other tracking or standby mode.
❹	Other Tracking mode or standby mode.

Example 1:

Stop parking mode and then enter standby mode (Send command via SMS or TCP or UDP)

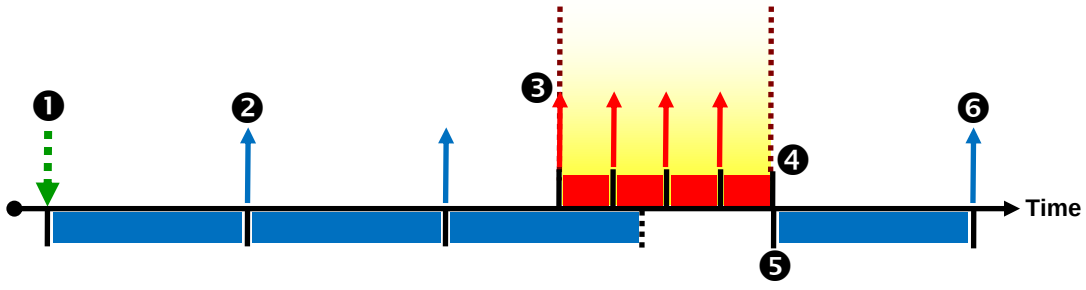
GSC,10339376540375,M7*27!

7.2 Sleeping Mode

In order to save the power of TR-203, you could make TR-203 enter sleeping mode. When TR-203 is under sleeping mode, its GSM module and GPS module will be turned off, the motion sensor will be turned on. TR-203 will also regularly send report to server according to the report Interval in Alert State. When TR-203 senses vibration, it will send alarm report to server according to the report Interval in Alarm State.

You could define the content of report and the report interval of sleeping mode.

The behavior is as following:



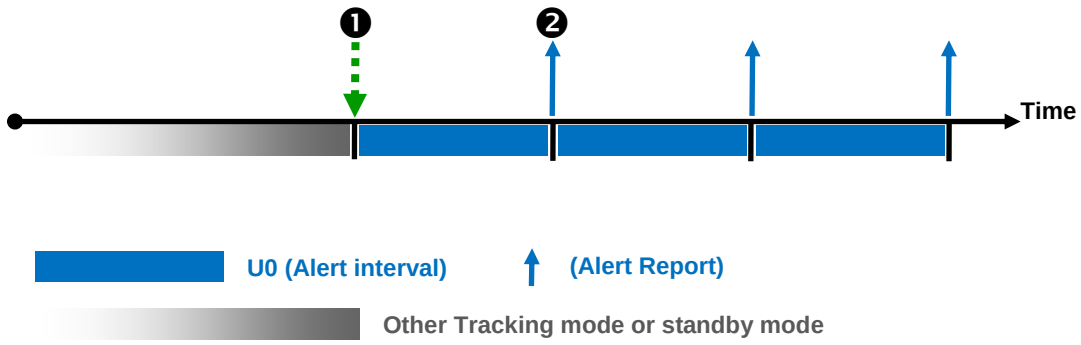
GPS/GSM always be turn off, except alert and alarm report time

❶	Received command and then entering sleeping mode (GPS/GSM will be turn off).
❷	When TR-203 is static, it will send “sleeping alert report” according to “Alert interval time”.
❸	When TR-203 detects motion, it will enter sleeping alarm state (GPS/GSM wake up) and send “sleeping alarm” report.
❹	If TR-203 is not moved, it will return to the sleeping alert state.
❺	Re-start timer for sleeping alert interval.
❻	Sleeping alert report.

The parameters of sleeping mode:

Code word	Parameters	Value	Description
U0	Report interval in alert state	1~4Giga seconds	
U1	Report interval in alarm state	1~4Giga seconds	
U2	Report Media		Please refer to 2.9 Report media

7.2.1 Enter Sleeping Alert



T

❶	Under standby mode or other tracking mode, TR-203 received command and then enter sleeping alert mode (GPS/GSM be turn off).
❷	When TR-203 is static, it will send “sleeping alert” report according to “Alert interval” time.

Command’s format:

GSC,IMEI,M1*Checksum!

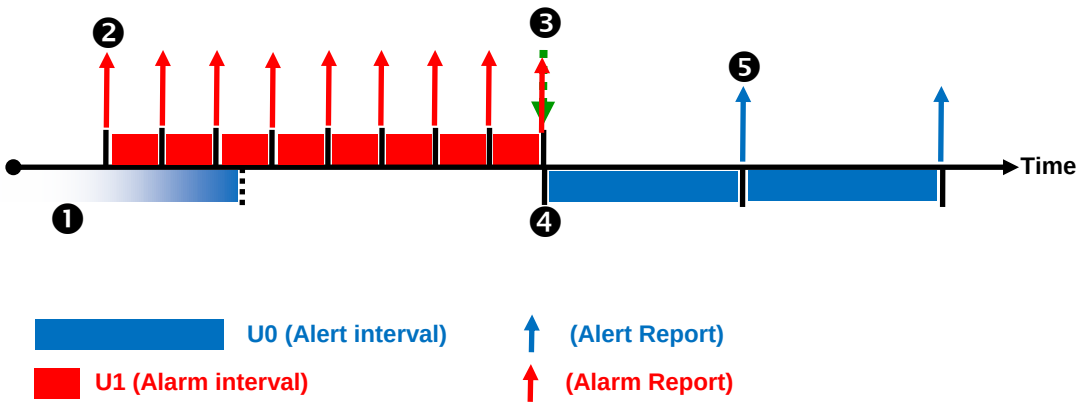
Commands Codeword	Parameters
M1	Set sleeping mode
Nc	Dismiss sleeping alarm

Example 1:

Set TR-203 sleeping mode with report interval of 3600 seconds for alert state (U0), report interval of 30 for alarm state (U1), and report media (U2) TCP

GSC,130158974523157,M1(U0=3600,U1=30,U2=02)*46!

7.2.2 Dismiss Sleeping Alarm



❶	Under sleeping alert state.
❷	When TR-203 detects motion, it will enter sleeping alarm mode and send “sleeping alarm” report.
❸	When the device send alarm report to server and then exchange dismiss command from server, the device will return to the sleeping alert mode.
❹	Re-start timer for sleeping alert interval.
❺	Sleeping Alert Report.

Command’s format:

GSC,IMEI,Nc*Checksum!

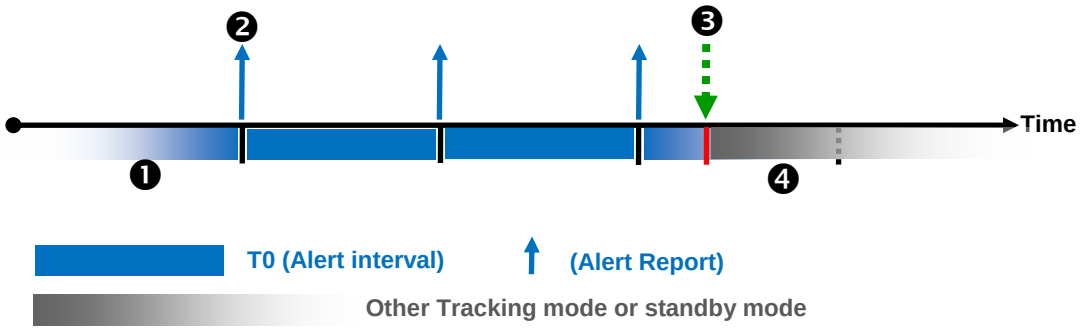
Example 1:

Send dismiss sleeping alarm command to TR-203

GSC,130158974523157,M1(U0=3600,U1=30,U2=02)*46!

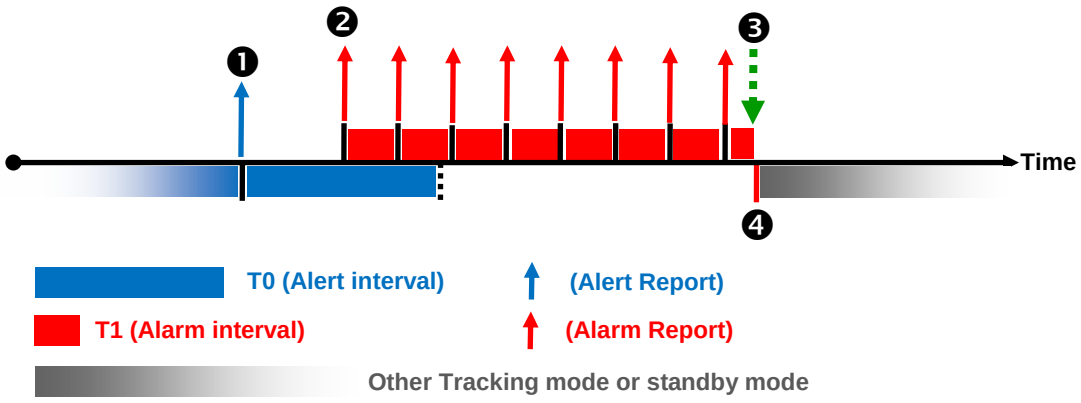
7.2.3 Stop Sleeping Mode

Under Sleeping Alert State



❶	Under sleeping alert state.
❷	Sleeping alert report.
❸	When receive other tracking or standby command, the device will enter other tracking or standby mode.
❹	Other Tracking mode or standby mode.

Under Sleeping Alarm State



❶	Sleeping alert report.
❷	When TR-203 detects motion, it will enter sleeping alarm mode and send alarm report.
❸	Under sleeping alarm state, when received other tracking or standby commands, the device will enter to the other tracking or standby mode.
❹	Other tracking mode or standby mode.

Example 1:

Stop sleeping mode and then enter standby mode (Send command via SMS or TCP or UDP)

GSC,10339376540375,M7*27!

Example 2:

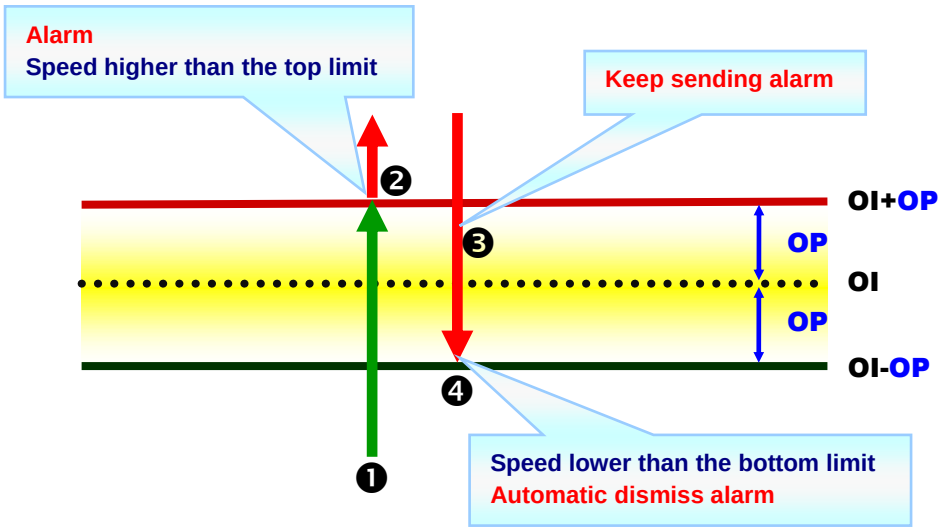
Stop sleeping mode and then enter periodic mode (Send command via SMS or TCP or UDP)

GSC,10339376540375,M2*22!

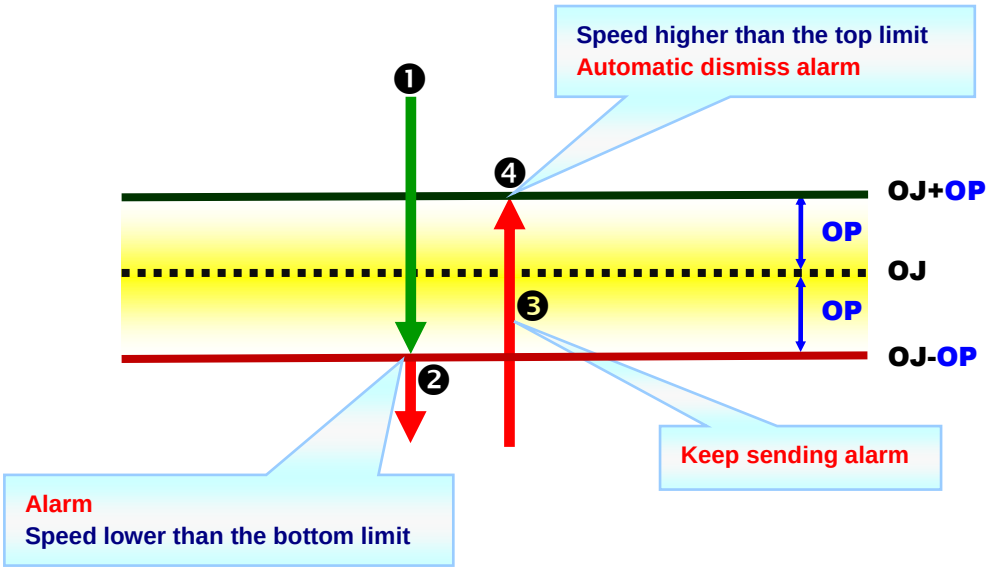
Commands Codeword	Parameters
M2	Set periodic mode

7.3 Speed Limits

High Speed Limit



Low Speed Limit



The parameters of speed alarm:

Code word	Parameters	Value
OI	Upper limit of speed alarm	u8, in Km/H 0 ~ 255 Km/H 0=disable
OJ	Lower limit of speed alarm	u8, in Km/H 0 ~ 255 Km/H 0=disable
OL	Report media for speed alarm	Please refer to 2.9 Report media
OP	Hysteresis of speed alarm	u8, in Km/H 0 ~ 255 Km/H

7.3.1 Enable Speed Limit Alert

Example 1:

Set upper limit of speed alert (Send command via SMS or TCP or UDP)

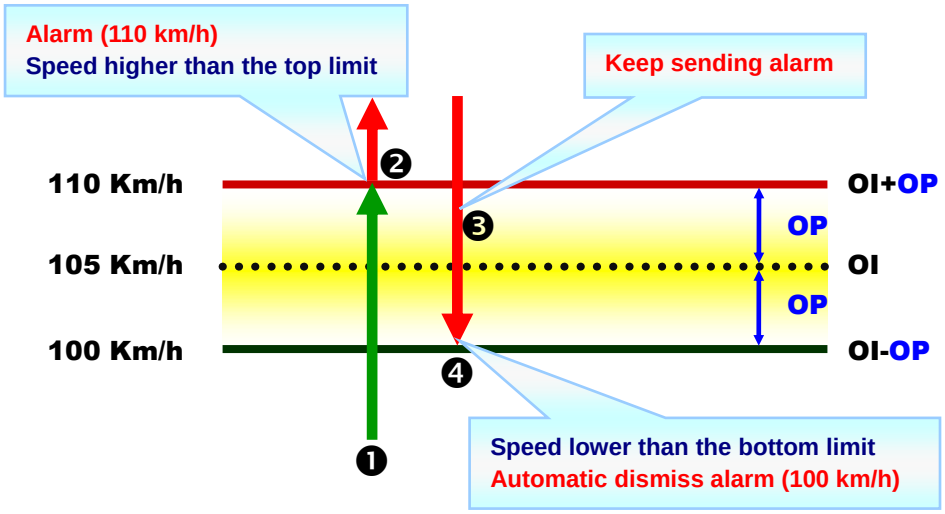
GSS,10339376540375,3,0,OI=105,OP=5,OL=02*6A!

Command Type	Description
GSS	Write setting to device

Code word	Parameters	Value	Description
OI	Upper limit of speed alarm	105	Set upper limit: 105 Km/h
OL	Report media for speed alarm	02	Report alarm messages via TCP. Alarm messages

			format: Format 0
OP	Hysteresis of speed alarm	5	

The behavior mode is as following:



Example 2:

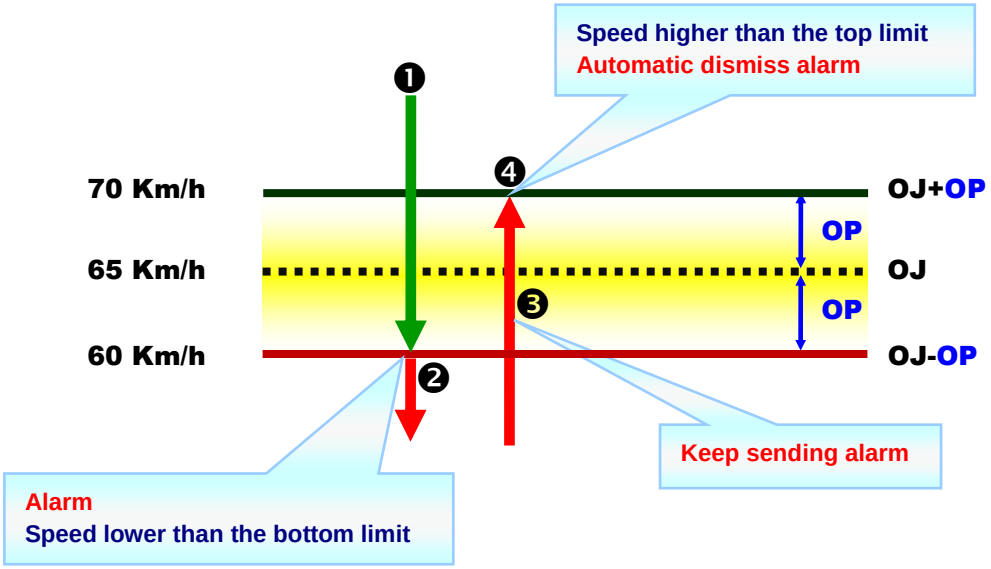
Set lower limit of speed alert (Send command via SMS or TCP or UDP)

GSS,10339376540375,3,0,OJ=65,OP=5,OL=02,*5E!

Command Type	Description
GSS	Write setting to device

Code word	Parameters	Value	Description
OJ	Upper limit of speed alarm	65	Set lower limit: 65 Km/h
OL	Report media for speed alarm	02	Report alarm messages via TCP. Alarm messages format: Format 0
OP	Hysteresis of speed alarm	5	

The behavior mode is as following:



7.3.2 Disable Speed Limit Alert

Example 1:

Disable upper limit of speed alert (Send command via SMS or TCP or UDP)

GSS,10339376540375,3,0,OI=0*48!

Command Type	Description
GSS	Write setting to device

Code word	Parameters	Value	Description
OI	Upper limit of speed alarm	0	0=disable

Example 2:

Disable lower limit of speed alert (Send command via SMS or TCP or UDP)

GSS,10339376540375,3,0,OJ=0*46!

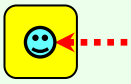
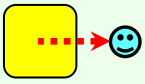
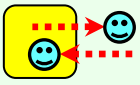
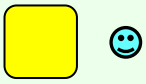
Command Type	Description
GSS	Write setting to device

Code word	Parameters	Value	Description
OI	Lower limit of speed alarm	0	0=disable

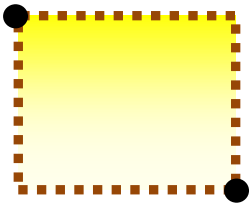
7.4 Geo-fence

Geo-fence is for setting a rectangular area as permissible area or restricted area. When TR-203 gets out the permissible area or goes in to the restricted area, TR-203 will send its location to the preset mobile phone number via SMS or to server via TCP, or UDP.

The behavior is as following:

Alert type of Geo-fence				
1	2	3	4	5
Get in area	Get out of area	Cross over the boundary	Stay in area	Stay out of area
				

(upper_left_Lon,upper_left_Lat)



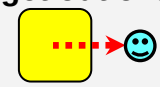
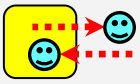
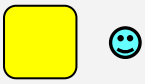
(right_bottom_Lon,right_bottom_Lat)

7.4.1 Setup Geo-fence

Command's format for set Geo-fence:

GSG,IMEI,T,S,1=(type,upper_left_Lon,upper_left_Lat,right_bottom_Lon,right_bottom_Lat[,gxxx][,StartTime,EndTime,weekday]),2=(…),3=(…),…*Checksum!

Format	Value	Note

GSG	”GSG” : Write geo-fence parameter command	Command head
IMEI	(The IMEI number)	GSM device ID
T	‘0’ : Middle of message ‘1’ : Start of message ‘2’ : End of message ‘3’ : Start and End of message, i.e., only one packet for message	Message packet control
S	‘0’,’1’,’2’,’3’,…,’9’,’10’,’11’,…,’99’	Sequence number
type	1=get in area  2=get out of area  3=cross over the boundary  4=stay in area  5=stay out of area 	Alert type of Geo-fence
upper_left_Lon, upper_left_Lat	upper_left_Lon =Lon upper_left_Lat =Lat Lon: (+ or -)ddddddddd unit: 0.000001 degree Lat: (+ or -)ddddddddd unit: 0.000001 degree	The top left coordinates of specified area
right_bottom_Lon, right_bottom_Lat	right_bottom_Lon =Lon right_bottom_Lat =Lat Lon: (+ or -)ddddddddd	The right bottom coordinates of specified

	unit: 0.000001 degree Lat: (+ or -)dddddddd unit: 0.000001 degree Example: 12129141 12129141 x0.000001 =12.129141degree	area
gxxx	g1~g254	Optional field for describing this area belong to area group xxx
Start Time	0~86400 sec Example: 00:00:01 = 1 23:59:59 = 86399	Optional field for specifying time frame of this geo-fence area. Start Time and end Time are in seconds.
End Time	0~86400 sec Example: 00:00:01 = 1 23:59:59 = 86399	Optional field for specifying the frame of this geo-fence area. Start Time and end Time are in seconds.
weekday	bit0=Sunday bit1=Monday	Weekday is in hex-digit

	bit2=Tuesday bit3=Wednesday bit4=Thursday bit5=Friday bit6=Saturday	**format which specifies applicable day in a week, where bit 0 represents Sunday, bit1 represents Monday, etc.**
*****	*****	**End of field**
Checksum	**The checksum value is derived by the same method of NMEA standard. It is calculated by 'exclusive OR' the 8 data bits of each character before "*" in the sentence, but excluding "*". The hexadecimal value of the most significant and least significant 4 bits of the result are converted to two ASCII characters (0-9, A-F) for transmission. The most significant character is transmitted first.**	
!	**!**	**Message delimiter**

You can set up to 512 sets of geo-fence areas.

Example 1:

Set up 152nd ~157th sets of geo-fence areas

GSG,130738902846156,1,0,152=(2,121752441,24756536,121752924,24755863),153=(2,121743236,24748254,12174845,24744844)*78!

GSG,130738902846156,0,1,154=(1,121758267,24786053,121760745,24784397),155=(3,120653272,24144678,120656791,2414037)*73!

GSG,130738902846156,2,2,156=(1,120680072,24161526,120680866,24160439),157=(2,120675888,2410602,120722923,2406402)*45!

Example 2:

Set up 1st ~10th sets of Geo-fence areas

GSG,132763902812736,1,0,1=(1,121305521,24999088,121308246,24997649,g2,00,86400,7f),2=(1,121302452,25004397,121305285,25002842,g2)*0A!

GSG,132763902812736,0,1,3=(1,121299427,25014101,121302345,25012545,,g2),4=(1,121301723,25022909,121305306,25021101,g2)*63!

GSG,132763902812736,0,2,5=(1,12146435,25009979,121466711,25008423,g3),6=(1,121471624,25012487,121474736,25010756,g3)*74!

GSG,132763902812736,0,3,7=(1,121479371,25016629,12148068,25015657,g4),8=(1,121547295,25043931,121548105,25043547,g4)*7C!

GSG,132763902812736,2,4,9=(1,121536984,25049913,121538894,25048514,g2),10=(1,121539195,25055901,121540675,25054773,g2)*78!

Command's format for read Geo-fence:

GSC,L3(1~512)*Checksum!

Commands Codeword	Parameters
L3	Read Geo-fence

Example 1:

Ask TR-203 report the parameters of 1st ~10th Geo-fence area

The method of marking 1st ~10th geo-fence areas is to write 1~10 in the braces after L3, like L3 (1-10)

GSC,132763902812736,L3(1-10)*04!

Report format for read Geo-fence:

GSg,IMEI,T,S,1=(type,upper_left_Lon,upper_left_Lat,right_bottom_Lon,right_bottom_Lat[,gxxx][,StartTime,EndTime,weekday]),2=(…),3=(…),…*Checksum!

About the parameters of reading geo-fence, please refer to the parameters of setting geo-fence.

Example 1:

Report 1~10 coordinates of Geo-fence

GSg,132763902812736,1,0,1=(1,121305521,24999088,121308246,24997649,g2,00,86400,7F),2=(1,121302452,25004397,121305285,25002842,g2,00,86400,7F)*6D!

GSg,132763902812736,0,1,3=(1,121299427,25014101,121302345,25012545,g2,00,86400,7F),4=(1,121301723,25022909,121305306,25021101,g2,00,86400, 7F)*4F!

GSg,132763902812736,0,2,5=(1,12146435,25009979,121466711,25008423,g3,00,86400,02),6=(1,121471624,25012487,121474736,25010756,g3,00,86400,02)*54!

GSg,132763902812736,0,3,7=(1,121479371,25016629,12148068,25015657,g3,00,86400,02),8=(1,121547295,25043931,121548105,

25043547,g3,00,86400,02)*5C!

GSg,132763902812736,2,4,9=(1,121536984,25049913,121538894,25048514,g4,00,86400,04),10=(1,121539195,25055901,121540675,25054773,g4,00,86400,04)*58!

7.4.2 Enter Geo-fence Alert

Geo-fence is independent from the other general tracking modes. Sending geo-fence command to TR-203 will not stop the other general tracking modes. TR-203 could execute general tracking mode and geo-fence at the same time
In geo-fence mode, it requires extra to turn on GPS on.
There are two ways for turning on GPS, one is to keep GPS always on by parameter C0, and the other is to use timer. Keep GPS always on will make the power run up within 10 hours.
The recommended method of making GPS on is to use timer.
While using timer, you could set the report media (X4 or Y4 or Z4) as 80, then TR-203 will turn on the GPS.

Code word	Parameters	Value	Description
C0	GPS always on	1/0	Applicable to all modes except Sleeping and Off mode
X0	Start time	u32, in seconds	
X1	End time	u32, in seconds	
X2	Report interval	u16, in seconds	
X3	Weekday mask	u8, xx(hex digits)	
X4	Report Media		Please refer to 2.9 Report media

Command's format for enable Geo-fence:

GSC,N6*Checksum!

Commands Codeword	Parameters
N6	Enable Geo-fence

Example 1:

Asking TR-203 enter geo-fence alert state and make GPS

always on (C0=1)
GSC, 135097652783615,N6(C0=1)*47!

Example 2:

Asking TR-203 enter geo-fence alert state and use timer 1: Start Time: 12:00AM (X0=0), End Time:11:59PM(X1=86399), Report Interval=0 (X2=0), Weekday: Sunday~ Saturday (X3=7f), Report Media: GPS ON(X4=80)

GSC,011412000010789,N6(X0=0,X1=86399,X2=0,X3=7f,X4=82)*29!

7.4.3 Dismiss Geo-fence Alarm

Command's format for dismiss Geo-fence alarm status:
GSC,Ne*Checksum!

Commands Codeword	Parameters
Ne	Dismiss Geo-fence Alarm

Example 1:

Dismiss TR-203 geo-fence alarm status

GSC,135097652783615,Ne*4A!

7.4.4 Stop Geo-fence Alert

Command's format for disable Geo-fence:
GSC,N7*Checksum!

Commands Codeword	Parameters

N7	Disable Geo-fence

Example 1:

Asking TR-203 disable geo-fence

GSC,135097652783615,N7*18!

8 Emergency

When SOS (Emergency) button is long pressed, TR-203 will send its location information to 6 sets of phone numbers by SMS or send its location information to server via TCP, and UDP.

The parameters emergency:

Code word	Parameters	Value	Description
G0	SMS Phone number 1	char(20)	
G1	SMS Phone number 2	char(20)	
G2	SMS Phone number 3	char(20)	
G3	SMS Phone number 4	char(20)	
G4	SMS Phone number 5	char(20)	
G5	SMS Phone number 6	char(20)	
H0	Report media		Please refer to 2.9 Report media
H1	Report number	u16	0 ~ 65535 SMS→ 0 or 1=1 SOS alarm report;2~65535=2~65535 SOS alarm report GPRS→ 0 =1 SOS alarm report;1~65535= continue sending SOS alarm report till receive stop command
H2	report interval	0~3600 seconds	

10 Timer

There are four timers for setting specified time report.

For Timer 0, when there is a new event (report), it will re-start to count down the report interval again.
Timer 1 ~ 3 will not count down the report interval when there is a new event.

10.1 Timer 0

The following parameters must be set for configuration or sending those parameters by other action command:

Code word	Parameters	Value	Description
W0	Start time	0~86400	
W1	End time	0~86400	
W2	Report interval	1~65535	
W3	Weekday mask	00~7f	u8, xx(hex digits)
W4	Report Media		Please refer to 2.9 Report media

10.2 Timer 1~3

The following parameters must be set for configuration or sending those parameters by other action command:
(“X”:Timer 1, “Y”:Timer 2, “Z”:Timer 3,)

Code word	Parameters	Value	Description
X0	Start time	0~86400	
X1	End time	0~86400	
X2	Report interval	1~65535	
X3	Weekday mask	00~7f	u8, xx(hex digits)
X4	Report Media		Please refer to 2.9 Report media
Y0	Start time	0~86400	
Y1	End time	0~86400	
Y2	Report interval	1~65535	
Y3	Weekday mask	00~7f	u8, xx(hex digits)
Y4	Report Media		Please refer to 2.9 Report media
Z0	Start time	0~86400	
Z1	End time	0~86400	
Z2	Report interval	1~65535	
Z3	Weekday mask	00~7f	u8, xx(hex digits)
Z4	Report Media		Please refer to 2.9 Report media

11 Report Messages

There are two types of message's report format, "format 0" and "format 1". Defined as follows:

11.1 Format 0 of Report Messages

Command's format for set format 0 of report messages:

GSS,IMEI,T,S,O3=y1y2y3….yn,*Checksum!

y1,y2,y3… are their respective parameters of report messages. (Refer to "2.6. Parameters of Report Messages" for details of parameters' definition)

Parameter's Codeword	Description
O3	Report format 0

Example 1:

Set TR-203 format of report messages for format 0 (Send command via SMS or TCP or UDP)

GSS,135785412249986,3,0,O3=ORPZAB72GHLMN*U!*38!

(Refer to "2.6. Parameters of Report Messages" for details of parameters' definition)

Report format for format 0 of report messages (report messages via SMS or TCP or UDP)

GSr,IMEI,Device_Mode,Report_Type,Alarm_Status,Geofence_status,GPS_Fix,UTC_Date,UTC_Time,Longitude,Latitude,Altitude,Speed,Heading,Number_of_Satellites,HDOP,Battery_capacity*checksum!

Command's format for read format of format 0:

GSC,IMEI,L1(O3)*Checksum!

Commands Codeword	Parameters
L1	Read Configure

Example 1:

Ask TR-203 report "format of format 0" (Send command via SMS or TCP or UDP)

GSC,136647890362718,3,0,L1(O3)*6D!

TR-203 received "GSC,IMEI,L1(O3)*Checksum!" and report as below (report via SMS or TCP or UDP)

GSs,136647890362718,3,0,O3=ORPZAB72GHLMN*U!*13!

11.2 Format 1 of Report Messages

Command's format for set format 1 of report messages:

GSS,IMEI,T,S,ON=y1y2y3….yn,*Checksum!

y1,y2,y3… are their respective parameters of report messages. (Refer to "2.6. Parameters of Report Messages" for details of

parameters' definition)

Parameter's Codeword	Description
ON	Report format 1

Example 1:

Set TR-203 format of report message for format 1 (Send command via SMS or TCP or UDP)

GSS,131826789036289,3,0,ON=PAN*U!*46!

(Refer to "2.6. Parameters of Report Messages" for details of parameters' definition)

Report format for format 0 of report messages (report messages via SMS or TCP or UDP)

GSh, IMEI,Alarm_Status,GPS_Fix,Battery_capacity*checksum!

Command's format for read format of format 1:

GSC,IMEI,L1(ON)*Checksum!

Commands Codeword	Parameters
L1	Read Configure

Example 2:

Ask TR-203 report "format of format 1" (Send command via SMS or TCP or UDP)

GSC,131826789036289,3,0,L1(ON)*16!

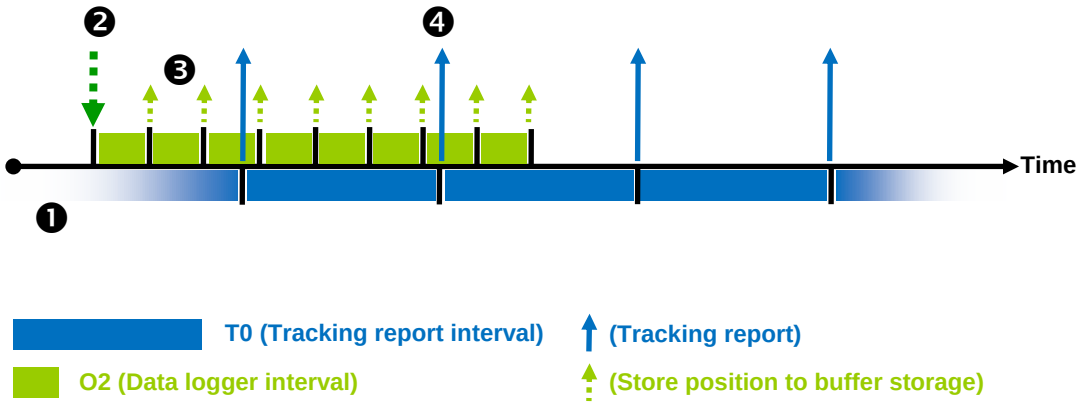
TR-203 receives "GSC,IMEI,L1(ON)*Checksum!" and report as below (report via SMS or TCP or UDP)

GSs,131826789036289,3,0,ON= PAN*U!*46!

12 Data Log

The function of Data Log is for you to record the location information of TR-203 based on the time interval or traveled distance or the combination of time interval and distance. After recording the location information, you could connect TR-203 to PC by USB cable for downloading the data log.

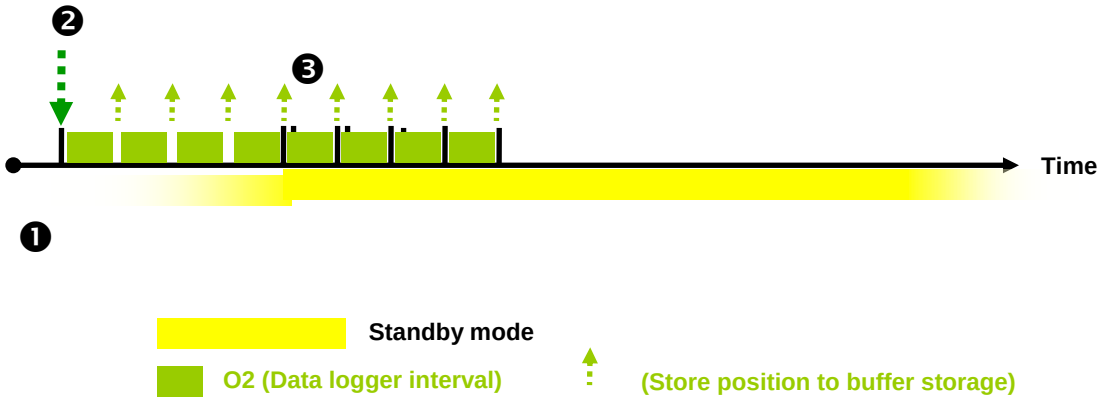
If you want TR-203 to store position according to traveled distance, you have to extra make GPS on. Please refer to "Chapter 4 GPS."



❶	Under tracking report state
❷	When device receives "N8" command and then enable data logger function.
❸	Store position according to data logger interval.
❹	Tracking report.

12.1 Set data logger

Under standby mode to store position according to data logger interval



❶	Under tracking report state
❷	When device received “N8” command and then enable data logger function.
❸	Store position in accordance with data logger interval.

You have to set the interval for storing location information by configuring the parameter O2 or setting it by other action command.

Code word	Parameters	Value	Description
O2	Data logger interval	u16, in seconds	0 ~ 65535 0=disable

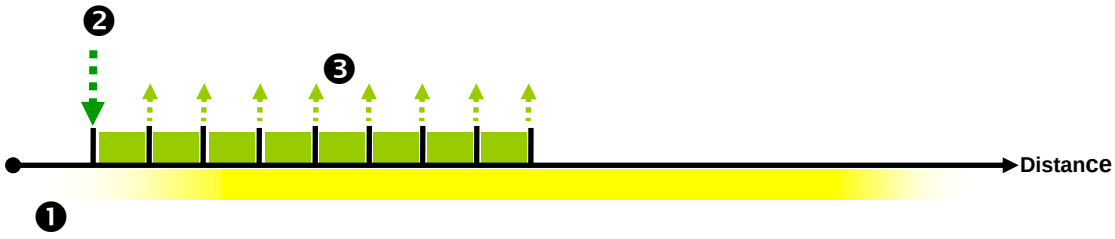
Command’s format for enable data logger:

GSC,IMEI,N8(O2)*Checksum!

Commands Codeword	Parameters
N8	Enable Data logger

Under standby mode to store position according to data logger distance

If you want TR-203 to store position according to traveled distance, you have to extra make GPS on. Please refer to "Chapter 4 GPS."



Standby mode

OH (Data logger distance)

(Store position to buffer storage)

❶	Under tracking report state
❷	When device received "N8" command and then enable data logger function.
❸	Store position in accordance with data logger distance.

You have to set the traveled distance for storing location information by configuring the parameter OH or setting it by other action command.

Code word	Parameters	Value	Description
OH	Data logger distance	u32, in meters	0 ~ 4Giga 0=disable

Command's format for enable data logger:

GSC,IMEI,N8(OH)*Checksum!

Commands Codeword	Parameters
N8	Enable Data logger

12.2 Download data of data logger

After recording the location information, you could connect TR-203 to PC by USB cable for downloading the data log.
And then please send "LB" command to device; device would start to send the logged data to PC.
Below please find the binary format of the logged data.

UTC	latitude	longitude	altitude	speed	Fix Status & satellite number	heading	HDOP	Battery Capacity
second	degree* 1,000,000	degree* 1,000,000	meter	0.01 km/hr	fix status and satellite number	2 degree	0.1	Percent
4 bytes	4 bytes	4 bytes	2 bytes	2 bytes	1 byte	1 byte	1 byte	1 byte

Fix Status & satellite number:

Fix Status	satellite number
2 bits	6 bits

Command's format for downloading data from data logger:

GSC,IMEI,LB*Checksum!

Commands Codeword	Parameters
LB	Download data from data logger

12.3 Delete data of data logger

After downloading the data from the device, you could delete the data in the flash of the device by sending the command “LC”.

Command’s format for deleting data of data logger:

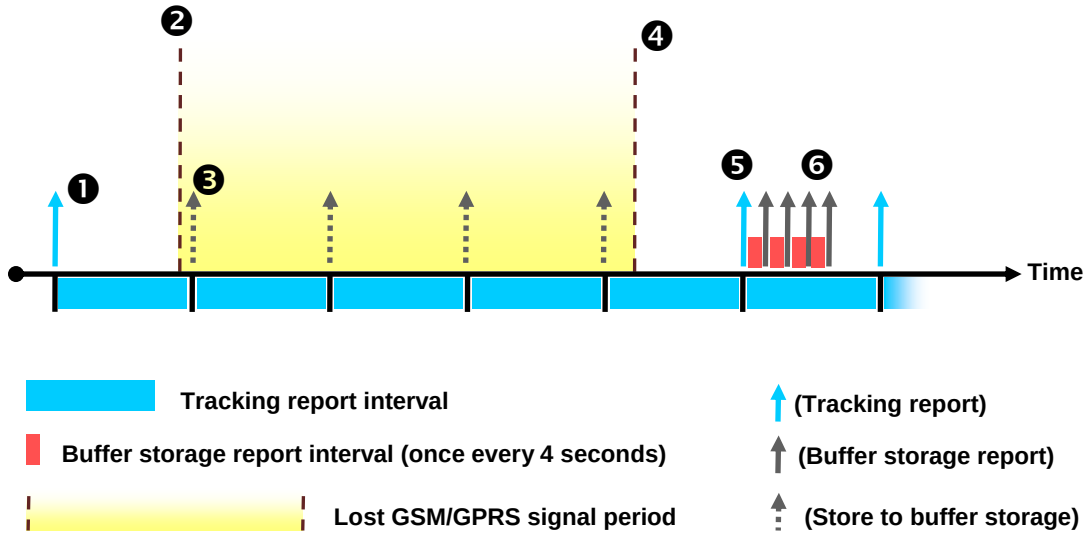
GSC,IMEI,LC*Checksum!

Commands Codeword	Parameters
LC	Delete data of data logger

13 Buffer Storage

When TR-203 is carried to the areas without GSM/GPRS signal coverage, TR-203 could not send its location reports to server. In order not to lose the location report, TR-203 will save the location reports during the periods without GSM/GPRS signal to buffer storage. When TR-203 is carried to the areas with GSM/GPRS signal, it will send the location reports in the buffer storage to server. TR-203 could save up to 8000 pieces of location reports to buffer storage.

The behavior mode is as following:



❶	Tracking report
❷	Enter area without GSM/GPRS signal coverage.
❸	Save location report to buffer storage
❹	Enter area with GSM/GPRS signal
❺	Send periodic report
❻	Send the location report in the buffer storage

The parameter of enable data buffer function is OG.
You could set OG by configuration or sending OG by the other action commands:

Code word	Parameters	Value	Description
OG	Enable/ disable data buffer function	1/0	0=disable 1=enable

14 Cell ID

GSM Cell ID is assisted information to get device location. When TR-203 does not get GPS fix, you could enable TR-203 to report the Cell ID. Then the report format of TR-203 will automatically switch from format 0 to format 2 when TR-203 does not get GPS fix. Report format 1 is not affected.

The parameter of enabling TR-203 to report the Cell ID is O8.

Code word	Parameters	Value	Description
O8	**Enable/ disable TR-203 to report “cell ID” if it does not get GPS fix**	**1/0**	**0=disable** **1=enable**

The report format (format 2) of cell ID is

GSi,IMEI,Device_Mode,Report_Type,Alarm_Status,Battery_capacity,
“MCC_1,MNC_1,LAC_1,CID_1,$BSIC_1$,$RSSI_1$”, “MCC_2,MNC_2,LAC_2,CID_2,$BSIC_2$,$RSSI_2$”,
“MCC_3,MNC_3,LAC_3,CID_3,$BSIC_3$,$RSSI_3$”,…*checksum!

MCC=mobile country code, 3 digits
MNC=mobile network code, 2 or 3 digits
LAC=location area code, 4 hexadecimal digits.
CID=cell identifier, 4 hexadecimal digits.
BSIC=base station identity code, 1 digit or 2 digits.
RSSI=received signal strength indicator, 1 digit or 2 digits.

The number of set of cell information depends on GSM network environment. The maximum number is 5.

15 Simple Command

You could send simple commands by SMS to TR-203 to activate the following functions.

Note:
Before sending the simple commands, you still have to set the concerning parameters.

Note:
To enable the simple command, please make the parameter A5=1.
For example, GSS, 011412000010789,3,1,A5=1*2d!

Simple Command	Activated action	Equal Command
“rs”	Re-start TR-203	LH
“ir”	Immediate report	N1
“pr”	Periodic Mode	M2
“ol”	On-line Mode	M3
“pk”	Parking Mode	M6
“sp”	Standby Mode	M7