



Telit GNSS Software Extensions User Guide

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TELIT
TECHNICAL
DOCUMENTATION

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APPLICABILITY TABLE

PRODUCTS

- ■ SL869-V2
- ■ SL869L-V2
- ■ SL871
- ■ SL871L
- ■ SE868-A
- ■ SE868K3-A
- ■ SE868K3-AL
- ■ SE878K3-A
- ■ SC872-A
- ■ SC874-A
- ■ SE868-V3
- ■ SE873
- ■ SE873Q5
- ■ SE876Q5-A
- ■ SL869-V3
- ■ SL869-ADR

SOFTWARE

- ■ V13-2.3.2-STD-5.1.14
- ■ V26-1.0.0-STD-5.7.11P4 and subsequent versions
- ■ V33-1.0.6-STD-4.5.10
- ■ V33-1.0.4-CLDR-4.7.10

CONTENTS

NOTICES	2
COPYRIGHTS	2
COMPUTER SOFTWARE COPYRIGHTS	2
USAGE AND DISCLOSURE RESTRICTIONS	3
APPLICABILITY TABLE	4
CONTENTS	5
TABLE LIST	7
1. INTRODUCTION	8
1.1. Scope	8
1.2. Audience.....	8
1.3. Contact Information, Support	8
1.4. Text Conventions.....	9
1.5. Related Documents	10
2. COMMUNICATION INTERFACE	11
2.1. Serial Communication.....	11
2.2. Telit Proprietary NMEA Messages Format	11
2.2.1. PTWS Messages Applicability Table.....	13
3. TELIT NMEA MESSAGES	14
3.1. PTWSVER - Telit Software Version Message.....	14
3.1.1. Input Message	14
3.1.2. Output Message	14
3.2. PTWSLNA – LNA Message.....	15
3.2.1. Input Message	15
3.2.2. Output Message	16
3.3. PTWSMODE – MODE Messages.....	17
3.3.1. CONST Message Type.....	17
3.4. PTWSRLM – RLM Messages	21
3.4.1. Input Message	21
3.4.2. Output Message	23
3.5. PTWSEPE – EPE Messages.....	24
3.5.1. Input Message	24
3.5.2. Output Message	25
3.6. PTWSANT – Antenna Status Messages.....	26

3.6.1.	Input Message	26
3.6.2.	Output Message	28
3.7.	PTWSFENCE – Geofencing Messages	30
3.7.1.	CONFIG Message Type	30
3.7.2.	STATUS Message Type	33
4.	TELIT LEGACY NMEA MESSAGES	37
4.1.	VERSION – Telit Software Version Message.....	37
4.1.1.	Input Message	37
4.1.2.	Output Message	37
4.2.	ANT – Antenna Status Message.....	37
4.2.1.	Input Message	37
4.2.2.	Output Message	38
4.3.	JAM – Jamming Detection Status Message.....	38
4.3.1.	Input Message	38
4.3.2.	Output Message	39
4.4.	LNA – LNA Gain Message.....	39
4.4.1.	Input Messages	40
4.4.2.	Output Message	40
4.5.	ODO – ODO Messages	41
4.5.1.	Input Messages	41
4.5.2.	Output Message	42
5.	GLOSSARY AND ACRONYMS	44
6.	DOCUMENT HISTORY	45

TABLE LIST

Table 1	Telit proprietary NMEA Messages	12
Table 2	Telit Legacy NMEA Messages	12
Table 3	PTWS Messages Applicability Table.....	13
Table 4	PTWSVER – Telit Software Version Input Message Structure	14
Table 5	PTWSVER – Telit Software Version Output Message Structure	15
Table 6	PTWSLNA – Telit LNA Input Message Structure	15
Table 7	PTWSMODE,CONST – Telit MODE,CONST Input Message Structure	18
Table 8	PTWSRLM – Telit RLM Message Structure	22
Table 9	PTWSRLM – Telit RLM Query Message Structure	23
Table 10	PTWSEPE – Telit EPE Input Message Structure	24
Table 11	PTWSEPE – Telit EPE Reporting Output Message Structure	26
Table 12	PTWSANT – Telit Antenna Status Input Message Structure	27
Table 13	PTWSANT – Telit Antenna Status Reporting Message Structure	28
Table 14	PTWSANT – Telit Antenna Status Reporting Mode Configuration Message Structure	29
Table 15	PTWSFENCE,CONFIG,SET – Set Fence Parameters	31
Table 16	PTWSFENCE,CONFIG,GET – Query Fence Parameters.....	31
Table 17	PTWSFENCE,STATUS,SET – Enable/Disable Fence	33
Table 18	PTWSFENCE,STATUS,GET – Poll Fence Status	34
Table 19	PTWSFENCE,STATUS – Poll Fence Status Response.....	35
Table 20	VERSION – Telit Software Version Output Message Structure	37
Table 21	ANT – Antenna Status Output Message Structure	38
Table 22	JAM – Jamming Detection Status Output Message Structure	39
Table 23	LNA – LNA Gain Input Message Structure.....	40
Table 24	LNA – LNA Gain Output Message Structure	41
Table 25	ODO – ODO Output Message Structure	43

1. INTRODUCTION

1.1. Scope

This document describes the Telit Software Extensions, i.e. custom commands belonging to the Telit proprietary NMEA interface.

The interface described in this specification applies to default or stock firmware for GNSS modules within the V13, V26, and V33 firmware families that use flash program memory.

1.2. Audience

This document is intended for public distribution to potential customers who are evaluating a GNSS module from the above firmware family and which is listed in the Applicability Table. It can also be used by customers who are developing application software for a Host Processor contained within their product that incorporates one of the listed modules.

1.3. Contact Information, Support

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
- TS-SRD@telit.com (for Short Range Devices)

Alternatively, use:

<https://www.telit.com/contact-us>

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

<http://www.telit.com>

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4. Text Conventions



Danger – This information **MUST** be followed or catastrophic equipment failure or bodily injury may occur.



Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.



Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.5. Related Documents

- [1] NMEA 0183, Version 3.00, National Marine Electronics Association
- [2] Interface Specification IS-GPS-200G, 2012-09-05
- [3] Galileo-OS-SIS-ICD
- [4] Galileo-SAR-SDD

2. COMMUNICATION INTERFACE

The serial communication interface between the GNSS receiver module and the host processor is based on the NMEA-0183 protocol standard specified by the National Marine Electronics Association (NMEA). This is an ASCII-based standard that is widely used in the GPS industry for serial communication with GNSS receivers [1].



For a full comprehensive description of NMEA 0183 standard, please refer to [1].

2.1. Serial Communication

Serial communication with the GNSS receiver is primarily conducted over the serial port. There is no hardware flow control. The default port settings are:

- 9600 Baud
- Eight data bits
- No parity bits
- One stop bit

Note: Some Firmware versions may have different default values than those given above.

2.2. Telit Proprietary NMEA Messages Format

In addition to the standard NMEA output messages as well as vendor's proprietary NMEA messages, Telit GNSS software supports a set of proprietary NMEA messages, that comply with NMEA 0183, to further enhance the control of GNSS receivers and expose more functionalities.

Telit proprietary NMEA messages start with the "\$" character, which is then followed by the proprietary address field string that uses the Manufacturer's Mnemonic Code registered by Telit with the NMEA, which is "TWS". Thus, the Telit proprietary address field is of the form:

`$PTWSxxx[x...]`

Where, xxx.. represents an alphanumeric message identifier having a minimum of three characters and being all upper case.

In Telit Legacy NMEA Messages, available for V13 firmware family only and now superseded by the new Telit NMEA message set, the message identifier is separated from Manufacturer's Mnemonic Code by a comma, for example, \$PTWS,VERSION.

Checksum fields are included in all Telit proprietary NMEA output messages, and letters representing hexadecimal digits are upper-case. Checksum fields are optional for Telit proprietary NMEA input commands.

The messages end with Carriage Return (CR) and Line Feed (LF) characters.

Following is the list of Telit NMEA messages that are supported with the applicable software.

Proprietary Address Field	Description
\$PTWSVER	Telit software version message
\$PTWSLNA	LNA Gain message
\$PTWSMODE	Operational setting message
\$PTWSRLM	Return Link Message
\$PTWSEPE	Estimated Position Error
\$PTWSANT	Antenna status message
\$PTWSFENCE	Geofence Management message

Table 1 Telit proprietary NMEA Messages

Proprietary Address Field	Message Identifier	Description
\$PTWS	VERSION	Telit software version message
	ANT	Antenna status message
	JAM	Jamming detection status
	LNA	LNA Gain message
	ODO	Odometer message

Table 2 Telit Legacy NMEA Messages

2.2.1. PTWS Messages Applicability Table

		\$PTWSVER	\$PTWSLNA	\$PTWSMODE	\$PTWSRLM	\$PTWSEPE	\$PTWSANT	\$PTWSFENCE	LEGACY				
									\$PTWS,VERSION	\$PTWS,ANT	\$PTWS,JAM	\$PTWS,LNA	\$PTWS,ODO
V13	SL869-V2	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	✓	✓
	SL869L-V2	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	✓	✓
	SL871	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SL871L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SE868-A	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	✓	✓
	SE868K3-A	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	✓	✓
	SE868K3-AL	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	✓	✓
	SE878K3-A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SC872-A	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	✓	✓
	SC874-A	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	✓	✓
V26	SE868-V3	✓	✓	✓	✓	✓	*	✓	*	*	*	*	*
	SE873	✓	✓	✓	✓	✓	*	✓	*	*	*	*	*
	SE873Q5	✓	✓	✓	✓	✓	*	✓	*	*	*	*	*
	SL876Q5-A	✓	✓	✓	✓	✓	✓	✓	*	*	*	*	*
V33	SL869-V3	✓	*	✓	*	✓	✓	✓	*	*	*	*	*
	SL869-ADR	✓	*	✓	*	✓	✓	✓	*	*	*	*	*

*	Not Supported
✓	Supported

Table 3 PTWS Messages Applicability Table

3. TELIT NMEA MESSAGES

3.1. PTWSVER - Telit Software Version Message

The Telit Software Version can be polled using the input message described in this section.

This command obsoletes \$PTWS,VERSION. Therefore, this latter is still supported but its usage is now deprecated.

3.1.1. Input Message

Synopsis:

```
$PTWSVER,action[,param][*CS]<CR><LF>
```

Example:

```
$PTWSVER,GET,TELIT*57<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSVER	Telit Software Version Message
Action	GET	Action to be executed: GET action only is supported
Param	TELIT	Optional parameter indicating the specific type of version to be retrieved TELIT = The Telit version is retrieved SDK = The vendor's version string from the underlying SDK is retrieved If no parameter is provided, the Telit version is retrieved

Table 4 PTWSVER – Telit Software Version Input Message Structure

3.1.2. Output Message

Synopsis:

```
$PTWSVER,param,text*CS<CR><LF>
```

Error:

```
$PTWSVER,ERROR[,Action][,Parameter]*CS<CR><LF>
```

```
$PTWSCHECKSUM*0D
```

```
$PTWSINVALID*51
```

Example:

```
$PTWSVER,TELIT,V13-2.3.0-STD-5.1.5-N96-000200*78
```

Field	Example	Description
Proprietary Address Field	PTWSVER	Telit SW Version Message
Param	TELIT	Parameter indicating the type of version string being reported TELIT = Telit version string SDK = Vendor's version string from the underlying SDK
Text	VAL	Firmware Version Information
VerString	V13-2.3.0-STD-5.1.5-N96-000200	Telit FW version string

Table 5 PTWSVER – Telit Software Version Output Message Structure

3.2. PTWSLNA – LNA Message

LNA related settings can be controlled using the messages described in this section.

This command obsoletes \$PTWS,LNA. Therefore, this latter is still supported but its usage is now deprecated.

3.2.1. Input Message

Synopsis:

```
$PTWSLNA,attrib,action[,<value>][[*CS]<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSLNA	Telit LNA Gain Message
Attrib	GAIN	Parameter indicating the feature attribute to which the message applies: GAIN attribute only is supported
Action	SET	Action to be executed GET = Poll the current LNA Gain value - The next field of this message must be omitted SET = Configure the LNA Gain to a specific setting to be specified in the next field
Value	HIGH	Optional parameter indicating the specific LNA GAIN setting when the Action is SET HIGH = High gain LOW = Low gain

Table 6 PTWSLNA – Telit LNA Input Message Structure

3.2.1.1. Set LNA Gain

This command is used to configure the LNA Gain setting.

Synopsis:

```
$PTWSLNA,GAIN,SET,<value>[*CS]<CR><LF>
```

Example:

```
$PTWSLNA,GAIN,SET,LOW*78<CR><LF>
```



V26 Firmware Family

The module performs a HOT Start after the command execution.

3.2.1.2. Query LNA Gain

This command is used to query the current LNA Gain setting.

Synopsis:

```
$PTWSLNA,GAIN,GET[*CS]<CR><LF>
```

Example:

```
$PTWSLNA,GAIN,GET*14<CR><LF>
```

3.2.2. Output Message

3.2.2.1. Set LNA Gain Responses

A. Success:

```
$PTWSLNA,OK*6B
```

B. Error:

```
$PTWSLNA,ERROR,GAIN,SET*74
```

```
$PTWSLNA,ERROR,GAIN*1A
```

```
$PTWSLNA,ERROR,SET*4A
```

```
$PTWSLNA,ERROR*37
```

```
$PTWSNOSUPPORT*4E
```

```
$PTWSCHECKSUM*0D
```

```
$PTWSINVALID*51
```

3.2.2.2. Query LNA Gain Responses

A. Success:

```
$PTWSLNA,GAIN,value*CS<CR><LF>
```

Example:

```
$PTWSLNA,GAIN,LOW*16<CR><LF>
```

B. Error:

```
$PTWSLNA,ERROR,GAIN*1A
```

```
$PTWSLNA,ERROR*37
```

```
$PTWSNOSUPPORT*4E
```

```
$PTWSCHECKSUM*0D
```

```
$PTWSINVALID*51
```

3.3. PTWSMODE – MODE Messages

Telit MODE messages can be used to control various aspects of the operating mode of the GNSS module.

3.3.1. CONST Message Type

PTWSMODE,CONST messages can be used to control (enable, disable) the use of navigational satellite constellations and poll the current configuration. When a constellation is enabled, the module will acquire and track satellites from that constellation and use its measurements to update the navigational solution.

3.3.1.1. Input Message

Synopsis:

```
$PTWSMODE,CONST,action[,GPS][,GLO][,BDS][,GAL][,QZS][*CS]<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSMODE	Telit MODE Messages
Attrib	CONST	Parameter indicating the feature attribute to which the message applies: CONST attribute only is supported
Action	SET	Action to be executed GET = Poll the current enabled constellations - The next fields of this message must be omitted SET = Configure the navigational constellations to be used – This configuration must be specified using one or more comma-separated fields of type Parameter specified below

Field	Example	Description
ParameterN	GPS	<p>Optional parameter indicating the specific constellations that must be enabled</p> <p>GPS = Enable GPS constellation</p> <p>GLO = Enable GLONASS constellation</p> <p>GAL = Enable GALILEO constellation</p> <p>BDS = Enable BEIDOU constellation</p> <p>QZSS = Enable QZSS constellation</p> <p>At least one constellation must be present in the command, however QZS-only operation is not supported. Also, GLONASS (GLO) and Beidou (BDS) constellations cannot be enabled at the same time.</p>

Table 7 PTWSMODE,CONST – Telit MODE,CONST Input Message Structure

3.3.1.1.1. Set Active Constellations

This command is used to enable the active constellations.

Synopsis:

```
$PTWSMODE,CONST,SET[,GPS][,GLO][,BDS][,GAL][,QZS][*CS]<CR><LF>
```

Example:

```
$PTWSMODE,CONST,SET,GPS,GLO*04<CR><LF>
```

3.3.1.1.2. Query Active Constellations

This command is used to query the constellations currently enabled.

Synopsis:

```
$PTWSMODE,CONST,GET[*10]<CR><LF>
```

Example:

```
$PTWSMODE,CONST,GET*10<CR><LF>
```

3.3.1.2. Output Message

3.3.1.2.1. Set Active Constellations Response

A. Success:

```
$PTWSMODE,OK*2B
```

B. Error:

```
$PTWSMODE,ERROR,CONST,SET*70
```

```
$PTWSMODE,ERROR,CONST*1E
```

```
$PTWSMODE,ERROR*77
```

*\$PTWSNOSUPPORT*4E*

*\$PTWSCHECKSUM*0D*

3.3.1.2.2. Query Active Constellations Response

A. Success:

*\$PTWSMODE,CONST[,GPS][,GLO][,BDS][,GAL][,QZS][*CS]<CR><LF>*

Example:

*\$PTWSMODE,CONST,GPS,GLO*6A<CR><LF>*

B. Error:

*\$PTWSMODE,ERROR,CONST*1E*

*\$PTWSMODE,ERROR*77*

*\$PTWSCHECKSUM*0D*



V26 Firmware Family

The supported constellation combinations are as follows

GPS	GLO	BDS	GAL	QZS
ON	OFF	OFF	OFF	OFF
ON	ON	OFF	OFF	OFF
ON	OFF	ON	OFF	OFF
ON	OFF	OFF	ON	OFF
ON	ON	OFF	ON	OFF
ON	OFF	ON	ON	OFF
ON	OFF	OFF	OFF	ON
ON	ON	OFF	OFF	ON
ON	OFF	ON	OFF	ON
ON	OFF	OFF	ON	ON
ON	ON	OFF	ON	ON
ON	OFF	ON	ON	ON
OFF	OFF	OFF	ON	OFF

V13 Firmware Family

The supported constellation combinations are as follows

GPS	GLO	BDS	GAL	QZS
ON	OFF	OFF	OFF	N/A
ON	ON	OFF	OFF	N/A
ON	OFF	ON	OFF	N/A
ON	OFF	OFF	ON	N/A
ON	ON	OFF	ON	N/A

QZSS configuration cannot be changed at runtime through \$PTWSMODE,CONST.

V33 Firmware family

The supported constellation combinations are as follows

GPS	GLO	BDS	GAL	QZS
ON	OFF	OFF	OFF	OFF
OFF	ON	OFF	OFF	OFF
ON	ON	OFF	OFF	OFF
OFF	OFF	ON	OFF	OFF
ON	OFF	ON	OFF	OFF
OFF	ON	ON	OFF	OFF

OFF	OFF	OFF	ON	OFF
ON	OFF	OFF	ON	OFF
OFF	ON	OFF	ON	OFF
ON	ON	OFF	ON	OFF
OFF	OFF	ON	ON	OFF
ON	OFF	ON	ON	OFF
OFF	OFF	OFF	OFF	ON
ON	OFF	OFF	OFF	ON
OFF	ON	OFF	OFF	ON
ON	ON	OFF	OFF	ON
OFF	OFF	ON	OFF	ON
ON	OFF	ON	OFF	ON
OFF	OFF	OFF	ON	ON
ON	OFF	OFF	ON	ON
OFF	ON	OFF	ON	ON
ON	ON	OFF	ON	ON
OFF	OFF	ON	ON	ON
ON	OFF	ON	ON	ON



In case of wrong constellation combination, the module's response is:
\$PTWSNOSUPPORT*4E
and the current configuration is maintained.

3.4. PTWSRLM – RLM Messages

PTWSRLM messages are used to control the reporting of the RLM (Return Link Service Message) output message defined in the NMEA-0183 standard.

3.4.1. Input Message

3.4.1.1. Configure RLM Message

The reporting of the RLM NMEA output message can be configured using the message described in this section.

Synopsis:

```
$PTWSRLM,action[,<value>][*CS]<CR><LF>
```

Examples:

```
$PTWSRLM,ENABLE*7E<CR><LF>
```

`$PTWSRLM,REGISTER,0A0A0A0A0A0A0A0*1B<CR><LF>`

Field	Example	Description
Proprietary Address Field	PTWSRLM	Telit RLM Message
Action	ENABLE	<p>Action to be executed</p> <p>Allowed values to enable/disable the reporting of the RLM message</p> <p>ENABLE = Enable RLM NMEA output message</p> <p>DISABLE = Disable RLM NMEA output message</p> <p>Allowed values to register/unregister a specific Beacon ID for which the reporting of the RLM message is to be enabled</p> <p>REGISTER = Register a Beacon ID</p> <p>UNREGISTER = Unregister a Beacon ID</p>
Value		Optional parameter, in form of 15 hex digits, indicating the specific Beacon ID for which the reporting of the RLM message is to be enabled – mandatory when the Action field is REGISTER

Table 8 *PTWSRLM – Telit RLM Message Structure*



The reporting of the RLM NMEA output message is disabled by default at each module restart. `$PTWSRLM,ENABLE` command has then to be sent to enable the RLM reporting again.

V26 Firmware Family

The Beacon ID, for which the reporting of the RLM message is to be enabled, must be specified through the `$PTWSRLM,REGISTER,<beaconID>` command. This latter command is therefore available on V26 firmware family only.

The SAR search/decode process ends if one of the following conditions is met:

- on demand via `$PTWSRLM,UNREGISTER,<beaconID>`
- valid RLM message received
- 30-min timeout exceeded



\$PTWSRLM message structure may be subjected to change to accommodate future enhancements needed to manage SAR/RLM messaging.

3.4.1.2. Query RLM Message Configuration

The current configuration for the reporting of the RLM NMEA output message can be queried using the command described in this section.

Synopsis:

```
$PTWSRLM,attrib,action[*CS]<CR><LF>
```

Example:

```
$PTWSRLM,STATUS,GET*11<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSRLM	Telit RLM Message
Attrib	STATUS	Parameter indicating the feature attribute to which the message applies: STATUS attribute only is supported
Action	GET	Action to be executed GET = Poll the current configuration for the RLM output message

Table 9 PTWSRLM – Telit RLM Query Message Structure

3.4.2. Output Message

3.4.2.1. Configure RLM Message Response

A. Success:

```
$PTWSRLM,OK*7B
```

B. Error:

```
$PTWSRLM,ERROR,REGISTER*02
```

```
$PTWSRLM,ERROR*27
```

```
$PTWSCHECKSUM*0D
```

3.4.2.2. Query RLM Message Configuration Response

A. Success:

```
$PTWSRLM,STATUS,1*76<CR><LF> - If RLM reporting is enabled
```

`$PTWSRLM,STATUS,0*77<CR><LF>` - If RLM reporting is disabled

B. Error:

`$PTWSRLM ERROR,STATUS*13`

`$PTWSRLM,ERROR*27`

`$PTWSCHECKSUM*0D`

3.5. PTWSEPE – EPE Messages

PTWSEPE messages are used to control the reporting of the EPE (Estimate Positioning Error) output message.

3.5.1. Input Message

The reporting of the PTWSEPE output message can be enabled or disabled using the message described in this section.

Synopsis:

`$PTWSEPE,action,<value>[*CS]<CR><LF>`

Example:

`$PTWSEPE,SET,ON*13<CR><LF>`

Field	Example	Description
Proprietary Address Field	PTWSEPE	Telit EPE Message
Action	SET	Action to be executed SET = Configure the EPE message reporting according to the value to be specified in the next field
Value	ON	Parameter to enable/disable the reporting of the EPE message ON = Enable PTWSEPE output message OFF = Disable PTWSEPE output message

Table 10 PTWSEPE – Telit EPE Input Message Structure



The reporting of the EPE output message is disabled by default at each module restart. `$PTWSEPE,SET,ON` command has then to be sent to enable the EPE reporting again.



V13 Firmware Family

The allowed values for the <action> field are:

- ENABLE = Enable PTWSEPE output message
- DISABLE = Disable PTWSEPE output message

The <value> field is not used.

Example:

```
$PTWSEPE,ENABLE*7D<CR><LF>
```

```
$PTWSEPE,DISABLE*28<CR><LF>
```

3.5.2. Output Message

3.5.2.1. Input Message Response

A. Success:

```
$PTWSEPE,OK*78
```

B. Error:

```
$PTWSEPE,ERROR,SET*4A
```

```
$PTWSEPE,ERROR*24
```

```
$PTWSCHECKSUM*0D
```

```
$PTWSINVALID*51
```

3.5.2.2. EPE Reporting Message

The EPE (Estimate Positioning Error) is reported using the PTWSEPE output message described in this section.

Synopsis:

```
$PTWSEPE,<timestamp>,<EHPE>,<EVPE>*CS <CR><LF>
```

Example:

```
$PTWSEPE,132517.000,5.35,16.74*56<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSEPE	Telit EPE Message
Timestamp	132517.000	UTC time of the position error data hhmmss.sss (hours,minutes,seconds)
EHPE	5.35	Expected Horizontal Position Error One-sigma estimate of the horizontal error expressed in meters as a floating point number with two digits of precision
EVPE	16.74	Expected Vertical Position Error One-sigma estimate of the vertical error, expressed in meters as a floating point number with two digits of precision

Table 11 PTWSEPE – Telit EPE Reporting Output Message Structure



V33 Firmware Family

The EPE reporting message reports the <EHPE> value only.

3.6. PTWSANT – Antenna Status Messages

PTWSANT messages are used to monitor the Antenna Status by performing antenna detection (in case of antenna modules only) and antenna sensing.

This command obsoletes \$PTWS,ANT. Therefore, this latter is still supported but its usage is now deprecated.



Antenna detection and antenna sensing features may require a specific external circuitry to be performed.

Please contact Telit Technical Support for further information.

3.6.1. Input Message

PTWSANT input messages are used to query the status of the antenna and configure specific reporting modes.

Synopsis:

```
$PTWSANT,attrib,action[,mode][[*CS]<CR><LF>
```

Examples:

```
$PTWSANT,STATUS,GET*19<CR><LF>
```

```
$PTWSANT,OUTPUT,SET,EVENT*66<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSANT	Telit Antenna Status Message
Attrib	STATUS	Parameter indicating the feature attribute to which the message applies: STATUS = Query the Antenna Status - Action field can be GET only OUTPUT = Configure a specific reporting mode for the Antenna Status - when the Action field is SET Poll the current reporting mode configuration - when the Action field is GET
Action	GET	GET = Query the Antenna Status – When the Attrib field is STATUS Poll the current reporting mode configuration - When the Attrib field is OUTPUT SET = Configure a specific reporting mode for the Antenna Status – When the Attrib field is OUTPUT
Mode		Optional parameter indicating the specific reporting mode to be set – When the Attrib field is OUTPUT and the Action field is SET NONE = Polling Mode PERIODIC = Periodic Mode EVENT = Event Mode

Table 12 PTWSANT – Telit Antenna Status Input Message Structure

**Antenna Status Reporting Modes**

- **NONE:** Polling mode - The output is provided only after a \$PTWSANT,STATUS,GET command
- **PERIODIC:** The output is provided along with the other NMEA sentences, once a second
- **EVENT:** The output is provided only if an antenna status change has been detected

3.6.2. Output Message

3.6.2.1. Antenna Status Reporting Message

The Antenna Status is reported through the message described in this section.

In case of antenna modules, antenna detection is performed first, to understand which, between the embedded internal antenna and an external active one, is used. In latter case, antenna sensing is performed to check the working status of the external antenna itself.

Synopsis:

```
$PTWSANT,STATUS,AntStatus*CS<CR><LF>
```

Examples:

```
$PTWSANT,STATUS,NORMAL*5C<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSANT	Telit Antenna Status Message
Attrib	STATUS	Parameter indicating the feature attribute to which the message applies: STATUS = Antenna Status Reporting
AntStatus	NORMAL	Antenna Status SHORT = Antenna Sense – Shorted NORMAL = Antenna Sense – Normal OPEN = Antenna Sense – Open/Detached INTERNAL = Antenna Detection – Internal Antenna UNKNOWN = Unknown status

Table 13 PTWSANT – Telit Antenna Status Reporting Message Structure

3.6.2.2. Antenna Status Reporting Mode Configuration Response

The current reporting mode configuration for Antenna Status is reported in the message described in this section.

Synopsis:

```
$PTWSANT,OUTPUT,mode*CS
```

Examples:

```
$PTWSANT,OUTPUT,EVENT*08
```

Field	Example	Description
Proprietary Address Field	PTWSANT	Telit Antenna Status Message
Attrib	OUTPUT	Parameter indicating the feature attribute to which the message applies: OUTPUT = Antenna Status Reporting Mode Configuration

Field	Example	Description
Mode	EVENT	NONE = Polling Mode PERIODIC = Periodic Mode EVENT = Event Mode

Table 14 PTWSANT – Telit Antenna Status Reporting Mode Configuration Message Structure



V26 Firmware Family

Polling mode only is supported.

PTWSANT supports the antenna detection only – The supported statuses are INTERNAL and NORMAL. In this latter case, the NORMAL status is used just to indicate that an external antenna is being used, i.e. no antenna sensing is performed.

V33 Firmware Family

PTWSANT supports the antenna sensing only – The only supported statuses are SHORT, NORMAL and OPEN.

3.6.2.3. Antenna Status Error and Acknowledge Responses

The messages described in this section are reported to respond to an unsuccessful command or to respond to a configuration modification command.

A. Success

The following response applies only to \$PTSANT,OUTPUT,SET commands:

```
$PTWSANT,OK*2B
```

B. Error

The following response applies only to \$PTWSANT,STATUS commands:

```
$PTWSANT,ERROR,STATUS*17
```

The following responses apply only to \$PTWSANT,OUTPUT commands:

```
$PTWSANT,ERROR,OUTPUT,SET*72
```

```
$PTWSANT,ERROR,OUTPUT*1C
```

The following are responses for generic errors:

```
$PTWSANT,ERROR*2F
```

```
$PTWSNOSUPPORT*4E
```

```
$PTWSCHECKSUM*0D
```

3.7. PTWSFENCE – Geofencing Messages

PTWSFENCE messages are used to control various aspects of Telit Geofencing feature.



V26 Firmware Family

PTWSFENCE messages are available on V26-1.0.1-STD-5.7.12P1.1 and subsequent versions.

3.7.1. CONFIG Message Type

\$PTWSFENCE,CONFIG messages can be used to configure the fence regions to be used by the Geofencing feature.

3.7.1.1. Input Messages

3.7.1.1.1. Set Fence Parameters

Synopsis:

```
$PTWSFENCE,CONFIG,SET,<id>,<tolerance>,<shape>,<lat>,<long>,<rad>[*CS]<CR><LF>
```

Example:

```
$PTWSFENCE,CONFIG,SET,1,1,CIRC,31.248672,121.589105,50*00<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSFENCE	Telit Geofencing Messages
Attrib	CONFIG	Parameter indicating the feature attribute to which the message applies
Action	SET	Action to be executed SET = Configure settings for a specific fence ID
ID	1	ID of the fence region to be configured 1 to 6

Field	Example	Description
Tolerance	1	Confidence level to be taken into account for geofence status calculation 0 = No confidence required 1 = 68% 2 = 95%, 3 = 99.7%
Shape	CIRC	Shape of the fence – CIRC, circular fences supported only
Lat	31.248672	Latitude in form of ±31.248672 (plus sign can be omitted)
Long	121.589105	Longitude in form of ±121.589105 (plus sign can be omitted)
Rad	50	Radius in meters Min value = 10 m Max value = 100000 m

Table 15 *PTWSFENCE,CONFIG,SET* – Set Fence Parameters

3.7.1.1.2. Query Fence Parameters

Synopsis:

```
$PTWSFENCE,CONFIG,GET[,<id>][*CS]<CR><LF>
```

Example:

```
$PTWSFENCE,CONFIG,GET,1*0A<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSFENCE	Telit Geofencing Messages
Attrib	CONFIG	Parameter indicating the feature attribute to which the message applies
Action	GET	Action to be executed GET = Query the current settings for a specific fence ID
ID	1	Optional Parameter indicating the ID of the fence whose configuration needs to be polled 1 to 6 If no fence ID is specified, multiple responses are relayed, one for each configured fence

Table 16 *PTWSFENCE,CONFIG,GET* – Query Fence Parameters



When a query is performed for an unconfigured fence ID, a \$PTWSFENCE,ERROR response is returned.

3.7.1.2. Output Messages

3.7.1.2.1. Set Fence Parameters Response

A. Success:

\$PTWSFENCE,OK*63

B. Error:

\$PTWSFENCE,ERROR,CONFIG,SET*77

\$PTWSFENCE,ERROR,CONFIG*19

\$PTWSFENCE,ERROR*3F

\$PTWSNOSUPPORT*4E

\$PTWSCHECKSUM*0D

\$PTWSINVALID*51

3.7.1.2.2. Query Fence Parameters Response

A. Success:

a. Case I – Fence ID is specified in the query message

\$PTWSFENCE,CONFIG,<id>,<tolerance>,CIRC,<lat>,<long>,<rad>[*CS]
<CR><LF>

Example:

\$PTWSFENCE,CONFIG,1,1,CIRC,31.248672,121.589105,50*6E<CR><LF>

b. Case II – No Fence ID is specified in the query message

\$PTWSFENCE,CONFIG,<n>,<id>,<tolerance>,CIRC,<lat>,<long>,<rad>[*CS]
<CR><LF>

Where, *n* is the number of configured fences

Example:

\$PTWSFENCE,CONFIG,3,1,1,CIRC,31.248672,121.589105,50*51<CR><LF>

```
$PTWSFENCE,CONFIG,3,2,0,CIRC,31.248672,-10.589105,16*4F<CR><LF>
```

```
$PTWSFENCE,CONFIG,3,3,2,CIRC,31.248672,112.589105,66*55<CR><LF>
```

B. Error:

```
$PTWSFENCE,ERROR,CONFIG,GET*63
```

```
$PTWSFENCE,ERROR,CONFIG*19
```

```
$PTWSFENCE,ERROR*3F
```

```
$PTWSNOSUPPORT*4E
```

```
$PTWSCHECKSUM*0D
```

```
$PTWSINVALID*51
```

3.7.2. STATUS Message Type

\$PTWSFENCE,STATUS messages can be used to enable/disable the fence regions to be used by the Geofencing feature and poll the status for each configured area.

3.7.2.1. Input Messages

3.7.2.1.1. Enable/Disable Fence

Synopsis:

```
$PTWSFENCE,STATUS,SET,<id>,<ON|OFF|1|0>[*CS]<CR><LF>
```

Example:

```
$PTWSFENCE,STATUS,SET,1,1*1D<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSFENCE	Telit Geofencing Messages
Attrib	STATUS	Parameter indicating the feature attribute to which the message applies
Action	SET	Action to be executed SET = Configure settings for a specific fence ID
ID	1	ID of the fence region to be enabled/disabled 1 to 6
Activation	1	Activation state for the specified ID 0/OFF = Disabled 1/ON = Enabled

Table 17 PTWSFENCE,STATUS,SET – Enable/Disable Fence

3.7.2.1.2. Poll Fence Status

Synopsis:

```
$PTWSFENCE,STATUS,GET[,<id>][*CS]<CR><LF>
```

Example:

```
$PTWSFENCE,STATUS,GET,1*14<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWSFENCE	Telit Geofencing Messages
Attrib	STATUS	Parameter indicating the feature attribute to which the message applies
Action	GET	Action to be executed GET = Poll the current status for a specific fence ID
ID	1	Optional Parameter indicating the ID of the fence whose status needs to be polled 1 to 6 If no fence ID is specified, a single, variable length message is relayed where only the status of enabled geofences is reported

Table 18 *PTWSFENCE,STATUS,GET – Poll Fence Status*



When a query is performed for an unconfigured fence ID, a \$PTWSFENCE,ERROR response is returned.

3.7.2.2. Output Messages

3.7.2.2.1. Enable/Disable Fence Response

A. Success:

```
$PTWSFENCE,OK*63
```

B. Error:

```
$PTWSFENCE,ERROR,STATUS,SET*69
```

```
$PTWSFENCE,ERROR,STATUS*07
```

```
$PTWSFENCE,ERROR*3F
```

`$PTWSCHECKSUM*0D`

`$PTWSINVALID*51`

3.7.2.2.2. Poll Fence Status Response

A. Success:

a. Case I – Fence ID is specified in the query message

`$PTWSFENCE,STATUS,<timestamp>,<date>,<id>,<1|0>,<status>[*CS]
<CR><LF>`

Example:

`$PTWSFENCE,STATUS,110415.000,300718,1,1,IN*4B<CR><LF>`

Field	Example	Description
Proprietary Address Field	PTWSFENCE	Telit Geofencing Messages
Attrib	STATUS	Parameter indicating the feature attribute to which the message applies
Timestamp	110415.000	UTC Time of the position that was used to determine the status – hhmmss.sss format
Date	300718	Date – DDMMYY format
ID	1	ID of the fence region being polled 1 to 6
Activation	1	Activation state for the specified ID 0 = Disabled 1 = Enabled
Status	IN	Current Position Status IN = The position and its uncertainty circle are completely inside the geofence OUT = The position and its uncertainty circle are completely outside the geofence ON = The position and its uncertainty circle intersect the geofence boundary UNK = The fence is turned off, or the position is invalid (module is not navigating)

Table 19 `PTWSFENCE,STATUS` – Poll Fence Status Response

b. Case II – No Fence ID is specified in the query message

```
$PTWSFENCE,STATUS,<hhmmss.sss>,<date>,<n>,<summary>,<id1>,<status1>,<id2>,<status2>,...<idN>,<statusN>[*CS]
```

Where:

- *n* is the number of configured fences
- **summary** is the OR'ed value of the status of all active/enabled geofences

Example:

```
$PTWSFENCE,STATUS,110415.000,300718,2,IN,1,IN,4,OUT*19
```

B. Error:

```
$PTWSFENCE,ERROR,STATUS,GET*7D
```

```
$PTWSFENCE,ERROR,STATUS*07
```

```
$PTWSFENCE,ERROR*3F
```

```
$PTWSCHECKSUM*0D
```

```
$PTWSINVALID*51
```

4. TELIT LEGACY NMEA MESSAGES

4.1. VERSION – Telit Software Version Message

The Telit Software Version can be obtained using the input message described in this section.

This message is now obsolete by the new PTWSVER message.

4.1.1. Input Message

Query Telit software version: This message polls the version string of Telit software.

Synopsis:

\$PTWS,VERSION,GET

Example:

*\$PTWS,VERSION,GET*0C<CR><LF>*

4.1.2. Output Message

Telit Software Version string output: This message outputs the version string of Telit software.

Synopsis:

\$PTWS,VERSION,VAL,VerString

Example:

*\$PTWS,VERSION,VAL,v13-2.2.0-STD-3.8.13-N96-B2*3F<CR><LF>*

Field	Example	Description
Proprietary Address Field	PTWS	Telit NMEA Talker ID
Message ID	VERSION	Software Version Message
Tag1	VAL	VAL = Version string value reported in the next field
VerString	v13-2.2.0-STD-3.8.13-N96-B2	Telit FW version string

Table 20 VERSION – Telit Software Version Output Message Structure

4.2. ANT – Antenna Status Message

Antenna Status can be obtained using the input message described in this section.

This message is now obsolete by the new PTWSANT message.

4.2.1. Input Message

Query Antenna Status: This message queries the status of the antenna circuit on a module.

Synopsis:

`$PTWS,ANT,STATUS`

Example:

`$PTWS,ANT,STATUS*4F<CR><LF>`

4.2.2. Output Message

Antenna Status output message: This message outputs the current antenna status.

Synopsis:

`$PTWS,ANT,STATUS,VAL,AntStatus,AntStatusCode`

Example:

`$PTWS,ANT,STATUS,VAL,OK,1*0D<CR><LF>`

Field	Example	Description
Proprietary Address Field	PTWS	Telit NMEA Talker ID
Message ID	ANT	Antenna Status Message
Tag1	STATUS	STATUS = Antenna Status reported in this message
Tag2	VAL	VAL = Antenna Status value reported in the next field
AntennaStatus	OK	SHORT = Antenna is Shorted OK = Antenna Status is Normal OPEN = Antenna is Detached UNKNOWN = Unknown status
AntennaStatusCode	1	0 = Antenna Sense → SHORT 1 = Antenna Sense → OK 2 = Antenna Sense → OPEN 3 – 255 = Any value returned by the Antenna sense function other than 0, 1, and 2

Table 21 ANT – Antenna Status Output Message Structure

4.3. JAM – Jamming Detection Status Message

Jamming detection status can be obtained using the input message described in this section.

4.3.1. Input Message

Query Jamming detection status: This message queries the status of the Jamming detection.

Synopsis:

```
$PTWS,JAM,STATUS
```

Example:

```
$PTWS,JAM,STATUS*52<CR><LF>
```

4.3.2. Output Message

Jamming Detection Message: this message outputs the Jamming detection results.

Synopsis:

```
$PTWS,JAM,SIGNAL,VAL,INDEX,JamIndex,FREQ,JamFreq
```

Examples:**1) Jamming Detected**

```
$PTWS,JAM,SIGNAL,VAL,INDEX,8,FREQ,1574.996338*6E<CR><LF>
```

2) No Jamming Detected

```
$PTWS,JAM,SIGNAL,NONE*7E<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWS	Telit NMEA Talker ID
Message ID	JAM	Jamming Detection Status Message
Tag1	SIGNAL	SIGNAL = Jamming signal information reported in the next field
Tag2	VAL	NONE = No jamming frequency is detected If this field = NONE, the rest field of this message will be voided. VAL = One or more jamming signal frequency detected
Tag3	INDEX	INDEX = Index of the jamming frequencies reported in the next field
JamFreq	1574.996338	The corresponding jamming frequency that was detected (at the JamIndex slot). Unit: MHz Precision: six decimal positions that gives a resolution of 1 Hz

Table 22 JAM – Jamming Detection Status Output Message Structure

4.4. LNA – LNA Gain Message

LNA Gain settings can be controlled using the messages described in this section.

This message is now obsolete by the new PTWSLNA message.

4.4.1. Input Messages

Synopsis:

```
$PTWS,LNA,Tag1,Tag2[,LNAUserValue]
```

Field	Example	Description
Proprietary Address Field	PTWS	Telit NMEA Talker ID
Message ID	LNA	LNA Gain Message
Tag1	GAIN	GAIN = LNA Gain specific message
Tag 2	SET	GET = Poll the current LNA Gain value - The next field of this message must be omitted SET = Configure the LNA Gain to a specific setting to be specified in the next field
LNAUserValue	1	Only applicable if Tag2 = "SET" 1 = LNA Gain High 0 = LNA Gain Low

Table 23 LNA – LNA Gain Input Message Structure

4.4.1.1. Set LNA Gain

This command is used to configure the LNA Gain setting.

Synopsis:

```
$PTWS,LNA,GAIN,SET,LNAUserValue
```

Example:

```
$PTWS,LNA,GAIN,SET,1*31<CR><LF>
```

4.4.1.2. Query LNA Gain

This command is used to query the current LNA Gain setting.

Synopsis:

```
$PTWS,LNA,GAIN,GET
```

Example:

```
$PTWS,LNA,GAIN,GET*38<CR><LF>
```

4.4.2. Output Message

The LNA Gain output message is used to report the current the LNA gain setting.

Synopsis:

```
$PTWS,LNA,GAIN,VAL,DEF,LNADefault,USR,LNAUser
```

Example:

```
$PTWS,LNA,GAIN,VAL,DEF,1,USR,0*27<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWS	Telit NMEA Talker ID
Message ID	LNA	LNA Gain Message
Tag1	GAIN	GAIN = LNA Gain specific message
Tag 2	VAL	VAL = This message reports LNA Gain setting information
Tag 3	DEF	DEF = Default LNA Gain setting reported in the next field
LNADefault	1	1 = default LNA gain value HIGH 0 = default LNA gain value LOW
Tag 4	USR	USR = LNA Gain setting configured by the User and reported in the next field
LNAUser	0	1 = default LNA gain value HIGH 0 = default LNA gain value LOW 1 = Not specified (the default gain value is used)

Table 24 LNA – LNA Gain Output Message Structure

4.5. ODO – ODO Messages

Odometer specific messages can be controlled through the input messages described in this section.

4.5.1. Input Messages

4.5.1.1. Start ODO Count

This command is used to reset the ODO count value to zero and restart the odometer count.

Synopsis:

```
$PTWS,ODO,START
```

Example:

```
$PTWS,ODO,START*04<CR><LF>
```

4.5.1.2. Stop ODO Count

This command is used to stop the ODO count.

Synopsis:

```
$PTWS,ODO,STOP
```

Example:

```
$PTWS,ODO,STOP*5C<CR><LF>
```

4.5.1.3. Query ODO Count

This command queries the current ODO value.

Use this command to poll ODO value if the ODO output has been turned off.

Synopsis:

```
$PTWS,ODO,GET
```

Example:

```
$PTWS,ODO,GET*12<CR><LF>
```

4.5.1.4. Turn ODO Output Messages On

This command turns the ODO output message on. The receiver will output the current ODO count through the *\$PTWS,ODO,VALUE* output message.

Synopsis:

```
$PTWS,ODO,OUTPUT,ON
```

Example:

```
$PTWS,ODO,OUTPUT,ON*76<CR><LF>
```

4.5.1.5. Turn ODO Output Messages Off

This command turns the ODO output message off. The receiver will stop reporting the current ODO count.

Synopsis:

```
$PTWS,ODO,OUTPUT,OFF
```

Example:

```
$PTWS,ODO,OUTPUT,OFF*38<CR><LF>
```

4.5.2. Output Message

ODO Output message: this message outputs the current ODO count at the output rate of position fix.

Synopsis:

```
$PTWS,ODO,VALUE,dddd.dd
```

Examples:

```
$PTWS,ODO,VALUE,9281.30*0C<CR><LF>
```

Field	Example	Description
Proprietary Address Field	PTWS	Telit NMEA Talker ID
Message ID	ODO	ODO Message
Tag1	VALUE	VALUE = Current ODO value reported in the next field
ODO Count Value	9281.30	dddd.dd (meters) Current ODO count value

Table 25 ODO – ODO Output Message Structure



The ODO output is turned OFF by default at each reset. The ODO output can be enabled again using the “*\$PTWS,ODO,OUTPUT,ON*” command.

Since after each restart the ODO value is undefined, the “*\$PTWS,ODO,START*” command must be sent to reset the ODO count value.

5. GLOSSARY AND ACRONYMS

ASCII	American Standard Code for Information Interchange
BE	Broadcast Ephemeris
DGPS	Differential Global Positioning System
DOP	Dilution of Precision
NMEA	National Marine Electronics Association
PRN	Pseudo-Random Noise
SRAM	Static Random Access Memory
UTC	Co-ordinated Universal Time

6. DOCUMENT HISTORY

Revision	Date	Changes
0	2018-04-12	First issue
1	2019-08-08	Added support to V33 Firmware Family Added PTWSFENCE Commands and Messages Added PTWSRLM support on V26 FW family
2	2019-11-13	Added PTWSFENCE support for V13 Firmware Family Updated Telit Technical Support access link



SUPPORT INQUIRIES

Link to www.telit.com and contact our technical support team for any questions related to technical issues.

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