S

u-connectXpress

AT commands manual

Abstract
u-blox AT commands reference manual for the short range stand-alone modules. This document lists both the standard and proprietary AT-commands for u-connectXpress based modules with Bluetooth low energy, Bluetooth BR/EDR and Wi-Fi.

www.u-blox.com
UBX-14044127 - R47
C1-Public

Document information		
Title	u-connectXpress	
Subtitle		
Document type	AT commands manual	
Document number	UBX-14044127	
Revision and date	R47	12-Jul-2021
Disclosure restriction	C1-Public	

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Preface

Applicable products

This document applies to the following products:

Product name	Software variant	Software version
ANNA-B112	u-connectXpress	1.0.0
		2.0.0
		3.0.0
		4.0.0
NINA-B111, NINA-B112	u-connectXpress	1.0.0
		2.0.0
		3.0.1
		4.0.0
		5.0.0
		6.0.0
		7.0.0
NINA-B221, NINA-B222	u-connectXpress	1.0.0
		2.1.0
		3.0.0
		4.0.0
NINA-B311, NINA-B312	u-connectXpress	1.0.0
		2.0.0
		3.0.0
		4.0.0
NINA-B316	u-connectXpress	2.0.0
		3.0.0
		4.0.0
NINA-B410, NINA-B411, NINA-B416	u-connectXpress	1.0.0 2.0.0
NINA-W131, NINA-W132	u-connectXpress	1.0.1
		2.0.0
		2.1.0
		3.0.0
		4.0.0
NINA-W151, NINA-W152	u-connectXpress	1.0.0
		2.1.0
		3.0.0
		4.0.0
NINA-W156	u-connectXpress	3.1.0
		4.0.0
ODIN-W260, ODIN-W262	u-connectXpress	1.0.0
		2.0.0
		2.0.1
		2.0.2
		3.0.0
		3.0.1

Product name	Software variant	Software version
		4.0.0
		4.0.1
		5.0.0
		5.0.1
		6.0.0
		6.0.1
		7.0.0
		7.0.2
		7.1.0
		8.0.0
ODIN-W263	u-connectXpress	7.1.0
		8.0.0

How to use this manual

The u-connect AT Commands Manual provides the necessary information to successfully design in and configure the applicable u-blox short range modules.

This manual has a modular structure. It is not necessary to read it from the beginning to the end.

The following symbols are used to highlight important information within the manual:

☞ An index finger points out key information pertaining to module integration and performance.

⚠ A warning symbol indicates actions that could negatively impact or damage the module.

Summary table

The summary table on the top of each command section is a quick reference for the user.

command_name				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

The summary table consists of two sections:

- **Modules**:
  Lists the product series that support the AT command and specific software version requirements, if any. Ideally, this field should include any one of the following values:
  - **All products:** The command is applicable for all products (listed in the Applicable products section) and all software versions of all software variants.
  - **Product family names such as ANNA-B112, NINA-B1, NINA-W15 and ODIN-W2 etc:** The command is applicable for all variants of the specific product family and all software versions of all software variants.
  - **Product family name with specific software version(s) such as "ODIN-W2-SW3.0.x onwards":** The command is applicable for all variants of the named product family ("ODIN-W2", i.e. ODIN-W260, ODIN-W262 and ODIN-W263) from a specific u-connectXpress software version onwards (3.0.x).

  For example, for NINA-B3

Representation in the summary table	**Applicable software versions**
NINA-B31	u-connectXpress only (all software versions)
NINA-B31-SW2.0.0 onwards	Specific software versions of u-connectXpress such as 2.0.0 onwards

- **Attributes**
  - **Syntax**
    - **Full**: The command syntax is fully compatible with all the products listed in the "Modules" section.
    - **Partial**: The products support different syntaxes (usually backward compatible with respect to previous short range standards).
  - **Settings saved**
    - **Profile**: The command setting is stored to start up database with &W command.
    - **NVM**: The command setting is saved with corresponding "save" action command in the non-volatile memory. The command setting is stored to the start up database using the Configuration Action - Store command.
    - **No**: The current command setting is volatile and cannot be saved.
  - **Can be aborted**
    - **Yes**: The command execution can be aborted, if a character is sent to DCE during the command execution.
    - **No**: The command cannot be aborted during the command execution.

    When a command is aborted, the Aborted result code is displayed.

☞ ODIN-W2
When a command is aborted, the OK result code is displayed.

☞ NINA-B1, NINA-W13, NINA-B31
The AT commands cannot be aborted, except if explicitly stated in the corresponding AT command description.

- **Response time**
  Response time (in seconds) taken by the command to get the result.

u-blox Technical Documentation

As part of our commitment to customer support, u-blox maintains an extensive volume of technical documentation for our products. In addition to our product-specific technical data sheets, the following manuals are available to assist u-blox customers in product design and development.

AT Commands Manual: This document provides the description of the AT commands supported by u-blox short range modules.

System Integration Manual: This document describes u-blox short range modules from the hardware and the software point of view. It provides hardware design guidelines for the optimal integration of the short range module in the application device and it provides information on how to set up production and final product tests on application devices integrating the short range module.

Application Notes: These documents provide guidelines and information on specific hardware and/or software topics on u blox short range modules.

Questions

If you have any questions about u-blox Short Range Hardware Integration, please:

- Read this manual carefully
- Contact our information service on our homepage - www.u-blox.com
- Read the questions and answers on our FAQ database.

Technical Support

Worldwide Web
Our website (www.u-blox.com) is a rich pool of information. You can access product information, technical documents, and helpful FAQs any time from our website.

By E-mail
If you have technical problems or cannot find the required information in the provided documents, contact the nearest Technical Support office by email. Use our service pool email addresses rather than any personal email address of our staff. This makes sure that your request is processed as soon as possible. You will find the contact details at the end of the document.

Helpful Information when contacting Technical Support
When contacting the technical support, please have the following information ready:

- Module type (for example, ODIN-W260-00B-00) and software version (for example, version 2.0.0)
- Module configuration
- Clear description of your question or the problem
- A short description of the application
- Your complete contact details.

Contents

1 AT command settings

u-blox short range modules provide at least one physical serial interface for configuration and data transport. At module power on, the module enters the command mode. For more details on the command mode, see Chapter 1.1.

For module and terminal connection and settings, see the corresponding evaluation kit user guide.

1.1 Definitions

In this document, the following naming conventions are used:

- DCE (Data Communications Equipment): u-blox short range module
- DTE (Data Terminal Equipment) or TE (Terminal Equipment): The terminal that issues the command to the module.

The terms DCE and DTE are used in the serial interface context. The DCE interface can operate in the following modes:

- Command mode: The DCE waits for AT command instructions. The DCE interprets all the characters received as commands to execute. The DCE may send responses back to the DTE indicating the outcome of the command or further information without having received any command from the DTE (for example, unsolicited response code - URC).
- Data mode: The DCE transfers data after having sent the ATO command; all characters sent to the DCE are intended to be transmitted to the remote party. Any further characters received over the serial link are deemed to be from the remote party, and any characters sent are transmitted to the remote party.
- Extended data mode: Binary mode. See the u-blox Extended Data Mode Protocol Specification [2] for detailed information.

It is possible to switch from the data mode to command mode in the following ways:

- Using the escape sequence: For more details, see Escape Character S2
- Through a DTR ON to OFF transition: For more details, see Circuit 108/2 (DTR) behavior &D

To switch back to data mode or Extended data mode from the command mode, use Enter Data Mode O command.

☞ The module start up mode is set using the Module Start Mode +UMSM command.

1.1.1 Command description

The AT commands configure and enable the short range module functionality according to 3GPP normative and u-blox specifications. The AT commands are issued to the module via a hyper terminal through a command line and are described in the following sections. A general description of each command is provided including functionalities, correct syntax to be provided by the TE/DTE and allowed responses.

The command description defines each named parameter with its type, range (valid / acceptable values), default value (when available) and factory default setting (when applicable).

☞ In this document, <CR><LF> are intentionally omitted in the command syntax. See Chapter 1.1.2 and Chapter 1.1.4 for more information.

1.1.2 Command line

The AT commands are typically issued to the short range modules using a command line with the following generic syntax:

"AT"<command_name><string><S3_character>

Where:

- "AT": The prefix to be set at the beginning of each command line
- <command_name>: The command name string; it can have a "+" character as prefix
- <string>: The string consisting of the value parameters following the syntax provided in this manual. The following rules are used when describing the command syntax:

  - o <...>: The name in angle brackets is a parameter. The brackets themselves do not appear in the command line
  - o [...]: The square brackets represent the optional parameters of a command or an optional part of the DCE information text response. Brackets themselves do not appear in the command line. When a parameter is not given, the value will be set to the default value provided in the command description
- <S3_character>: The command line termination character; it can be set with Command line termination character S3 command; the factory-programmed termination character is <CR>

☞ The command line is not case sensitive.

The serial interface driver generally does not allow a new command until the previous one has been terminated by "OK" or an error message.

1.1.3 Default values

If the command has optional parameters, and default values are not specified, the default values are assumed as follows:

- For parameters of type Number, the default value is 0
- For parameters of type String, the default value is an empty string

1.1.4 Information text responses and result codes

The response format is as follows:

- Information text response(s): <S3_character><S4_character><text><S3_character><S4_character>
- Result codes: <S3_character><S4_character><verbose code><S3_character><S4_character>

where

- <S3_character> is the command line termination character; it can be set with S3 command
- <S4_character> is the linefeed character; it can be set with S4 command

If the command line is successfully processed and the command is correctly executed, in verbose response format the string "OK" is sent as a final result code.

Intermediate output and descriptive output of a command are formatted as information text responses;

If more than one string has to be printed out (see for example Scan +UWSCAN command description), additional command line termination and linefeed characters can be inserted for the sake of readability.

If the command is not accepted by the DCE, an error result code will be displayed. The error result has the following format:

- <S3_character><S4_character>ERROR<S3_character><S4_character>

1.1.5 S-parameters

The S-parameters, as specified in ITU-T recommendation V250, constitute a group of commands that begin with the string "ATS". They are generally indicated as S registers and are used to configure the way the module operates. Their syntax is:

ATS<parameter_number>?

ATS<parameter_number>=<value>

The number following the "ATS" is the referenced S parameter.

u-blox short range modules support the following set of S-parameters (<parameter_number>):

- 2: escape character setting (for more details see the S2)
- 3: command line termination character setting (for more details see the S3)
- 4: response formatting character setting (for more details see the S4)
- 5: command line editing character setting (for more details see the S5)

2 General operation

2.1 Start up

Start up mode can be set with the +UMSM command.

2.2 AT Command types

2.2.1 Set command

A set command configures preferred settings for the specified command. The set command is the only way to set the preferred settings in the DCE. Parameters set with a set command will be used immediately and the parameters can be stored to the start up database using &W.

Some Set commands requires a reboot before using. Store with &W and reset with +CPWROFF.

2.2.2 Read command

A read command provides current setting of the command parameters. It is used to find out the current command configuration.

2.2.3 Status command

A status command provides current operating status of the module.

2.2.4 Action command

An action command forces the DCE to print information text or execute a specific action for the command.

2.2.5 Configuration action command

Some configuration commands require that the configuration is reset, stored, activated, or deactivated using a corresponding configuration action command. For ODIN-W2 00B, this applies only to the Wi-Fi Station Configuration command.

2.2.6 Unsolicited result code (URC)

An unsolicited result code is a string message (provided by the DCE) that is not triggered as a information text response to a previous AT command and can be output, when enabled, at any time to inform the DTE of a specific event or status change. The URC can have the same name of the command that enables it or can be enabled by another command.

2.3 Data types

The definition of each command specifies the data types used for values associated with the command. The different data types are listed below and are described in the following subsections:

- String
- Integer
- Enumerator
- Byte_Array
- IPv4_Addr
- IPv6_Addr
- MAC_Addr
- Bd_Addr
- List
- Blob

2.3.1 String

A string shall consist of a sequence of displayable characters from the ISO 8859-1 character set, except for characters "\", """ and characters below 32 (space). A string constant shall be delimited by two double quote (""") characters, for example, "Donald Duck". If the double quote character (""") is to be used within a string, for example, "My friend "Bono" is a singer", they have to be represented as "\22". If the back-slash character ("\") is to be used within a string constant, it has to be represented as "\5C". An empty string is represented by two adjacent delimiters - "".

2.3.2 Integer

An integer value consists of a sequence of characters, all in the range {0..9} plus a possible minus ("-") sign for negative values. Numeric constants are expressed in decimal format only.

2.3.3 Enumerator

An enumerator value is actually an integer, where all its possible values are specified in each case. Only the defined values are accepted for the command in question.

2.3.4 Byte_Array

A Byte_Array consists of a sequence of characters expressed in two digit hexadecimal in the ranges {0..9}, {a..f} and {A..F}. The hexadecimal values are grouped together without delimiters; an example of Byte_Array (three values) is "800000" (Bit 23 is set), excluding the double quote characters.

2.3.5 IPv4_Addr

An IPv4_Addr is a special text string in dotted decimal notation form (that is, four numbers in the range 0-255 separated by periods). An example IP address is "192.168.0.1", excluding the double quote characters.

2.3.6 IPv6_Addr

An IPv6_Addr is a special text string represented as eight groups of four hexadecimal digits, each group representing 16 bits (two octets) and surrounded by brackets. The groups are separated by colons (:). An example of an IPv6 address is "[2001:0db8:85a3:0000:0000:8a2e:0370:7334]", excluding the double quote characters.

2.3.7 MAC_Addr

A MAC_Addr is a Byte_Array of fixed length (6 values). An example MAC_Addr is "01A0F7101C08", excluding the double quote characters.

2.3.8 Bd_Addr

A Bd_Addr is a MAC_Addr followed an optional address type, "r" for random address and "p" for public address. If the address type is omitted, it will default to public. An example Bd_Addr is "01A0F7101C08p", excluding the double quote characters.

2.3.9 List

A List is a comma (,) separated list of items, where items can be any of the other data types. For example, channel list is a list of integers, "1,6,11", excluding the double quote characters.

2.3.10 Blob

Raw 8-bit binary data without encoding. A separate method, such as another parameter indicating the size of the Blob, is used to detect the end of the Blob.

3 General

3.1 Attention AT

AT				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

3.1.1 Description

Attention command that determines the presence of a Data Communication Equipment (DCE).

3.1.2 Syntax

AT Command	Description
AT	Attention command.

Response	Description
OK	Successful response.
ERROR	Error response.

3.2 Manufacturer identification +CGMI

+CGMI				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

3.2.1 Description

Read a text string that identifies the manufacturer.

3.2.2 Syntax

AT Command	Description
AT+CGMI	Read manufacturer text string.

Response	Description
<manufacturer>	Successful read response.
OK	

3.2.3 Defined values

Parameter	Type	Description
manufacturer	String	u-blox

3.3 Model identification +CGMM

+CGMM				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

3.3.1 Description

Read a text string that identifies the device model.

3.3.2 Syntax

AT Command	Description
AT+CGMM	Read device model.

Response	Description
<model>	Successful read response.
OK	

3.3.3 Defined values

Parameter	Type
model	String

3.4 Software version identification +CGMR

+CGMR				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

3.4.1 Description

Read a text string that identifies the software version of the module.

3.4.2 Syntax

AT Command	Description
AT+CGMR	Read software version

Response	Description
<version>	Successful read response.
OK	

3.4.3 Defined values

Parameter	Type
version	String

3.5 Serial number +CGSN

+CGSN				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

3.5.1 Description

Read the product serial number.

3.5.2 Syntax

AT Command	Description
AT+CGSN	Read serial number.

Response	Description
<serial_number>	Successful read response.
OK	

3.5.3 Defined values

Parameter	Type
serial_number	String

3.6 Manufacturer identification +GMI

+GMI				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

3.6.1 Description

Read a text string that identifies the manufacturer.

3.6.2 Syntax

AT Command	Description
AT+GMI	Read manufacturer.

Response	Description
<manufacturer>	Successful read response.
OK	

3.6.3 Defined values

Parameter	Type	Description
manufacturer	String	u-blox

3.7 Model identification +GMM

+GMM				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

3.7.1 Description

Read a text string that identifies the model.

3.7.2 Syntax

AT Command	Description
AT+GMM	Read model identification.

Response	Description
<model>	Successful read response.
OK	

3.7.3 Defined values

Parameter	Type
model	String

3.8 Software version identification +GMR

+GMR				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

3.8.1 Description

Read a text string that identifies the software version of the module.

3.8.2 Syntax

AT Command	Description
AT+GMR	Read software version.

Response	Description
<version>	Successful read response.
OK	

3.8.3 Defined values

Parameter	Type
version	String

3.9 Serial number +GSN

+GSN				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

3.9.1 Description

Read a text string with the module serial number.

3.9.2 Syntax

AT Command	Description
AT+GSN	Read module serial number.

Response	Description
<serial_number>	Successful read response.
OK	

3.9.3 Defined values

Parameter	Type
serial_number	String

3.10 Identification information I

I				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

3.10.1 Description

Read identification information.

3.10.2 Syntax

AT Command	Description
ATI<value>	Read identification information.

Parameter value	Response	Description
0	<TypeCode> OK	Successful read response.
9	<ApplicationVersion>, <UniqueIdentifier> OK	Successful read response.
10	<MCUId> OK	Successful read response.

3.10.3 Defined values

Parameter	Type	Description
value	Enumerator	0: Type code 9: Complete software version information 10: MCU ID

3.10.4 Parameter values

Parameter	Type
TypeCode	String
ApplicationVersion	String
UniqueIdentifier	String
MCUId	byte array

3.11 Set greeting text +CSGT

+CSGT				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

3.11.1 Description

Sets the greeting text.

Configures and activates/deactivates the greeting text. The configuration change in the greeting text will be applied at the subsequent boot. If active, the greeting text is shown at boot once, on any AT interface, if the module start up mode is set to command mode.

3.11.2 Syntax

AT Command	Description
AT+CSGT= <mode>[,<text>]	Sets the greeting text.
AT+CSGT?	Reads the greeting text.

Response	Description
+CSGT:<mode>,<text>	Successful read response.
OK	
OK	Successful write response.

3.11.3 Defined values

Parameter	Type	Description
mode	enumerator	0: Turn off the greeting text 1(factory default): Turn on the greeting text
text	String	Factory default: "+STARTUP" Maximum string length is 49

4 System

4.1 Store current configuration &W

&W				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

4.1.1 Description

Store the current configuration. Note that a restart is needed to write to permanent storage.

4.1.2 Syntax

AT Command	Description
AT&W[<profile>]	Commits all the settings to be stored in start up database. The parameters are written to non-volatile memory when +CPWROFF is issued.

Response	Description
OK	Successful response.
ERROR	Error response if <profile> is invalid.

4.1.3 Defined values

Parameter	Type	Description
profile	Enumerator	0: Only valid value

4.2 Set to default configuration Z

Z				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

4.2.1 Description

Resets the profile to the last stored configuration. Any settings committed with AT&W will be discarded. The restored settings will be used after a reboot.

4.2.2 Syntax

AT Command	Description
ATZ[<profile>]	Reset profile.

Response	Description
OK	Successful response.
ERROR	Error response if <profile> is invalid.

4.2.3 Defined values

Parameter	Type	Description
profile	Enumerator	0: Only valid value

4.3 Set to factory defined configuration +UFACTORY

+UFACTORY				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

4.3.1 Description

Reset to factory defined defaults. A reboot is required before using the new settings.

4.3.2 Syntax

AT Command	Description
AT+UFACTORY	Reset to factory defaults.

Response	Description
OK	Successful response.

4.4 Circuit 108/2 (DTR) behavior &D

&D				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

4.4.1 Description

Controls the module's behaviour when the host changes its RS232 circuit 108/2 - Data Terminal Ready (DTR) signal between ASSERTED (i.e. logical 0 on UART_DSR signal) and DEASSERTED (logical 1 on UART_DSR signal) states.

4.4.2 Syntax

AT Command	Description
AT&D[<value>]	Set behavior.

Response	Description
OK	Successful response.
ERROR	Error response if <value> is invalid.

4.4.3 Defined values

Parameter	Type	Description
value	Enumerator	0: DTR line is ignored. 1 (default): Upon an ASSERTED to DEASSERTED transition of the DTR line, in data mode, the module enters the command mode and issues an OK result code. 2: Upon an ASSERTED to DEASSERTED transition of the DTR line, in data mode, the DCE performs an orderly disconnect of all the Bluetooth radio links and peer connections. No new connections will be established while the DTR line remains DEASSERTED. 3: Upon an ASSERTED to DEASSERTED transition of the DTR line, the UART is disabled. The radio is still active. The UART can be enabled again either on an DEASSERTED to ASSERTED transition on the DTR line, or by an incoming Bluetooth low energy SPS connection, an incoming Bluetooth SPP connection or an incoming TCP connection. 4: Upon an ASSERTED to DEASSERTED transition of the DTR line, the module enters STOP mode. Upon an DEASSERTED to ASSERTED transition on the DTR line, the module is awoken.

4.4.4 Notes

- Values 3 and 4 are supported on NINA-B2-SW3.0.0 onwards, NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards, NINA-B1, NINA-B31, NINA-B41 and ANNA-B1.
- Values 3 and 4 are not supported by ODIN-W2.
- For NINA-W13 and NINA-W15, setting AT&D3 will also allow the module to enter and leave SLEEP mode whenever the UART is disabled.
- Wake-up time from STOP mode or UART re-enable may not be immediate.
- The implementation of SLEEP and STOP mode depends on the actual module.

  For details regarding the implementation of STOP, SLEEP and other low power modes, see the u-connectXpress user guide [1], and the corresponding datasheet for the ANNA-B1 [23], NINA-B1 [24], NINA-B2 [25], NINA-B31 [26], NINA-B41 27 NINA-W13 [28], NINA-W15 [29], ODIN-W2 [30] module.

  For additional methods of tuning the power consumption based on use-case, also see AT+UPWRMNG

4.5 DSR Override &S

&S				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

4.5.1 Description

Selects how the module will control RS232 circuit 107 - Data Set Ready (DSR) between ASSERTED (logical 0 on signal UART_DTR) and DEASSERTED (logical 1 on signal UART_DTR) states.

- The DSR line is connected to the DTR pin on the module

4.5.2 Syntax

AT Command	Description
AT&S[<value>]	Set behavior.

Response	Description
OK	Successful response.
ERROR	Error response if <value> is invalid.

4.5.3 Defined values

Parameter	Type	Description
value	Enumerator	0: ASSERT DSR
		1(default and factory default value): ASSERT DSR line in data mode and DEASSERT the DSR line in command mode
		2: ASSERT the DSR line when at least one remote peer is connected and DEASSERT DSR line when no remote peers are connected. See Connect Peer +UDCP and Default remote peer +UDDRP for definition of the remote peer. This applies to both incoming and outgoing connections.
		For NINA-B31, NINA-B41, ANNA-B112, and NINA-B1 from software version 4.0.0 onwards, the condition when the DSR line is asserted can be modified using Device Configuration +UDCFG

4.6 Echo On/Off E

E				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

4.6.1 Description

This command configures whether or not the unit echoes the characters received from the DTE in Command Mode. If <echo_on> is omitted, it turns off the echoing.

4.6.2 Syntax

AT Command	Description
ATE[<echo_on>]	Set echo on or off.
ATE?	Reads current echo setting.

Response	Description
echo_on	Successful read response.
OK	
OK	Successful response.
ERROR	Error response.

4.6.3 Defined values

Parameter	Type	Description
echo_on	integer	0: Unit does not echo the characters in command mode 1(factory default): Unit echoes the characters in command mode.

4.7 Escape character S2

S2				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

4.7.1 Description

Configures the escape character used to switch the unit from data mode to command mode.

4.7.2 Syntax

AT Command	Description
ATS2=<esc_char>	Configures the escape character.
ATS2?	Reads escape character.

Response	Description
esc_char	Successful read response.
OK	
OK	Successful response.
ERROR	Error response.

4.7.3 Defined values

Parameter	Type	Description
esc_char	integer	0...255 The escape sequence is the sequence that forces the module to switch from the data mode to command mode, or to enter configuration mode over the air. To enter

Parameter	Type	Description
		configuration mode over the air, this must be enabled on the specific server or peer, and all three escape characters must be transmitted in a single frame. Upon successful transition to the command mode, the DCE will transmit an OK response. Factory default: 43, the "+" character.

4.8 Command line termination character S3

S3				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

4.8.1 Description

Writes command line termination character.

This setting changes the decimal value of the character recognized by the DCE from the DTE to terminate an incoming command line. It is also generated by the DCE as part of the header, trailer, and terminator for result codes and information text along with the S4 parameter.

The previous value of S3 is used to determine the command line termination character for entry of the command line containing the S3 setting command. However, the result code issued shall use the value of S3 as set during the processing of the command line. For example, if S3 was previously set to 13 and the command line "ATS3=30" is issued, the command line shall be terminated with a CR, character (13), but the result code issued will use the character with the ordinal value 30 instead of the CR.

4.8.2 Syntax

AT Command	Description
ATS3=<line_term>	Writes command line termination character.
ATS3?	Reads command line termination character.

Response	Description
line_term	Successful read response.
OK	
OK	Successful response.
ERROR	Error response.

4.8.3 Defined values

Parameter	Type	Description
line_term	integer	0...127 Factory default: 13

4.9 Response formatting character S4

S4				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

4.9.1 Description

Writes response formatting character.

This setting changes the decimal value of the character generated by the DCE as part of the header, trailer, and terminator for result codes and information text, along with the S3 parameter. If the value of S4 is changed in a command line, the result code issued in response to that command line will use the new value of S4.

4.9.2 Syntax

AT Command	Description
ATS4=<term>	Writes response formatting character.
ATS4?	Reads response formatting character.

Response	Description
term	Successful read response.
OK	
OK	Successful response.
ERROR	Error response.

4.9.3 Defined values

Parameter	Type	Description
term	integer	0...127 Factory default: 10

4.10 Backspace character S5

S5				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

4.10.1 Description

Writes backspace character.

This setting changes the decimal value of the character recognized by the DCE as a request to delete from the command line, the immediately preceding character.

4.10.2 Syntax

AT Command	Description
ATS5=<backspace>	Writes backspace character.
ATS5?	Reads backspace character.

Response	Description
<backspace>	Successful read response.
OK	
OK	Successful response.
ERROR	Error response.

4.10.3 Defined values

Parameter	Type	Description
backspace	integer	0...127 Factory default: 8

4.11 Module switch off +CPWROFF

+CPWROFF				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Yes	No	-

4.11.1 Description

Reboot the DCE. During shutdown, the settings marked for storing to start up the database by &W are written in the non-volatile memory of the module.

4.11.2 Syntax

AT Command	Description
AT+CPWROFF	Reboot the DCE.

Response	Description
OK	Successful read response.

4.12 Software update +UFWUPD

+UFWUPD				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

4.12.1 Description

Force start of the boot loader.

The boot loader will start at the defined baud rate. To update any binary image other than the u-connect software, enter the bootloader mode and follow the boot menu commands. Optional parameters are available for secure boot and are supported by NINA-W13, NINA-B2, NINA-B31, NINA-B41, and NINA-W15 only.

4.12.2 Syntax

AT Command	Description
AT+UFWUPD=<mode>,<baud_rate>[<id>,<size>,<signature>,<name>,<flags>]	Force start of the boot loader.

Response	Description
CCC...	Successful write response.
	For NINA-B1 until software version 3.0.1, the response will be: NINA-B1 Bootloader 2.0.0.0 u-blox

4.12.3 Defined values

Parameter	Type	Description
Mode	Enumerator	Download mode: 0: u-connect software update using serial port 1: Enter the bootloader mode using serial port. This mode is supported by NINA-B31, NINA-B41, ANNA-B112, and NINA-B1 from software version 4.0.0 onwards only.
Baud_rate	Enumerator	Baud rate in bits per second: 38400 (see below) 115200 (default) 230400

Parameter	Type	Description
		460800 921600 - This baud rate is supported by NINA-W13, NINA-B1, ANNA-B112, NINA-B2, NINA-B31, NINA-B41, and NINA-W15. For NINA-B1 bootloaders with version lower than 3.0.2, only the baudrate 115200 with flow control is supported. The baud rate 38400 is only supported by ANNA-B1 SW 4.0.0 and NINA-B1 SW 7.0.0 onwards, with boot loader version 3.2.
Id	Integer	ID number of the firmware. Only 0 is supported.
Size	Integer	Size of the firmware image in bytes in decimal notation.
Signature	String	RSA Signature of the firmware image as base64 encoded string. The signature length for NINA-W13, NINA-B2, NINA-B31, NINA-B41 and NINA-W15 is 344.
Name	String	The name of the firmware. Maximum string length is 22.
Flags	String	Permissions for using the firmware image. Permission flags are marked in UNIX style. "rwx" is the default flag for the u-connect software. "rw" is the default flag for other binary images. Only "rwx" is supported.

4.13 Local address +UMLA

+UMLA				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

4.13.1 Description

In the summary table, the Profile is valid only for ODIN-W2.

4.13.2 Syntax

AT Command	Description
AT+UMLA=<interface_id>	Reads the local address of the interface id.
AT+UMLA=<interface_id>, <address>	Sets the local address of the interface id. A DCE reboot is required before an address change takes effect. Setting the address is supported by ODIN-W2, NINA-B2, NINA-W13, and NINA-W15 in all SW versions. Setting the address is supported by NINA-B31 and ANNA-B1 from SW 3.0, NINA-B1 from SW 6.0, and by NINA-B41.

Response	Description
OK	Successful write response.
+UMLA:<address> OK	Successful read response.
ERROR	Error response.

4.13.3 Defined values

Parameter	Type	Description
interface_id	integer	1: Bluetooth 2: Wi-Fi 3: Ethernet 4: Wi-Fi Access Point (AP)

Parameter	Type	Description	
		interface_id	**Supported by**
		1	ODIN-W2, NINA-B1, NINA-B31, NINA-B41, NINA-B2, ANNA-B112, NINA-W15
		2	ODIN-W2, NINA-W13, NINA-W15
		3	ODIN-W2, NINA-W13 from software version 2.0.0 onwards, NINA-W15
		4	NINA-W13 from software version 2.0.0 onwards, NINA-W15
address	MAC_Addr	MAC address of the interface id. If the address is set to 000000000000, the local address will be restored to factory-programmed value. ☞ The least significant bit of the first octet of the <address> must be 0; that is, the <address> must be a unicast address.	

4.14 LPO detection +UMLPO

+UMLPO				
Modules	ODIN-W2-SW7.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

4.14.1 Description

Checks if Low Power Oscillator (LPO) is detected or not.

4.14.2 Syntax

AT Command	Description
AT+UMLPO?	Checks if Low Power Oscillator (LPO) is detected or not.

Response	Description
+UMLPO:<LPO detected>	Successful with result 1="LPO detected" or 0="LPO not detected".
OK	
ERROR	Error message.

4.15 RS232 Settings +UMRS

+UMRS				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

4.15.1 Description

Read and set RS232 Settings.

4.15.2 Syntax

AT Command	Description
AT+UMRS?	Reads current RS232 settings from the module.
AT+UMRS[=<baud_rate>[,<flow_control>[,<data_bits>[, <stop_bits>[,<parity>[,<change_after_confirm>]]]]]]	Applies new RS232 settings. If <change_after_confirm> is 0, the new settings will be applied after reset (if stored to the profile).

Response	Description
+UMRS:<baud_rate>, <flow_control>, <data_bits>, <stop_bits>, <parity>	Successful read response.
OK	
OK	Successful write response.

Response	Description
	After receiving the OK response, the DTE shall wait for at least 40 ms for ODIN-W2 and 1 second for NINA-B1, NINA-B31, NINA-B41, and ANNA-B112 before issuing a new AT command, to guarantee a proper baudrate reconfiguration.
ERROR	Error message.

4.15.3 Defined values

Parameter	Type	Description
baud_rate	integer	Factory default value: 115200 • **ODIN-W2:** 19200 - 5250000. The module will set a baud rate as close as possible to the requested baud rate. Recommended baud rates: 9600, 14400, 19200, 28800, 38400, 57600, 76800, 115200, 230400, 250000, 460800, 921600, 3000000. For EVB-W2xxU, the baud rate - 2625000 cannot be used and the highest allowed baud rate is 3000000. This is a limitation for the development board and not for ODIN-W2. • **NINA-B1, NINA-B31, NINA-B41, and ANNA-B112:** 19200, 38400, 57600, 115200, 230400, 460800, 1000000. • **NINA-W13, NINA-B2, and NINA-W15:** 9600 - 3000000. The module will set a baud rate as close as possible to the requested baud rate. Recommended baud rates: 9600, 14400, 19200, 28800, 38400, 57600, 76800, 115200, 230400, 250000, 460800,921600.
flow_control	enumerator	1 (factory default): CTS/RTS used for flow control 2: CTS/RTS not used.
data_bits	integer	Factory-programmed value:8
stop_bits	enumerator	1 (factory default): 1 stop bit 2: 2 stop bits. This is supported by ODIN-W2 only.
parity	enumerator	1 (factory default): no parity 2: odd parity. This is supported by ODIN-W2 only. 3: even parity
change_after_confirm	enumerator	0: Do not change; it must be stored and reset before applying the new setting 1 (default): Change after OK. The DTE should wait at least 40 ms before sending a new command. When operating in the extended data mode, the change_after_confirm has no direct effect. Settings must be stored to the profile and the module must be rebooted before applying the settings.

4.16 Secondary RS232 Settings +UMRSCFG

+UMRSCFG				
Modules	NINA-B31-SW3.0.0 onwards, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

4.16.1 Description

Set up a secondary UART, to be used for for example communicating with another module.

The secondary UART can be used as a stream using the Chapter 5.7 command.

4.16.2 Syntax

AT Command	Description
AT+UMRSCFG=<id>	Reads RS232 <id> settings from the module.
AT+UMRSCFG=<id>,<mode>, <txd>, <rxd>,<rts>,<cts>	Set RS232 settings for <id>.

Response	Description
+UMRSCFG:<id>, <mode>, <txd>, <rxd>, <rts>, <cts>	Successful read response.
OK	
OK	Successful write response.
ERROR	Error message.

4.16.3 Defined values

Parameter	Type	Description
id	enumerator	1: Secondary UART
mode	enumerator	1 (factory default): On
txd	integer	TXD pin
rxd	integer	RXD pin
rts	integer	RTS pin
cts	integer	CTS pin

4.17 Route radio signals to GPIOs +UMRSIG

+UMRSIG				
Modules	NINA-B31-SW2.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

4.17.1 Description

Enable routing of radio signals to EXT_TX_EN and EXT_RX_EN pins.

4.17.2 Syntax

AT Command	Description
AT+UMRSIG=<mode>	Enable routing. When routing is enabled on both the pins, it is recommended not to use other GPIO commands on the same pins to avoid undefined behavior.
AT+UMRSIG?	Read if the radio signals are routed on the EXT_TX_EN and EXT_RX_EN pins.

Response	Description
OK	Successful response.
ERROR	Error response.

4.17.3 Defined values

Parameter	Type	Description
mode	integer	0 (default): Disabled 1: Enabled.

4.17.4 Notes

For the settings to take effect, use the commands - &W and +CPWROFF to store the configuration to start up database and reboot the module.

The EXT_TX_EN and EXT_RX_EN pins are chosen as IO_2 and IO_3 respectively on NINA-B31.

4.18 Module start mode +UMSM

+UMSM				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

4.18.1 Description

Set the start mode for the module.

4.18.2 Syntax

AT Command	Description
AT+UMSM=<start_mode>	Writes start mode
AT+UMSM?	Reads start mode

Response	Description
OK	Successful write response.
+UMSM:<start_mode> OK	Successful read response.

4.18.3 Defined values

Parameter	Type	Description
start_mode	Enumerator	0 (factory default): Command mode 1: Data mode 2: Extended data mode. For NINA-B1, the Extended data mode is supported from software version 2.0.0 onwards only. 3: PPP mode. The PPP mode is supported only by ODIN-W2, NINA-W13 from software version 2.0.0 onwards and NINA-W15.

4.19 System status +UMSTAT

+UMSTAT				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

4.19.1 Description

Read the system status.

4.19.2 Syntax

AT Command	Description
AT+UMSTAT[=<status_id>]	Reads current status of the system. If <status_id> is omitted, all applicable ids will be listed.

Response	Description
+UMSTAT:<status_id>,<status_val> OK	Successful read response.
ERROR	Error message.

4.19.3 Defined values

Parameter	Type	Description
status_id	integer	0: The <status_val>is the uptime in seconds. That is, the seconds since last reboot

Parameter	Type	Description
		1: The <status_val>is the current status of the settings • 0: Not saved. That is, there are some changes since the last stored command. • 1: Saved

4.20 Power management +UPWRMNG

+UPWRMNG				
Modules	NINA-B2-SW3.0.0 onwards, NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

4.20.1 Description

Fine-tune power management to obtain lowest possible power consumption.

4.20.2 Syntax

AT Command	Description
AT+UPWRMNG=<param_tag>, <param_val>	Write power management configuration.
AT+UPWRMNG?	Read power management configuration.

Response	Description
+UPWRMNG:<param_tag>, <param_val> ... OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

4.20.3 Defined values

Param tag	Default value	Minimum value	Maximum value	Description	Supported Modules
1	160	10	240	Minimum CPU Frequency (MHz).	All
2	160	80	240	Maximum CPU Frequency (MHz).	All

4.20.4 Notes

Lowering the Minimum CPU Frequency below the Maximum CPU Frequency will enable the Automatic Frequency Adaption (AFA) feature of u-connectXpress, ensuring the module will not require more power than required during ACTIVE, STANDBY and SLEEP modes.

The implementation of power management depends on the actual module. For details regarding the implementation of ACTIVE, STANDBY, SLEEP and other low-power modes, see the u-connectXpress user guide [1], and the corresponding datasheet for the ANNA-B1 [23], NINA-B1 [24], NINA-B2 [25], NINA-B31 [26], NINA-B41 [27] NINA-W13 [28], NINA-W15 [29], ODIN-W2 [30] module.

For additional methods of tuning the power consumption based on use-case, also see AT&D, AT+UBTCFG, AT+UBTLECFG, AT+UBTMODE, AT+UDCFG, AT+USTOP, AT+UMLPO, AT+UPWRREG, AT+USTOP, AT+UWAPC, AT+UWCFG, AT+UWSC.

☞ For NINA-B2, NINA-W13 and NINA-W15, the CPU frequencies must be one of 80, 160 and 240. In addition, 10 and 40 may also be set as the Minimum CPU Frequency

☞ On NINA-B2 and NINA-W15, decreasing the Minimum CPU Frequency to below 40 MHz may cause an increased frequency of dropped connections in Bluetooth Classic or Bluetooth LE mode.

4.21 Power regulator +UPWRREG

+UPWRREG				
Modules	NINA-B1-SW5.0.0 onwards			
	ANNA-B112-SW2.0.0 onwards			
	NINA-B31-SW2.0.0 onwards, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	< 1s

4.21.1 Description

Set power regulator behavior.

4.21.2 Syntax

AT Command	Description
AT+UPWRREG=<value>	Enable/disable automatic switch between DC/DC and LDO power regulators.
AT+UPWRREG?	Reads power regulator setting.

Response	Description
OK	Successful write response.
ERROR	Error response.

4.21.3 Defined values

Parameter	Type	Description
param_tag	enumerator	0 (default): Switch automatically between DC/DC and LDO regulators. 1: Disable DC/DC and use only LDO regulator.

4.21.4 Notes

☞ For the settings to take effect, use the commands - &W and +CPWROFF to store the configuration to start up database and reboot the module.

4.22 Enter STOP Mode +USTOP

+USTOP				
Modules	NINA-B2-SW3.0.0 onwards, NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

4.22.1 Description

Configure wake-up source and enter the low-power STOP mode. STOP mode is the lowest possible power mode.

4.22.2 Syntax

AT Command	Description
AT+USTOP=<mode>,<param_value>[,<polarity>]	Enter STOP mode now

Response	Description
OK	Successful response.
ERROR	Error response.
+STARTUP	Sucessful wakeup from STOP mode. ☞ This response is configurable using the AT+CSGT command.

4.22.3 Defined values

Parameter	Type	Description
mode	Enumerator	1: Enter STOP mode now and wake up after a timeout. 2: Enter STOP mode now and wake up when a GPIO is either LOW or HIGH.
param_value	Integer	When mode is 1: Time in milliseconds until wake up from STOP Mode. When mode is 2: GPIO which will wake module up from STOP mode. Valid GPIOs are: • 2 • 3 • 4 • 18 • 31 • 34 • 35
polarity	Enumerator	Applicable only when mode is 2. 0: wake up from STOP mode when GPIO is LOW. 1: wake up from STOP mode when GPIO is HIGH.

4.22.4 Notes

The implementation of STOP mode depends on the actual module. For details regarding the implementation of STOP and other low power modes, see the u-connectXpress user guide [1], and the corresponding datasheet for the ANNA-B1 [23], NINA-B1 [24], NINA-B2 [25], NINA-B31 [26], NINA-B41 [27], NINA-W13 [28], NINA-W15 [29], ODIN-W2 [30] module.

For additional methods of tuning the power consumption based on use-case, also see AT+UPWRMNG,

☞ Wake-up time from STOP mode may not be immediate.

5 Data mode

5.1 Enter data mode O

O				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

5.1.1 Description

Go from command mode to a new mode.

5.1.2 Syntax

AT Command	Description
ATO[<mode>]	Requests the module to move to the new mode.

Response	Description
OK	Successful response.
ERROR	Error response.

5.1.3 Defined values

Parameter	Type	Description
mode	Enumerator	0: Command mode
		1: Data mode (default)
		2: Extended data mode (EDM): For NINA-B1 and ANNA-B112, the EDM is supported only from software version 2.0.0 onwards.
		3: PPP mode: Supported by ODIN-W2 only.

5.1.4 Notes

- The module start up mode is set using the Module Start Mode +UMSM command. If remote configuration is enabled, entering data mode will set all channels to the data mode.
- After executing the data mode command or the extended data mode command, a delay of 50 ms is required before start of data transmission.

5.2 Read data in AT command mode +UDATR

+UDATR				
Modules	NINA-W13-SW4.0.0 onwards, NINA-W15-SW4.0.0 onwards			
	NINA-B1-SW7.0.0 onwards, ANNA-B112-SW4.0.0 onwards, NINA-B2-SW4.0.0 onwards			
	NINA-B3-SW4.0.0 onwards, NINA-B4-SW2.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

5.2.1 Description

Generic read command that can be used for any peer connection created with a url-scheme starting with "at-" (see +UDCP).

5.2.2 Syntax

AT Command	Description
AT+UDATR=<peer_handle>>, <data_format>,<max_data_length>	Read received data from peer.

Response	Description
+UDATR:<data_length> <data>	When data format is 2 (binary). The carriage return and linefeed ending the AT-response is sent after data_length parameter, followed by that actual data.
+UDATR:<data_length>,<hex_data>	When data format is 1 (hexadecimal).
OK	Successful response.
ERROR	Error response.

5.2.3 Defined values

Parameter	Type	Description
peer_handle	Integer	The peer handle identifies the connection.
max_data_length	Integer	Maximum amount of data bytes to read. Set this to 0 to check available data without reading.
data_format	Enumerator	0: Reserved 1: Hexadecimal (Byte Array) 2: Binary
data_length	Integer	Actual amount of data bytes to read.
data	Blob	Received raw data.
hex_data	Byte Array	Received data in hexadecimal form.

5.2.4 Example

The following example sets up an outgoing Bluetooth SPP connection that can be used for reading data in AT command mode. In this example, 5 bytes of data is read on peer handle 1 each time.

AT+UDCP=at-spp://04D3B0285423p

+UDCP:1

OK

+UUDCP:1,1,1,04D3B0285423p,1011

We try to read 5 bytes before something has been sent from remote side and see that we get +UDATR response that 0 bytes where read followed by +UUDATA event that tells us that 0 bytes are in the incoming buffer.

+UDATR:0

OK

+UUDATA:1,0

Now the remote side send 9 bytes of data and we get an event to indicate that there are 9 bytes to be read.

+UUDATA:1,9

Now we read 5 bytes of data in binary format

AT+UDATR=1,2,5

+UDATR:5

12345

OK

We get an event that indicates that 4 bytes are still left in buffer to be read.

+UUDATA:1,4

Now we try to read 5 bytes of data in hex format, but only receive 4 bytes since buffer is empty after that.

AT+UDATR=1,1,5

+UDATR:4,36373839

OK

Now we get event that indicate that there are no more bytes to read.

+UUDATA:1,0

5.3 Write data in AT command mode +UDATW

+UDATW				
Modules	NINA-W13-SW4.0.0 onwards, NINA-W15-SW4.0.0 onwards			
	NINA-B1-SW7.0.0 onwards, ANNA-B112-SW4.0.0 onwards, NINA-B2-SW4.0.0 onwards			
	NINA-B3-SW4.0.0 onwards, NINA-B4-SW2.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

5.3.1 Description

Generic write command that can be used for any peer connection created with a url-scheme starting with "at-" (see +UDCP).

5.3.2 Syntax

AT Command	Description
AT+UDATW=<peer_handle>,<data_format>,<data>	Send data to peer, where data_format is 0 or 1 (string or hexadecimal).
AT+UDATW=<peer_handle>,<data_format>,<data_length>	Send data to peer, where data_format is 2 (binary). The command response is first a data prompt. After data prompt is received by the host it should send data_length number of bytes. OK response is given after data_length of bytes has been received.

Response	Description
>	Prompt to start sending data, when data format is 2 (binary). ☞ Binary data will not be echoed.
OK	Successful response.
ERROR	Error response. These are the situations resulting in error: • There is currently no room for the data in transmit buffer. Wait some time and retry. • There was a too long idle period in data reception in binary mode. The timeout value can be set with +UDCFG command. • Invalid parameter. • Peer connection url does not start with "at-".

5.3.3 Defined values

Parameter	Type	Description
peer_handle	Integer	The peer handle identifies the connection.
data_format	Enumerator	0: String 1: Hexadecimal (Byte Array) 2: Binary
data	String/Byte Array	Data to send, String in text case, Byte Array in hexadecimal case.
data_length	Integer	Number of bytes to send. Minimum 1, maximum 2000.

5.3.4 Example

The following example sets up an outgoing Bluetooth SPP connection that can be used for sending data in AT command mode. In this example, data in text format is sent on peer handle 1.

AT+UDCP=at-spp://04D3B0285423p

+UDCP:1

OK

+UUDCP:1,1,1,04D3B0285423p,1011

AT+UDATW=1,0,"Some Text"

OK

5.4 Bind +UDBIND

+UDBIND				
Modules	ODIN-W2, NINA-W15, NINA-B31, NINA-B41,			
	NINA-B2, NINA-W13-SW2.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

5.4.1 Description

Bind two streams together for transparent data transfer between physical interfaces.

5.4.2 Syntax

AT Command	Description
AT+UDBIND=<StreamId1>, <StreamId2>	Binds TX data from Stream 1 to RX of Stream 2 and vice versa. Stream ids are provided on response of a successful connection.
AT+UDBIND?	Reads current bindings.

Response	Description
+UDBIND:<ChannelId1>, <ChannelId2> OK	Successful set response.
+UDBIND:<StreamId>, <ChannelId1>,<ChannelId2> ... ... OK	Successful read response.
ERROR	Error response.

5.4.3 Defined values

Parameter	Type	Description
StreamId	Integer	Stream id is provided when a stream connection is done.
ChannelId	Integer	Channel id is provided when a successful binding is done.

5.5 Bind to channel +UDBINDC

+UDBINDC				
Modules	ODIN-W2			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

5.5.1 Description

Bind a stream and a channel together. Stream ids are provided on response of a successful connection. Channel id is provided on response of a successful bind command.

5.5.2 Syntax

AT Command	Description
AT+UDBINDC=<StreamId>, <ChannelId>	Binds Stream with Id <StreamId> to channel with Id <ChannelId>.

Response	Description
OK	Successful set response.
ERROR	Error response.

5.5.3 Defined values

Parameter	Type	Description
StreamId	Integer	Stream id is provided when a stream connection is done.
ChannelId	Integer	Channel id is provided when a successful binding is done.

5.6 Configuration +UDCFG

+UDCFG				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

5.6.1 Description

Read and set configurations related to remote peers.

5.6.2 Syntax

AT Command	Description
AT+UDCFG[=<param_tag>]	Reads peer configuration.
AT+UDCFG=<param_tag>,<param_val>[, param_val, param_val]	Writes peer configuration.

Response	Description
+UDCFG:<param_tag>,<param_val>	Sent for each applicable param_tag.
OK	Successful write response.
ERROR	Error message.

5.6.3 Defined values

Parameter	Type	Description
param_tag	Enumerator	0: Keep remote peer in the command mode • 0: Disconnect peers when entering the command mode • 1 (default): Keep connections when entering the command mode 1: The module will be reset to factory default settings if it detects the following sequence on the DTR line: 1 second silence, 5 transfers from DEASSERTED to ASSERTED within 1 second, and 1 second silence. AT&D settings does not affect this. • 0: Disabled • 1 (default): Enabled 2: Number of allowed TCP links. **ODIN-W2:** • 1-8: Default is 2. **NINA-W1:** • 2: Default and the only allowed value is 2. Use the commands -&W and +CPWROFF to store the configuration and reboot the module for changes to param_tag 2 to take effect. 3: DSR activation bit mask. Defines the condition when the DSR line is asserted. The default value for the bit mask corresponds to the previous behavior of the &S2 AT command. • Bit 0: Activate DSR if any data peer is connected (old behavior) • Bit 1: Activate DSR if a Bluetooth LE bonded device is connected • Bit 2: Activate DSR on any Bluetooth LE GAP connection o NINA-B2/W13/W15 only support bit 0 in software versions prior to 4.0.0 4: Always connected reconnect time out

Parameter	Type	Description
		• 100-60000 milliseconds before trying to reconnect a default remote peer with always connected bit set (Default is 10000) 5: TCP out of sequence queue length • 0-15: Queue length for TCP packets arriving out of sequence (Default is 3). If multiple TCP links are used, this should be low. 6: Keep-alive settings Configures the tcp keep-alive settings for all tcp connections. It includes keepIdle, keepInterval and keepCount separated by a ",". Default is "0,0,0". Uses tcp stack default values (~2h). • keepIdle: Time in milliseconds (ms) between keepalive packets • keepInterval: Time in milliseconds between two successive keepalive retransmissions • keepCount: The number of retransmissions to be sent before disconnecting the remote end 7: AT command mode data timeout (ms) Maximum idle period when transferring binary data in +UDATW command. 8: Escape sequence timing Configuration of escape sequence timing. For an escape sequence to be valid, a silence period of no data activity on uart is required before and after the 3 characters in the escape sequence are sent. This command takes 3 parameters (param_val) that are given in milliseconds (ms): • preTimeout: 50 - 5000 (Default is 1000) Minimum time of no data activity required before the escape sequence is sent • postTimeout: 50 - 5000 (Default is 1000) Minimum time of no data activity required after the escape sequence is sent • withinTimeout: 50 - 5000 (Default is 200) Maximum time for the actual escape characters to be sent 9: Drop data when going to AT command mode. When enabled, switching from data mode to AT command mode using the escape sequence will be faster since we will not wait for outstanding data to be successfully transmitted to the remote peer. • 0 (default): Disabled • 1: Enabled ☞ Only works when module is configured to disconnect peers when entering AT command mode (AT+UDCFG=0,0).

5.6.4 Notes

The products and their corresponding supported parameter tags are listed in the table below:

Products	Supported parameter tags	Supported software versions
ODIN-W2	0,1	All versions
	2	4.0.0 onwards
	4,5	7.0.0 onwards
	8	8.0.0 onwards
NINA-B1	0,1	All versions
	3	4.0.0 onwards
	9	7.0.0 onwards
ANNA-B112, NINA-B31	0,1,3	All versions
	9	4.0.0 onwards
NINA-B41	0,1,3	All versions
	9	2.0.0 onwards
NINA-W13	0,1,2,3	All versions
	5,6	2.1.0 onwards
	7	4.0.0 onwards
NINA-W15	0,1,2,3	All versions
	5,6	2.1.0 onwards

	7	4.0.0 onwards
NINA-B2	0,1,3	All versions
	7	4.0.0 onwards

5.7 Connect peer +UDCP

+UDCP				
Modules	ODIN-W2, NINA-W13, NINA-W15			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

5.7.1 Description

Connects to an enabled service on a remote device. When the host connects to a service on a remote device, it implicitly registers to receive the "Connection Closed" event.

5.7.2 Syntax

AT Command	Description
AT+UDCP=<url>	Connects to an enabled service on a remote device. When the host connects to a service on a remote device, it implicitly registers to receive the "Connection Closed" event.

Response	Description
+UDCP:<peer_handle>	Successful response.
OK	
ERROR	Error response.

5.7.3 Defined values

Parameter	Type	Description
url	String	URL to the service on the remote peer. The format of the URL is <scheme>://<domain>[:<port>]/[?<query_string>] <domain> depends on the <scheme>. For internet domain names, the maximum length is 64 characters. ☞ Domain name length is 128 for NINA-W13 and NINA-W15 software version 4.0.0 or later. <query_string> may contain both &-separated key/value-pairs passed on to the remote peer (typically for MQTT connections), as well as key/value-pairs proprietary to u-connectXpress. Such key/value-pairs define and affects the behaviour and properties of the actual connection. ☞ In case the <domain> requires a value for a key in the <query_string> of the <scheme> to contain URL escape character coding such as %3d for '=' or %26 for '&', or a non-escaped space character (' '), that value cannot be written as-is into the <query_string>. Instead, use +UDUV to define an index for that value, and replace the value in the <query_string> for the relevant key with "%%n", where 'n' is the index as specified in +UDUV. Schemes starting with "at-" creates a connection capable of sending and receiving data without entering Data mode using the AT+UDATR and AT+UDATW commands together with the unsolicited event +UUDATA. Such a connection will not transfer any data in data mode. They are available on NINA-W13, NINA-W15, NINA-B2, ANNA-B112 and NINA-B3 uX-SW4.0.x onwards, NINA-B4 uX-SW2.0.x onwards and NINA-B1 uX-SW7.0.x onwards. <scheme> shall be one of the following, with the relevant u-connectXpress-proprietary keys as part of the <query_string>: **sps/at-sps**:

Parameter	Type	Description
		u-blox Serial Port Service connection. See the u-blox Low Energy Serial Port Service Protocol Specification [3] for detailed information. • <domain> specifies Bluetooth address <Bd_Addr> of the remote device; port is ignored. • <query_string> can define "bt_name", "role" and "escseq" o "bt_name" defines the Bluetooth name to which the device shall connect and is available for ODIN-W2 only from software version 5.0.0 onwards. o "role" defines the role of the remote device; if the local device is configured as Bluetooth low energy Simultaneous Peripheral or Central. o "escseq" defines allowed "escseq"; if the "escseq" is 1, the remote device can put the local device in AT command mode (see AT+UDSF command). **spp/at-spp/dun**:* * - Both spp and dun are supported by ODIN-W2. Only spp is supported by NINA-B2 and NINA-W15. • <domain> specifies Bluetooth address <Bd_Addr> of the remote device and port specifies RFCOMM channel • <query_string> can define "bt_name", "uuid", "qos" and "escseq" o "bt_name" defines the Bluetooth name to which the device shall connect in spp and is available for ODIN-W2 from software version 5.0.0 onwards only. o "uuid" defines the uuid of the remote service o "qos=1" enables Bluetooth Quality of service (see AT+UBTCFG command). o "escseq=1" enables escape sequence detection (see AT+UDSF command). **tcp/at-tcp**: TCP or TLS connection. Supported by ODIN-W2, NINA-W13, and NINA-W15 only • <domain> specifies either IPv4 <IPv4_Addr> or IPv6 <IPv6_Addr> address or domain name. • <query_string> can define "local_port" • <query_string> "flush_tx" defines if a flush should be done after each write o 0(default): disabled o 1: enabled • <query_string> "keepAlive" is used to configure the tcp keepalive settings. It includes keepIdle, keepInterval, and keepCount separated by a "+" o keepIdle: time in milliseconds (ms) between keepalive packets o keepInterval: time in milliseconds between two successive keepalive retransmissions o keepCount: the number of retransmissions to be sent before disconnecting the remote end • <query_string> "ca" defines the certificate authority • <query_string> "cert" defines the client certificate • <query_string> "privKey" defines the private key For certificate management, see AT+USECMNG command. • <query_string> "encr" defines the minimum TLS version used: o 1: TLS v1.0 - Default if either "ca" or "cert" and "privKey" is defined o 2: TLS v1.1 o 3: TLS v1.2 **udp/at-udp**: Supported by ODIN-W2, NINA-W13, and NINA-W15 only • <domain> specifies either IPv4 <IPv4_Addr> or IPv6 <IPv6_Addr> address or domain name • <query_string> can define "local_port" • <query_string> "flags=1" enables reception from a unicast address when peer is configured to a multicast address. This query string is valid for ODIN-2 only from software version 6.0.0 onwards. **mqtt/at-mqtt**: TCP or TLS connection to an MQTT Broker.

Parameter	Type	Description
		Supported by NINA-W13, NINA-W15 and ODIN-W2 software version 7.0.0 onwards. • See the u-connectXpress MQTT Application Note [12] for detailed information. **com/at-com**: Supported by NINA-B3-uX-SW3.0.0 onwards only • <domain> com2 (secondary UART, id=1 in +UMRSCFG). • <query_string> "settings" baud_rate,data_bits,stop_bits,parity,flow_ctrl. • <query_string> "misc" esc_sequence,min_packet_size,us_min_poll_time_rx (min_packet_size=0 => Packet mode disabled). **http-tcp** Connect to HTTP server using HTTP or HTTP over TLS (HTTPS). Supported by NINA-W15 and NINA-W13 from SW version 3.0.0 onwards • <query_string> supports all keys supported by the tcp <scheme>, plus: o "http-timeout": Defines the timeout in ms for response. **spi/at-spi**: Set up an SPI stream in SPI slave role. Supported by NINA-W13, NINA-W15 and NINA-B2 from SW version 3.0.0 onwards • <domain>: Which SPI bus to use. For NINA-W15 and NINA-B2 only SPI2 is supported, mapped logically as "spi0" • <query_string> defines pins, mode, data size and protocols o "drdy", gpio pin: slave output, signals that slave have data available. If not specified, data ready pin is not utilized. Instead, if the protocol is enabled from slave to master, the master can poll the slave. o "norx", gpio pin: slave output, signals that the slave cannot receive data right now. If not specified, cannot receive pin is not utilized. Instead, if protocol is enabled from slave to master, the master can read status. o "miso", gpio pin: if not specified, the MISO pin is not utilized, and the master cannot read from the slave. o "mosi", gpio pin: if not specified, the MOSI pin is not utilized, and the master cannot write to the slave. o "sclk", gpio pin: if not specified, the SCLK pin is not utilized. In slave mode, this pin must be defined or the command will return an error. o "cs", gpio pin: if not specified, the CS pin is not utilized. In slave mode, this pin must be defined or the command will return an error. o "mode", SPI bus mode: if not specified, mode is 3 (slave, SPI mode 3) - 0: slave, SPI mode 0 (not implemented) - 1: slave, SPI mode 1 - 2: slave, SPI mode 2 (not implemented) - 3: slave, SPI mode 3 - 4: master, SPI mode 0 (not implemented) - 5: master, SPI mode 1 (not implemented) - 6: master, SPI mode 2 (not implemented) - 7: master, SPI mode 3 (not implemented) o "size", SPI maximum transaction size in bytes. Defaults to 16 if not specified. o "csactive", chip select active level. Defaults to 0 (active low) - 0: active low - 1: active high (not supported) o "drdyactive", data ready active level. Defaults to 1 (active high) - 0: active low - 1: active high o "norxactive", cannot receive active level. Defaults to 1 (active high) - 0: active low - 1: active high o "proto", software protocol. Defaults to 0 (none) - 0: none

Parameter	Type	Description
		- 1: module to host protocol enabled - 2: host to module protocol expected - 3: module to host protocol enabled, host to module protocol expected See the u-blox SPI bus Protocol Description [17] for detailed information on the u-blox SW protocol used over SPI. Examples of different URLs are provided below: **sps**: "sps://0012f3000001/" "at-sps://0012f3000001/" "sps://000000000000/?bt_name=device_no1" "sps://0012f3000001/?role=p" "sps://0012f3000001/?role=c" "sps://0012f3000001/?esqseq=1" "sps://0012f3000001/?role=c&escseq=1" **spp**: "spp://0012f3000001p/" "at-spp://0012f3000001p" "spp://000000000000/?bt_name=device_no1" "spp://0012f3000001p/?qos=1" "spp://0012f3000001:31/" "spp://0012f3000001/?&escseq=1" "spp://0012f3000001p/?uuid=fa87c0d0afac11de8a390800200c9a66" **tcp**: "tcp://192.168.0.1:8080/" "at-tcp://192.168.0.1:8080/" "tcp://[FE80:0000:0000:0000:0202:B3FF:FE1E:8329]:8080/" "tcp://example.org:2000/?local_port=2001" "tcp://example.org:2000/?flush_tx=1" "tcp://example.org:2000/?keepAlive=5000+1000+5" "tcp://example.org:2000/?ca=ca.crt&cert=client.crt&privKey=client.key" "tcp://example.org:2000/?ca=ca.crt" "tcp://example.org:2000/?encr=1" **udp**: "udp://192.168.0.1:8080/" "at-udp://192.168.0.1:8080/" "udp://[FE80:0000:0000:0000:0202:B3FF:FE1E:8329]:8080/" "udp://example.org:2000/?local_port=2001" "udp://[FF02:0000:0000:0000:0000:0000:0000:0001]:15118/?flags=1" (Valid for ODIN-W2 only from software version 6.0.0 onwards) **mqtt**: "mqtt://iot-u-connectXpress-AN-test.azure-devices.net:8883/?client=NINA-W13-D4CA6EFD96E0&user=iot-u-connectXpress-AN-test.azure-devices.net/NINA-W13-D4CA6EFD96E0&ca=azure-iot-baltimore-cert.pem&cert=client.cer&privKey=client.key.pem&pt=devices/NINA-W13-D4CA6EFD96E0/messages/events/" "mqtt://iot-u-connectXpress-AN2-test.azure-devices.net:8883/?encr=1&client=NINA-W13-D4CA6EFD96E0&user=iot-u-connectXpress-AN2-test.azure-devices.net/NINA-W13-D4CA6EFD96E0&pt=devices/NINA-W13-D4CA6EFD96E0/messages/events/&passwd=%%1"

Parameter	Type	Description
		Valid only for NINA-W13 and NINA-W15 from software version 3.0.0 onwards. The above example also requires that index 1 of +UDUV has been set to a valid value such as AT+UDUV=1,"SharedAccessSignature sr=iot-u-connectXpress-AN2-test.azure-devices.net&sig=nRS62PjqvQaMJRfFFEFovkqqeDRftAdH3rqzkGoqlpE%3D&se=1574417203" "mqtt://%%0/?pt=%%1&st=mytopic/#&mode=1"
		Valid only for NINA-W13 and NINA-W15 from software version 3.0.0 onwards. The above example also requires that index 0 and 1 of AT+UDUV has been set to valid values such as AT+UDUV=0,"192.168.0.7:1883" AT+UDUV=1,"mytopic/2"
		com: "com://com2/?settings=115200,8,1,none,ctsrts&misc=true,0,500" "com://com2/?settings=115200,8,1,none,none&misc=true,0,500" "com://com2/?settings=115200,8,1,even,none&misc=true,0,500"
		SPI: "spi://spi0/?cs=32&sclk=31&miso=36&mosi=35&mode=3&drdy=25&size=720&proto=3" SPI slave with PDU size 720, SW protocol 3
peer_handle	Integer	The peer handle identifies the connection and is used when closing the connection.

5.8 Close peer connection +UDCPC

+UDCPC				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

5.8.1 Description

Closes an existing peer connection.

5.8.2 Syntax

AT Command	Description
AT+UDCPC=<peer_handle>	Close connection.

Response	Description
OK	Successful response.
ERROR	Error response.

5.8.3 Defined values

Parameter	Type	Description
peer_handle	integer	The peer handle identifies the connection.

5.9 Default remote peer +UDDRP

+UDDRP				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

5.9.1 Description

The default remote peer command works for Bluetooth BR/EDR, Bluetooth low energy (SPS), TCP, and UDP. The DCE will connect to a default remote peer when entering either the Data mode or Extended data mode (either by command or at start up, if defined by the Module Start Mode +UMSM command).

5.9.2 Syntax

AT Command	Description
AT+UDDRP[=<peer_id>]	This command reads the default remote peer (peer id).
AT+UDDRP=<peer_id>,<url>, <connect_scheme>	This command writes the default remote peer (peer id).

Response	Description
+UDDRP:<peer_id>,<url>, <connect_scheme> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

5.9.3 Defined values

Parameter	Type	Description
peer_id	Integer	• For ODIN-W2, the peer ID can be 0-6. • For NINA-B1 software version 1.0.0, the peer ID can be 0. • For ANNA-B112 and NINA-B1 from software version 2.0.0 onwards, the peer ID can be 0-7. • For NINA-B31 and NINA-B41 the peer ID can be 0-7. • For NINA-W13, NINA-B2, and NINA-W15, the peer ID can be 0-6.
url	String	URL to the service on the remote peer. See Connect Peer +UDCP for more details and examples of valid URLs. Writing an empty url "" will reset the connect_scheme.
connect_scheme	Integer	This parameter is a bit field. At least one bit needs to be set. Bit 0 is the least significant bit. Each bit is defined as shown below: • Bit 0: Reserved. Do not use. • Bit 1: Always connected - Keep the peer connected when not in command mode. That is, on errors and remote disconnect, the peer will automatically try to reconnect. ☞ For the Always connected connection scheme, the reconnect timeout interval (in milliseconds) can optionally be selected by setting the parameter "ac-to" to the query string, "spp://0012f3000001/?ac-to=5000,2". Default value: 10000 ms. Supported by: NINA-B2, NINA-B31, NINA-B41, NINA-W15, NINA-W13 from software version 2.0.0 onwards, ANNA-B1 from SW version 3.0 onwards, NINA-B1 from SW version 6.0 onwards, and ODIN-W2 from software version 7.1.0 onwards. • Bit 2: External connect - Trigger connection to peer on external signal connect event. The connect event is generated when the signal SWITCH_0 (in ODIN-W2) or SWITCH_2 (in NINA-B1, NINA-W13, NINA-B2, NINA-B31, NINA-B41, and NINA-W15) is kept low for at least 200 ms but not more than 1000 ms while the device is in the data mode.

5.10 List peers +UDLP

+UDLP				
Modules	ODIN-W2-SW7.0.x onwards, NINA-B2,			
	NINA-B1-SW5.0.0 onwards, NINA-B31, NINA-B41, NINA-W13, NINA-W15			
	ANNA-B112-SW2.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

5.10.1 Description

This command reads the connected peers and lists them with connection type and peer handle.

5.10.2 Syntax

AT Command	Description
AT+UDLP?	List peers

Response	Description
+UDLP:<peer_handle>,<protocol>,<local_address>,<remote_address> OK	Successful read response.
ERROR	Error response.
+UDLP:<peer_handle>,<protocol>,<local_address>,<remote_address>	Successful read response.

5.10.3 Defined values

Parameter	Type	Description
peer_handle	Integer	Peer handle that identifies the connection.
protocol	String	Protocol of the connection.
local_address	String	Local address.
remote_address	String	Remote address if available. Empty string if there is no remote address.

5.11 Server configuration +UDSC

+UDSC				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

5.11.1 Description

Sets up a server for different connection types.

5.11.2 Syntax

AT Command	Description
AT+UDSC=<id>,<type>[,<option1>[,<option2>][,<option3>]] or AT+UDSC=<id>,<url>	Writes server configuration.
AT+UDSC[=<id>]	Reads server configuration.

Response	Description
+UDSC:<id>,<type>[,<option1>[,<option2>]] OK	Successful read response.

Response	Description
OK	Successful write response.
ERROR	Error response.

5.11.3 Defined values

Parameter	Type	Description
id	Integer	0-6, the server ID to configure. Disable an active server first before changing. Only the server ID 0 is supported by NINA-B1, NINA-B31, NINA-B41, and ANNA-B112. By default, the following servers are enabled on id 0: • SPP server - ODIN-W2, NINA-B2, NINA-W15 • SPS server - NINA-B1, NINA-B31, NINA-B41, ANNA-B112 ☞ **A DCE reboot is required before any Bluetooth related server configuration takes effect, including if an ATP server uses Bluetooth.**
url	String	Service URL <scheme>://<domain>[:<port>]/[?<query_string>] Supported schemes: spp, sps, tcp, udp, at-spp, at-sps, at-tcp, at-udp. For spp and sps schemes, set the domain to "spp" and "sps" respectively. For tcp and udp schemes, set the domain to "0.0.0.0". Example URL is provided below: "tcp://0.0.0.0:5003/?keepalive=10000+1000+5" For description and module support of schemes, see +UDCP description. ☞ On ODIN-W2 only supported from software version 7.0.0 onwards.
type	Integer	See table below
option1	Integer or String	For TCP and UDP, <option1> specifies the listening port. Valid values are 1 - 65535. For SPP, DUN, and UUID, <option1> specifies the service name. The service name can be maximum 15 characters. If an empty string is provided, the default service name is used ("SPP", "DUN", "UUID"). For ATP, <option1> specifies the interface on which the AT-service is started, values are identical to the <type> parameter above.
option2	Enumerator or Byte_Array	For UDP,<option2> specifies the behavior of incoming data. • 0 (default): No connect. This spawns a new peer and triggers a +UUDPC URC when data arrives,. The remote peer IP is broadcast and the remote port is set to 0. It is not be possible to respond to the sender or extract the data source. There is only one +UUDPC URC, even if several remote peers send data to the socket. This is typically used together with the data mode. • 1: Auto connect. This spawns a new peer and triggers a +UUDPC URC so that the host can respond to the sender. Further incoming data from the same source is received on the newly created peer. The originally created server is still active and listens for new data. This is typically used together with the Extended data mode. For UUID,<option2> specifies the 128-bit UUID identifier. For ATP, <option2> specifies the listening port if the AT-service is started on a TCP or UDP interface

Server type	Description	Supported by
0	Server disabled	All
1	TCP	ODIN-W2, NINA-W13, NINA-W15
2	UDP	ODIN-W2, NINA-W13, NINA-W15
3	SPP	ODIN-W2, NINA-B2, NINA-W15
4	DUN	ODIN-W2
5	UUID	ODIN-W2
6	SPS	ODIN-W2, NINA-B1, NINA-B2, NINA-B31, NINA-B41, ANNA-B112, NINA-W15
7	Reserved	
8	ATP	ODIN-W2, NINA-W15, NINA-B2-SW2.1.0 onwards, NINA-W13-SW2.1.0 onwards

Parameter	Type	Description
		For TCP, <option2> specifies if there should be an immediate flush after a write. • 0 (default): Disabled • 1: Enable
option3	Integer	For UDP, <option3> specifies IP version of the started service. • 0 (default): IPv4 connections are accepted • 1: IPv6 connections are accepted

5.12 Server flags +UDSF

+UDSF				
Modules	ODIN-W2, NINA-W15			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

5.12.1 Description

Configure server-independent flags.

When the remote configuration bit is set, the module will look for the escape sequence over the air (see S2 command). When the escape sequence is detected, the channel will enter command mode and parse AT commands. The command mode is exited by sending an ATO to the module (see O command).

☞ The AT+UFWUPD command is disabled in this mode.

5.12.2 Syntax

AT Command	Description
AT+UDSF=<id>,<flags>	Writes flags to a server.
AT+UDSF=<id>	Reads flags from a server.

Response	Description
OK	Successful write response.
+UDSF:<id>,<flags> OK	Successful read response.

5.12.3 Defined values

Parameter	Type	Description
id	Integer	Id as given by AT+UDSC
flags	Integer	Bit 0: Allow remote configuration • 0: Disabled (default) • 1: Enabled Bit 1: Data in AT command mode. When this bit is set, the server creates connections capable of sending and receiving data in AT mode, just as a connection created with a url-scheme starting with "at-" (see +UDCP command for module support). This bit will be automatically set if the url-scheme used when creating the server starts with "at-". Similarly, unsetting this bit will remove "at-" from the server url. ☞ It is not possible to have both bit 0 and 1 set at the same time. Bit 1 is supported on NINA-B2, NINA-W13 and NINA-W15 SW 4.0.0 onwards.

5.13 URL value +UDUV

+UDUV				
Modules	NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

5.13.1 Description

Configure up to 10 specific values which are optionally inserted at specified positions in URL.

☞ This must be used in case a value in the <query_string> of a URL is using URL escape character coding, such as %3d for '=' or %26 for '&', or when the value contains a non-escaped space (' '). Typical cases when this is required, is e.g. automatically generated Azure SAS tokens.

Values can also be inserted in e.g. the <domain> part of the URL, to avoid redundancy in the URL or decrease the number of characters in the AT-command string.

u-connectXpress will, as final step of parsing a URL, replace any values of type %%n with the written URL value at index 'n'.

This applies for URLs used in +UDCP, +UDDRP, and the +UDSC, commands.

Setting is stored to start up the database with &W command.

5.13.2 Syntax

AT Command/Event	Description
AT+UDUV=<index>,<value>	Write URL value as index
AT+UDUV=<index>	Read URL value at index
AT+UDUV=<index>,""	Delete URL value at index

Response	Description
+UDUV:<index>,<value>	Read response.
OK	Successful response.
ERROR	Error response.

5.13.3 Defined values

Parameter	Type	Description
<index>	Number	Index of URL value Range: 0..9
<value>	String	The value. Length must be less than 500 characters.

5.14 Watchdog settings +UDWS

+UDWS				
Modules	ODIN-W2, NINA-W13, NINA-W15			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

5.14.1 Description

This command configures a watchdog for a data connections.

☞ The data watchdog functionality is active only in the data or extended data mode. Additionally, the power mode must also be set to online or sleep mode.

5.14.2 Syntax

AT Command	Description
AT+UDWS[=<type>]	Reads current watchdog settings.
AT+UDWS=<type>,<value>	Writes watchdog parameters.

Response	Description
+UDWS:<type>,<value> OK	Successful read response.
OK	Successful write response.
ERROR	Error message.

5.14.3 Defined values

Parameter	Type	Description
type	enumerator	0: SPP (and all SPP based protocols like DUN) write timeout: <value>is the time in milliseconds before DCE disconnects if a write is not acknowledged. • 0: Disabled • > 0: Timeout in milliseconds (factory default value: 10000 ms) 1:inactivity timeout: <value> is the time in milliseconds before DCE disconnects all links when no data activity in the system is detected. • 0 (factory default): Disabled • > 0: Timeout in milliseconds 2: Bluetooth disconnect reset: <value> defines if the DCE shall reset on any dropped Bluetooth connection (not on an actively closed connection) • 0 (factory default): Disabled • 1: Enabled 3: Wi-Fi Station disconnect reset: <value> defines if the DCE shall reset on dropped Wi-Fi Station connection (not on actively closed connection) • 0 (factory default): Disabled • 1: Enabled 5: Wi-Fi connect timeout: <param_val1> is the time, in seconds, that an ongoing connection attempt, for a station, will proceed before a Wi-Fi recovery is done. Note that after the recovery, the connection attempt will continue and there is no need for additional user activity. Recommended value is 30s and it should not be set lower than 20s. The default value is 0, which means that the watchdog is disabled. 6: Net Up timeout: <param_val1> is the time, in seconds, allowed between a +UUWLE (link connected) event and a +UUNU (net up) event. If the +UUNU is not received within the set time, the link is automatically disconnected and connected again shortly. Typically, this watchdog is set to ensure that active Bluetooth links get enough air time to avoid link loss. The watchdog is disabled by default, value 0, and an enabled recommended value is 3 seconds. Also, the link supervision time for the Bluetooth links should be increased from the default value of 2s (see the parameter tag 7 in +UBTCFG for more information).

5.15 Data available +UUDATA

+UUDPD				
Modules	NINA-W13-SW4.0.0 onwards, NINA-W15-SW4.0.0 onwards			
	NINA-B1-SW7.0.0 onwards, ANNA-B112-SW4.0.0 onwards, NINA-B2-SW4.0.0 onwards			
	NINA-B3-SW4.0.0 onwards, NINA-B4-SW2.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

5.15.1 Description

Unsolicited response code (URC) notifying that there are data available to read from peer connection.

5.15.2 Syntax

Unsolicited response code	Description
+UUDATA:<peer_handle>,<data_length>	Data from remote peer is available.

5.15.3 Defined values

Parameter	Type	Description
peer_handle	integer	The connection handle identifies the connection.
data_length	integer	Minimum number of bytes available for reading with +UDATR. command.

5.15.4 Notes

This URC will only be issued from peer connections created with url-scheme starting with "at-".

This URC will be issued the first time data arrives after the receive buffer has become empty. It will also be issued after every +UDATR command, even when receive buffer is empty (data_length=0).

There can be more data in the receive pipline than indicated by this URC, held back by flow control mechanisms. This data will become available after reading data.

5.15.5 Example

+UUDATA:1,123

5.16 Peer connected +UUDPC

+UUDPC				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

5.16.1 Description

Unsolicited response code indicating a data peer has been connected.

☞ The Unsolicited response code (URC) will not be received if the device has entered data mode.

5.16.2 Syntax

Unsolicited response code(URC)	Description
+UUDPC:<peer_handle>,<type>,<profile>,<address>,<frame_size>	A Bluetooth peer has been connected.
+UUDPC:<peer_handle>,<type>,<protocol>,<local_address>,<local_port><remote_address>, <remote_port>	An IP peer has been connected.

5.16.3 Defined values

Parameter	Type	Description
peer_handle	integer	The peer handle identifies the connection.
type	integer	1: Bluetooth
		2: IPv4
		3: IPv6
profile	enumerator	1: SPP
		2: DUN
		3: UUID
		4: SPS
		5: Reserved

Parameter	Type	Description
protocol	enumerator	0: TCP 1: UDP 6: MQTT
address	Bd_Addr	Bluetooth address.
local_address	IPv4_Addr or IPv6_Addr	Local IP address associated to the peer (TCP connection only).
local_port	integer	Local port associated to the peer.
remote_address	IPv4_Addr or IPv6_Addr	Remote IP address associated to the peer.
remote_port	integer	Remote port associated to the peer.
frame_size	integer	GAP data length.

5.17 Peer disconnected +UUDPD

+UUDPD				
Modules	All products			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

5.17.1 Description

Unsolicited response code received when a connection to a remote peer has been disconnected.

☞ The Unsolicited response code (URC) will not be received in the data mode.

5.17.2 Syntax

Unsolicited response code	Description
+UUDPD:<peer_handle>	A connection to a remote peer has been disconnected.

5.17.3 Defined values

Parameter	Type	Description
peer_handle	integer	The connection handle identifies the connection.

6 Bluetooth

6.1 Discoverability mode +UBTDM

+UBTDM				
Modules	ODIN-W2, NINA-W15			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.1.1 Description

Read and set the GAP discoverability mode.

6.1.2 Syntax

AT Command	Description
AT+UBTDM?	Reads the GAP discoverability mode.
AT+UBTDM=<discoverability_mode>	Writes the GAP discoverability mode.

Response	Description
+UBTDM:<discoverability_mode> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

6.1.3 Defined values

Parameter	Type	Description
discoverability_mode	enumerator	1: GAP non-discoverable mode
		2: GAP limited discoverable mode
		For NINA-B31, NINA-B41 and ANNA-B112, the device will stay in the limited discoverable mode for 180 seconds, before going back to non-discoverable mode.
		3 (factory default): GAP general discoverable mode

6.2 Connectability mode +UBTCM

+UBTCM				
Modules	ODIN-W2, NINA-W15			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.2.1 Description

Sets and reads the GAP connectability mode.

6.2.2 Syntax

AT Command	Description
AT+UBTCM?	Reads the GAP connectability mode.
AT+UBTCM=<connectability_mode>	Writes the GAP connectability mode.

Response	Description
+UBTCM:<connectability_mode> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

6.2.3 Defined values

Parameter	Type	Description
connectability_mode	enumerator	1: GAP non-connectable mode 2 (factory default): GAP connectable mode

6.3 Pairing mode +UBTPM

+UBTPM				
Modules	ODIN-W2, NINA-W15			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.3.1 Description

Enable or disable pairing.

6.3.2 Syntax

AT Command	Description
AT+UBTPM?	Reads the pairing mode.
AT+UBTPM=<pairing_mode>	Writes the pairing mode.

Response	Description
+UBTPM:<pairing_mode> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

6.3.3 Defined values

Parameter	Type	Description
pairing_mode	enumerator	1: GAP non-pairing mode 2 (factory default): GAP pairing mode

6.4 Security mode +UBTSM

+UBTSM				
Modules	ODIN-W2, NINA-W15			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.4.1 Description

Set the Security Mode of the device. The Security Mode controls the bonding capabilities of the device.

6.4.2 Syntax

AT Command	Description
AT+UBTSM?	Reads the security mode.
AT+UBTSM=<security_mode>[,<security_mode_setting>,<fixed_pin1>,<fixed_pin2>]	Writes the security mode.

Response	Description
+UBTSM:<security_mode>,<security_mode_BT2.0> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

6.4.3 Defined values

Parameter	Type	Description
security_mode	enumerator	1 (factory default): Security Disabled. Should not be used in real life application. - Auto accept (No man-in-the-middle attack protection, encryption enabled) 2: Security Enabled - Just Works - Auto accept (no man-in-the-middle attack protection, encryption enabled). This security mode is intended for pairing in safe environments. When this mode is set, pairability (see +UBTPM) is automatically disabled. In AT command mode, use AT +UBTPM to enable pairing. In data mode, pairing can be enabled by holding SWITCH_0 (in ODIN-W2) or SWITCH_2 (in NINA-B1, NINA-B31, NINA-B41, ANNA-B112, NINA-B2, NINA-W15) low for at least 5 seconds. When the module is pairable, the LED will blink. Pairing is not automatically enabled when leaving the security mode "Just Works". 3: Security Enabled - Display Only* - Service level authentication and encryption enabled. User interaction is required. This security mode is used when the local device has a display where the user can see a passkey that can be entered on the remote device. 4: Security Enabled - Display Yes/No* - Service level authentication and encryption enabled. User interaction is required for bonding. This security mode is used when the device has a display, where the user can see a passkey that can be verified and confirmed with the remote device. 5: Security Enabled - Keyboard Only* - Service level authentication and encryption enabled. User interaction is required. This security mode is used when the device has a keyboard where the user can enter a passkey to verify the passkey that is presented on the remote device. 6: Security Enabled - Out of band* - Service level authentication and encryption enabled. User interaction is required (see +UBTOTK). This security mode is used to connect to a remote device when the temporary key has been exchanged out of band. If the remote device does not support out of band, the module will fall back to "Just works" pairing. ☞ * - For the security modes - 3, 4, and 5, the DCE must be in the Command or Extended Data mode to be able to bond because user interaction might be required. ☞ The security mode 6 is supported only by NINA-B1 from software version 3.0.1 onwards, ANNA-B1, NINA-B31 and NINA-B41. This mode requires user interaction to bond only when the OOB temporary key is not entered before the bonding takes place.
security_mode_setting	integer	0 (factory default): Disabled, no pairing is allowed with Bluetooth 2.0 devices. 1: Enabled. Pairing is allowed with Bluetooth 2.0 devices using the fixed_pin1. When enabling also, the parameter fixed_pin1 must be set. ☞ This parameter tag is applicable for ODIN-W2, NINA-W15 and NINA-B2-SW2.1.0 onwards. 2: Bluetooth LE headless fixed pin pairing. Must be be used with Security mode 3. When enabling also, the parameter fixed_pin1 must be set.

Parameter	Type	Description
		This parameter tag is valid from NINA-B1 SW 7.0, ANNA-B1/NINA-B31 SW 4.0 and NINA-B41. 3: Bluetooth LE + Bluetooth 2.0 headless fixed pin pairing. Must be be used with Security mode 3. When enabling, the parameter fixed_pin1(Bluetooth 2.0) and fixed_pin2 (Bluetooth low energy) must be set. This parameter tag is reserved for future use.
fixed_pin1	String	When fixed_pin1 is used with security_mode_setting 1 or 3 then 1-16 alphanumerical characters are allowed. When fixed_pin1 is used with security_mode_setting 2 then 1-6 digit only characters are allowed. s applicable if security_mode_setting is 1,2 or 3.
fixed_pin2	Integer	Bluetooth low energy fixed pin. This parameter tag is reserved for future use.

6.4.4 Notes

- For the settings to take effect on NINA-B1, NINA-B31, NINA-B41, ANNA-B112, NINA-B2, and NINA-W15, use the commands - &W and +CPWROFF to store the configuration to start up database and reboot the module.
- Bluetooth low energy fixed pin should be 6 digits. Any shorter sequence will be padded with starting zeros.
- A fixed PIN gives limited security against an attacker.

6.5 Security type +UBTST

+UBTST				
Modules	NINA-B1-SW5.0.0 onwards			
	ANNA-B112-SW2.0.0 onwards			
	NINA-B31-SW2.0.0 onwards, NINA-B41			
	NINA-W15-SW3.0.0 onwards			
	NINA-B2-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.5.1 Description

Enable or disable Bluetooth low energy Secure Connections.

6.5.2 Syntax

AT Command	Description
AT+UBTST?	Reads the security type for Bluetooth pairing.
AT+UBTST=<security_type>	Writes the security type for Bluetooth pairing.

Response	Description
+UBTST:<security_type> OK	Successful read response.
OK	Successful write response.
ERROR	Error message.

6.5.3 Defined values

Parameter	Type	Description
security_type	enumerator	0 (factory default): Secure Simple Pairing mode. The legacy mode used for pairing Bluetooth LE. 1: Secure Connections Mode

Parameter	Type	Description
		The P-256 Elliptic curve is used for pairing and AES-CCM is used for encryption of the Bluetooth LE link. The secure simple pairing will be used if there is no support from the remote side. 2: FIPS mode Strictly uses Secure Connections. Pairing requests will be rejected if the remote device does not support this mode. ☞ Enabling P-256 Elliptical curve based encryption is memory intensive. Hence, when enabled, the memory reserved for other functionalities will be affected. For NINA-B1 and ANNA-B112, if LE role (AT+UBTLE) is Simultaneous Peripheral and Central and Secure Connection is enabled, the device will not be able to support more than 1 central link and 1 peripheral link (AT+UBTCFG).

6.5.4 Notes

☞ For the settings to take effect, use the commands - &W and +CPWROFF to store the configuration to start up database and reboot the module.

6.6 User confirmation +UBTUC

+UBTUC				
Modules	ODIN-W2			
	NINA-B2, NINA-W15			
	NINA-B1-SW6.0.0 onwards			
	ANNA-B112-SW3.0.0 onwards			
	NINA-B31-SW3.0.0 onwards, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.6.1 Description

The user confirmation is used together with the security mode 4 - "Display Yes/No" to respond on a user confirmation request (+UUBTUC). The command shall be used only after +UUBTUC has been received.

6.6.2 Syntax

AT Command	Description
AT+UBTUC=<bd_addr>,<yes_no>	Respond to +UUBTUC and confirm/deny bonding.

Response	Description
OK	Successful response.
ERROR	Error message.

6.6.3 Defined values

Parameter	Type	Description
bd_addr	Bd_Addr	The remote Bluetooth device address.
yes_no	enumerator	0: No. The remote and local numeric values are different or the user cancels. 1: Yes. The remote and local values are the same.

6.7 User passkey entry +UBTUPE

+UBTUPE				
Modules	ODIN-W2, NINA-W15			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.7.1 Description

The user passkey entry is used together with security mode 5 - "Keyboard Only" to respond on a user passkey entry request (+UUBTUPE). This command shall be used only after +UUBTUPE has been received.

6.7.2 Syntax

AT Command	Description
AT+UBTUPE=<bd_addr>,<ok_cancel>[,<passkey>]	Respond to +UUBTUPE event and confirm/deny bonding.

Response	Description
OK	Successful response.
ERROR	Error message.

6.7.3 Defined values

Parameter	Type	Description
bd_addr	Bd_Addr	The remote Bluetooth device address.
ok_cancel	enumerator	0: Cancel 1: Ok
passkey	integer	This is an integer in the range of [0..999999]. If ok_cancel is Cancel, this can be omitted.

6.8 OOB temporary key +UBTOTK

+UBTOTK				
Modules	NINA-B1-SW3.0.1 onwards, ANNA-B112			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.8.1 Description

Set and read the OOB temporary key used for OOB bonding. The user can set a fixed key or let the module generate a random key.

6.8.2 Syntax

AT Command	Description
AT+UBTOTK=<mode>,[<temp_key>]	Writes the OOB temporary key.
AT+UBTOTK?	Reads the OOB temporary key.

Response	Description
+UBTOTK:<temp_key> OK	Successful read response.
ERROR	Error response.

6.8.3 Defined values

Parameter	Type	Description
mode	enumerator	0: Generate a random key 1: User input key
temp_key	Byte_array	User defined temporary key with length of 16 bytes. Only applicable if <mode> is set to 1.

6.9 Name discovery +UBTND

+UBTND				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.9.1 Description

Retrieves the device name of a remote device given its Bluetooth device address.

6.9.2 Syntax

AT Command	Description
AT+UBTND=<bd_addr>[,<mode>[,<timeout>]]	Retrieves the device name of a remote device.

Response	Description
+UBTND:<device_name>	Successful response.
OK	
ERROR	Error message.

6.9.3 Defined values

Parameter	Type	Description
device_name	String	Local name of the remote device; maximum of 240 characters (8-bit ASCII).
bd_addr	Bd_Addr	Bluetooth device address of the device from which the name is retrieved.
timeout	Integer	Timeout measured in milliseconds, applicable only for Bluetooth BR/EDR Time Range: 10 ms - 40 s Default: 5s ☞ This parameter is not supported by NINA-B2 and NINA-W15.
mode	Enumerator	This parameter is applicable only for multiradio devices. 0 (default): Bluetooth BR/EDR 1: Bluetooth low energy

6.10 Inquiry (BR/EDR) +UBTI

+UBTI				
Modules	ODIN-W2			
	NINA-B2, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.10.1 Description

Performs an inquiry procedure to find any discoverable devices in the vicinity.

6.10.2 Syntax

AT Command	Description
AT+UBTI[=<inquiry_type>,<inquiry_length>]]	Start Inquiry procedure.

Response	Description
+UBTI:<bd_addr>,<rssi>,<cod>,<device_name>	This response is sent for every found device.
OK	Successful response.
ERROR	Error message.

6.10.3 Defined values

Parameter	Type	Description
bd_addr	Bd_Addr	Bluetooth device address of a found device.
cod	Byte_Array	See Local COD command.
Inquiry_type	Enumerator	1 (default): General extended inquiry 2: Limited extended inquiry
Inquiry_length	Integer	Timeout measured in milliseconds Time range: 10 ms - 40 s, default 5000 ms
device_name	String	Name of the discovered device. ☞ Names of the discovered devices are returned only by the devices supporting Bluetooth 2.1 or later.
rssi	Integer	Received signal strength in dBm.

6.11 Discovery (Low Energy) +UBTD

+UBTD				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.11.1 Description

Performs a discovery procedure to find any advertising devices in the vicinity.

6.11.2 Syntax

AT Command	Description
AT+UBTD[=<discovery_type>[,<mode>[,<discovery_length>]]]	Start discovery.

Response	Description
+UBTD:<bd_addr>,<rssi>,<device_name>,<data_type>,<data>	This response is sent for every found device. If no name is found, <device_name> is an empty string. If <mode> is set to Active, both Scan responses and Advertisements will be shown.
OK	Successful response.
ERROR	Error message.

6.11.3 Defined values

Parameter	Type	Description
bd_addr	Bd_Addr	Bluetooth device address of a found device.
discovery_type	Enumerator	1: All. Displays all found devices; each device is displayed only once. 2 (default): General inquiry. Displays devices in General or Limited discoverability mode; each device is displayed only once.

Parameter	Type	Description
		The discovery_type 1 and 2 will give the same result. 1 is kept for backward compatibility. 3: Limited inquiry. Displays devices in the Limited discoverability mode; each device is displayed only once. 4: All with no filter. Displays all found devices; devices can be displayed multiple times. The filter that displays each device only once can hold only a limited number of devices. If more devices than the limit are found, the devices can be displayed more than once. 5: Filtered. Only displays whitelisted devices. Bonded devices are automatically whitelisted.
mode	Enumerator	1 (default): Active 2: Passive, no scan response data will be received
discovery_length	Integer	Timeout measured in milliseconds. Time range: 10 ms - 40 s, default 5000 ms
device_name	String	Name of the discovered device.
rssi	Integer	Received signal strength in dBm.
data_type	enumerator	1: Scan response data 2: Advertise data
data	Byte_Array	Complete advertisement / scan response data received from the remote device.

6.11.4 Notes

This command is supported only for Bluetooth LE Central role.

Discovery type 5 is only available in NINA-B1 SW 7.00, NINA-B31 and ANNA-B112 SW 4.0.0 and NINA-B41 SW 2.0.0 onwards.

6.12 Bond +UBTB

+UBTB				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.12.1 Description

Performs a GAP bond procedure with another Bluetooth device.

For some security modes, user interaction is required during the bonding procedure. The procedure to use is determined by the security mode. For user interaction during bonding, see User Confirmation +UBTUC and User Passkey Entry +UBTUPE commands and User Confirmation +UUBTUC and User Passkey Entry +UUBTUPE events.

6.12.2 Syntax

AT Command	Description
AT+UBTB=<bd_addr>[,<mode>]	Initiate bonding. To perform the bonding, the remote device must be in a pairable and connectable mode. When the bond is complete, a Bond Event +UUBTB is generated. The Bluetooth device can hold only a limited number of bondings. In case of memory shortage, the oldest bonding will be overwritten with the new bonding.

Response	Description
OK	Successful response.
ERROR	Error message.

6.12.3 Defined values

Parameter	Type	Description
bd_addr	Bd_Addr	Bluetooth device address of the device to bond with.
mode	integer	0 (default): Bluetooth BR/EDR 1: Bluetooth low energy; this is the default value for NINA-B1, NINA-B31, NINA-B41 and ANNA-B112.

6.12.4 Notes

☞ A Bluetooth low energy peripheral cannot initiate bonding.

6.13 Unbond +UBTUB

+UBTUB				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.13.1 Description

Unbond from a previously bonded device. Note that this will remove the bond from the local device only.

6.13.2 Syntax

AT Command	Description
AT+UBTUB=<bd_addr>	Removes a previously bonded device. ☞ Any device to be removed has to be disconnected first.

Response	Description
OK	Successful response.
ERROR	Error message.

6.13.3 Defined values

Parameter	Type	Description
bd_addr	Bd_Addr	Bluetooth device address of the device subject to unbond. The address FFFFFFFFFFFF will remove all the bonded devices.

6.14 Read bonded devices +UBTBD

+UBTBD				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.14.1 Description

Reads the list of bonded devices.

6.14.2 Syntax

AT Command	Description	
AT+UBTBD[=<mode>]	**Modules**	**Maximum number of bonded devices**
	ODIN-W2	25
	NINA-B1, NINA-B31, NINA-B41, ANNA-B112	20

AT Command	Description	
	Modules	**Maximum number of bonded devices**
	NINA-B2, NINA-W15	40

Response	Description
+UBTBD:<bd_addr>,<device_mode>>[,<IRK>,<LTK_present>]	This response is sent for every found device.
OK	Successful response.
ERROR	Error message.

6.14.3 Defined values

Parameter	Type	Description
mode	integer	0: Bluetooth BR/EDR 1: Bluetooth low energy; this is the default value for NINA-B1, NINA-B31, NINA-B41, and ANNA-B112. 2 (default): Bluetooth BR/EDR and low energy. 3: Bluetooth low energy, with IRK and LTK_present parameters printed
bd_addr	Bd_Addr	Bluetooth device address.
device_mode	enumerator	0: The bonded device is in the BR/EDR mode. 1: The bonded device is in the low energy mode.
IRK	Byte_array	Identity Resolving Key,16 bytes. Only present in output when mode = 3
LTK_present	Integer	0: Own LTK is set to all zeros, i.e. not present 1: Own LTK is non-zero. Only present in output when mode = 3

☞ Mode 3 and the parameters IRK and LTK_present are only available in NINA-B1 SW 7.0.0, NINA-B31 and ANNA-B112 SW 4.0.0, NINA-B41 SW 2.0.0 onwards.

6.15 Local name +UBTLN

+UBTLN				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.15.1 Description

Set the local name used as device name for Bluetooth Classic, in the advertising data of the device and in the Device Information service for Bluetooth low energy.

6.15.2 Syntax

AT Command	Description
AT+UBTLN?	Reads the local Bluetooth device name.
AT+UBTLN=<device_name>	Writes the local Bluetooth device name.

Response	Description
+UBTLN:<device_name>	Successful read response.
OK	
OK	Successful write response.
ERROR	Error message.

6.15.3 Defined values

Parameter	Type	Description
device_name	String	For Bluetooth Classic the maximum size is 31 characters. The default name is "Bluetooth Device". For Bluetooth low energy the maximum size is 29 characters. For NINA-B1, from SW3.0.1 onwards, the default name is "NINA-B1-XXXXXX", where XXXXXX is the last 6 characters from the Bluetooth address. For NINA-B31, the default name is "NINA-B3-XXXXXX", where XXXXXX is the last 6 characters from the Bluetooth address. For NINA-B41, the default name is "NINA-B4-XXXXXX", where XXXXXX is the last 6 characters from the Bluetooth address. For ANNA-B112, the default name is "ANNA-B1-XXXXXX", where XXXXXX is the last 6 characters from the Bluetooth address. For NINA-B2, the default name is "NINA-B22-XXXXXX", where XXXXXX is the last 6 characters from the Bluetooth address. For NINA-W15, the default name is "NINA-W15-XXXXXX", where XXXXXX is the last 6 characters from the Bluetooth address.

6.16 Local COD +UBTLC

+UBTLC				
Modules	ODIN-W2			
	NINA-B2, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.16.1 Description

Read and set Local Class of Device code.

6.16.2 Syntax

AT Command	Description
AT+UBTLC?	Reads the Local Class of Device code.
AT+UBTLC=<cod>	Writes the Local Class of Device code.

Response	Description
+UBTLC:<cod> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

6.16.3 Defined values

Parameter	Type	Description
cod	Byte_Array	Valid values for this parameter are specified in the Bluetooth Assigned Numbers Document, www.bluetooth.com. The parameter has been divided into three segments, a service class segment, a major device class segment, and a minor device class segment (bits 2-7). Extract from the Bluetooth Assigned Numbers document: Service class (bit mask, bits 13-23): Bit 16: Positioning (Location identification) Bit 17: Networking (LAN, Ad hoc, etc) Bit 18: Rendering (Printing, Speaker, etc) Bit 19: Capturing (Scanner, Microphone, etc) Bit 20: Object Transfer (v-Inbox, v-Folder, etc)

Parameter	Type	Description
		Bit 21: Audio (Speaker, Microphone, Headset service, etc)
		Bit 22: Telephony (Cordless telephony, Modem, Headset service)
		Bit 23: Information (WEB-server, WAP-server, etc)
		Major device class (number, bits 12-8):
		00000: Miscellaneous
		00001: Computer (desktop, notebook, PDA, etc)
		00010: Phone (cellular, cordless, modem, etc)
		00011: LAN/Network Access point
		00100: Audio/Video (headset, speaker, stereo, video display, VCR)
		00101: Peripheral (mouse, joystick, keyboards)
		00110: Imaging (printing, scanner, camera, etc)
		11111: Uncategorized, specific device code not specified
		The default value is 0.

6.17 Master slave role +UBTMSR

+UBTMSR				
Modules	ODIN-W2			
	NINA-B2, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.17.1 Description

Read the local master-slave role of a Bluetooth BR/EDR ACL connection.

6.17.2 Syntax

AT Command	Description
AT+UBTMSR=<bd_addr>	Returns the local role for a specific connection identified by the remote device address.

Response	Description
+UBTMSR:<role>	Successful response.
OK	
ERROR	Error response.

6.17.3 Defined values

Parameter	Type	Description
role	enumerator	0: Master
		1: Slave
bd_addr	Bd_Addr	Address of the remote device.

6.18 Master slave role policy +UBTMSP

+UBTMSP				
Modules	ODIN-W2			
	NINA-B2, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.18.1 Description

Read and set role policy.

6.18.2 Syntax

AT Command	Description
AT+UBTMSP?	Reads the role policy of the device.
AT+UBTMSP=<role_policy>	Writes the role policy of the device.

Response	Description
+UBTMSP:<role_policy>	Successful read response.
OK	
OK	Successful write response.
ERROR	Error response.

6.18.3 Defined values

Parameter	Type	Description
role_policy	enumerator	0: Always attempt to become master on incoming connections. 1 (default): Always let the connecting device select master/slave role on incoming connections.

☞ When Multipoint is used in Bluetooth Classic mode, it is strongly recommended to have only one master within the network and not allow a device to have mixed roles (act as both master and slave). By setting the role_policy parameter to 0 (Always attempt to become master), all incoming connections will switch to keep the existing master to remain the master for the connection, and not mixing to be both master and slave at the same time.

Depending on the Controller capability it may be able handle a multi role net (Scatternet), but in some situations the link may become more unstable and the connection lost.

6.19 Get RSSI +UBTRSS

+UBTRSS				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.19.1 Description

Returns the current received RSSI for a specified Bluetooth connection.

6.19.2 Syntax

AT Command	Description
AT+UBTRSS=<bd_addr>	Returns the current RSSI for a specified Bluetooth connection.

Response	Description
+UBTRSS:<rssi>	Successful response.
OK	
ERROR	Error response.

6.19.3 Defined values

Parameter	Type	Description
rssi	integer	Received signal strength in dBm. The RSSI parameter returns the following: • Absolute receiver signal strength value for Bluetooth LE • Difference between the measured Received Signal Strength Indication (RSSI) and the limits of the Golden Receive Power Range See the Bluetooth specification [22] for more information.
bd_addr	Bd_Addr	Address of the remote device.

6.20 Get link quality +UBTLQ

+UBTLQ				
Modules	ODIN-W2			
	NINA-B2, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.20.1 Description

Read the link quality for a connection. Link quality is represented as a percentage value, where 100% is a perfect link without CRC errors.

6.20.2 Syntax

AT Command	Description
AT+UBTLQ=<bd_addr>	Returns the link quality for the specified Bluetooth connection.

Response	Description
+UBTLQ:<link_quality>	Successful response.
OK	
ERROR	Error response.

6.20.3 Defined values

Parameter	Type	Description
link_quality	integer	Link quality represented as a percentage value. Packet types are not taken into account.
bd_addr	Bd_Addr	Address of the remote device.

6.21 Bluetooth low energy role +UBTLE

+UBTLE				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

6.21.1 Description

Read/Write Bluetooth low energy role.

6.21.2 Syntax

AT Command	Description
AT+UBTLE?	Reads the configuration status.
AT+UBTLE=<role>	Writes the configuration status.

Response	Description
+UBTLE:<role>	Successful read response.
OK	
OK	Successful write response.
ERROR	Error message.

6.21.3 Defined values

Parameter	Type	Description
role	integer	0: Disabled. This is the factory default for ODIN-W2, NINA-B2, and NINA-W15.

Parameter	Type	Description
		1: Bluetooth low energy Central 2: Bluetooth low energy Peripheral. This is the factory default for NINA-B1, ANNA-B112, NINA-B31 and NINA-B41. 3: Bluetooth low energy Simultaneous Peripheral and Central. In this mode, one link is reserved for the Peripheral role. Use the AT+UBTCFG command to configure at least 2 links. This value is supported by NINA-B1, NINA-B31, NINA-B41, ANNA-B112, NINA-B2, NINA-W15 and ODIN-W2 from SW 8.0.

6.21.4 Notes

☞ For the settings to take effect, use the commands - &W and +CPWROFF to store the configuration to start up database and reboot the module.

☞ When ODIN-W2 is in simultaneous Central and Peripheral mode (role = 3) ODIN-W2 can perform a Bluetooth low energy discovery operation for other devices, but can not initiate an ACL connection.

6.22 Bluetooth low energy Advertising Data +UBTAD

+UBTAD				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.22.1 Description

Command for using the custom advertising data in Bluetooth low energy. Any custom advertising data will be appended to the default mandatory flags field. Note that the AT command AT+UBTD supports scan modes that can be used to see the complete advertising data. This is useful when testing the advertising configurations set with the AT+UBTAD.

By default, the service UUID for the u-blox Serial Port Service is part of the advertising data.

6.22.2 Syntax

AT Command	Description
AT+UBTAD?	Read custom advertising data.
AT+UBTAD=<data>	Write custom advertising data.

Response	Description
+UBTAD:<data> OK	Successful read response.
OK	Successful write response.
ERROR	Error message.

6.22.3 Defined values

Parameter	Type	Description
data	Byte_Array	Custom advertising data. Maximum 28 bytes. Maximum 252 bytes if advertisement extensions are enabled (See parameter tag 29 in AT+UBTLECFG). The default value includes AD Flags, Tx power, Peripheral connection interval, and the u-blox Serial Service UUID. It is recommended to use the u-blox Serial Service UUID [2456e1b926e28f83e744f34f01e9d701] for filtering when doing scan in smartphone apps. The data must follow the Bluetooth Specification, see GAP section in the related documents [22]. Data is divided into different consecutive data blocks, where each block has the following structure:

Parameter	Type	Description
		Byte 0: Length of data block, N, excluding length byte. Byte 1: GAP advertising data type, see below. Byte 2-N: Data. Typical GAP advertising data types: 0x01 AD Flags (Mandatory for advertising data) 0x02 16-bit Service UUIDs, more available 0x03 16-bit Service UUIDs, complete list 0x04 32-bit Service UUIDs, more available 0x05 32-bit Service UUIDs, complete list 0x06 128-bit Service UUIDs, more available 0x07 128-bit Service UUIDs, complete list 0x08 Shortened Local name 0x09 Complete Local Name 0x0A Tx Power in dBm 0x12 Peripheral connection interval range 0xFF Manufacturer Specific Data (The first 2 octets contain the Company Identifier Code followed by additional manufacturer specific data) See GAP section in related documents [22] for complete list. Example: "07FF710000112233", where "07" is the length, "FF" is the GAP advertising data type "Manufacturer Specific Data" and "7100" is the u-blox Company Identifier written with lowest octet first and "00112233" is the application data.

6.22.4 Notes

☞ This command is supported only in LE peripheral mode.

6.23 Bluetooth low energy scan response data +UBTSD

+UBTSD				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.23.1 Description

Command for use of custom scan response data in Bluetooth low energy. Any custom scan response data will override the default scan response data. By default the local name is part of the scan response data.

6.23.2 Syntax

AT Command	Description
AT+UBTSD?	Read scan response data.
AT+UBTSD=<data>	Write scan response data.

Response	Description
+UBTSD:<data> OK	Successful read response.
OK	Successful write response.
ERROR	Error message.

6.23.3 Defined values

Parameter	Type	Description
data	Byte_Array	Custom scan response data with a maximum length of 31 bytes. The default value includes the complete local name of the device. The format is same as for the data parameter in AT+UBTAD command. Setting the value '00' will empty the scan response data.

6.23.4 Notes

- This command is supported in LE peripheral mode only.
- The command will override the local name set by AT+UBTLN. To avoid confusion, the local name should be equal to the name set in the scan response data.
- The AT+UBTD command supports scan modes that can be used to see the complete scan response data.
- Clearing scan response data by setting data parameter to '00 is only supported on the following modules
  - ANNA-B1 and NINA-B31 from software version 3.0 onwards
  - NINA-B1 from software version 6.0 onwards
  - NINA-B2 and NINA-W15 from software version 3.0 onwards
  - NINA-B41 all versions

6.24 Service search +UBTSS

+UBTSS				
Modules	ODIN-W2			
	NINA-B2, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.24.1 Description

Search for services on a remote device.

6.24.2 Syntax

AT Command	Description
AT+UBTSS=<bd_addr>,<type>[,<uuid>]	Start service search.

Response	Description
+UBTSS:<service_name>,<rfcomm_server_chan>	This response is sent for every found service when the parameter type is set to 0, 1, 2, 3.
UBTSS:<spec_version>,<vendor_id>,<product_id>,<product_version>,<vendor_id_source>,<primary_service>	This response is sent for every found service when the parameter type is set to 4.
OK	Successful response sent when the service is completed.
ERROR	Error message.

6.24.3 Defined values

Parameter	Type	Description
bd_addr	Bd_Addr	Remote Bluetooth device address.
type	Enumerator	0: Serial Port Profile 1:* Dial-Up Networking Profile 2: UUID (iPhone)* 3: UUID (Android)* 4: Device Id ☞ * - Not supported by NINA-B2 and NINA-W15.

Parameter	Type	Description
uuid	Byte_Array	16 values
rfcomm_server_chan	Integer	RFCOMM server channel number on which this service can be found. It is used when connecting to a profile. Range 1 to 30.
service_name	String	Service name.
spec_version	Byte_Array	This is intended to reflect the version number of the Bluetooth Device ID Profile specification supported by the device. The two most significant hexadecimal digits will indicate the major number of the Bluetooth Device ID Profile specification and the two least significant hexadecimal digits will reflect the minor number of the specification. For example, JJMM for version JJ.MM (JJ - major version number, M - minor version number).
vendor_id	Byte_Array	Unique identifier for the vendor of the device. Used in conjunction with the required attribute 0205, VendorIDSource, which determines the organization that assigned the VendorID value. ☞ The Bluetooth Special Interest Group assigns Device ID Vendor ID and the USB Implementer's Forum assigns vendor ID, either of which can be used for the VendorID value here. Device providers should procure the vendor ID from the USB Implementer's Forum or the Company Identifier from the Bluetooth SIG. The VendorID "FFFF" is reserved as the default VendorID when no Device ID Service Record is present in the device.
product_id	Byte_Array	This is intended to distinguish between different products made by the vendor above. These IDs are managed by the vendors themselves.
product_version	Byte_Array	A numeric expression identifying the device release number in Binary-Coded Decimal. This is a vendor-assigned field, which defines the version of the product identified by the VendorID and ProductID attributes. This attribute is intended to differentiate between the versions of products with identical VendorIDs and ProductIDs. The value of the field is JJMN for version JJ.M.N (JJ - major version number, M - minor version number, N - sub-minor version number). For example, version 2.1.3 is represented with the value 0213 and version 2.0.0 is represented with the value 0200. When upward-compatible changes are made to the device, it is recommended to increment the minor version number. If incompatible changes are made to the device, it is recommended to increment the major version number.
primary_service	Integer	0: This is not the primary Device Id service 1: This is the primary Device Id service
vendor_id_source	Integer	Organization that assigned the VendorID attribute. 1: Bluetooth SIG 2: USB Implementer's Forum

6.25 Watchdog settings +UBTWS

+UBTWS				
Modules	ODIN-W2			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.25.1 Description

DEPRECATED: Watchdog settings

6.25.2 Syntax

AT Command	Description
AT+UBTWS=<type>,<value>	Write watchdog parameter.
AT+UBTWS=[<type>]	Read watchdog parameter(s).

Response	Description
+UBTWS:<type>,<value>	Sent for every applicable watchdog parameter.
OK	Successful response.
ERROR	Error message.

6.25.3 Defined values

Parameter	Type	Description
type	enumerator	0: connection setup timeout: <value> is the maximum connection time in milliseconds (integer) before a connection is terminated. • 0: Disabled • >0: Timeout in milliseconds. Maximum is 2147483647 ms (factory default 30 s) 1:disconnect reset:<value> defines if the DCE shall reset on any dropped Bluetooth connection (not on an actively closed connection). • 0 (factory default): Disabled • 1: enabled

6.25.4 Notes

⚠ This command is deprecated and kept for backwards compatibility. Use +UDWS instead.

6.26 Bluetooth configuration +UBTCFG

+UBTCFG				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

6.26.1 Description

Configures miscellaneous Bluetooth parameters. The values are kept in the volatile memory and will have an immediate effect for all upcoming connections (exceptions mentioned below).

6.26.2 Syntax

AT Command	Description
AT+UBTCFG=<param_tag>	Read Bluetooth configuration.
AT+UBTCFG=<param_tag>,<param_val>	Write Bluetooth configuration.

Response	Description
+UBTCFG:<param_tag>,<param_val>	Sent for each applicable configuration id.
OK	Successful write response.
ERROR	Error message.

6.26.3 Defined values

<table>
<tr><th>Param tag</th><th>Default value</th><th>Min. value</th><th>Max. value</th><th>Description</th><th>Supported by</th></tr>
<tr><td>1</td><td>1</td><td>0</td><td>7</td><td>Maximum number of Bluetooth BR/EDR links
For ODIN-W2, the minimum value is 1.
For NINA-B2 and NINA-W15, the maximum value is 6.</td><td>ODIN-W2, NINA-B2, NINA-W15</td></tr>
<tr><td>2</td><td>1</td><td>0</td><td>8</td><td>Maximum number of Bluetooth low energy links.
For some products the maximum value is lower. See details in Description column.
Product name | Max. number of supported Peripheral role links
ODIN-W2 | 1
NINA-B1, ANNA-B112, NINA-B41, NINA-B2, NINA-W15 | 6
NINA-B31 | 7
Product name | Max. number of supported Central role links
All | 7
Product name | Max. number of supported Simultaneous Central Peripheral role links
ODIN-W2, NINA-B1, ANNA-B112 | 7
NINA-B31, NINA-B41, NINA-B2, NINA-W15 | 8
In Simultaneous Central Peripheral role a minimum of one link is reserved for the Peripheral role.
For NINA-B1, NINA-B31, NINA-B41, ANNA-B112, NINA-B2, NINA-W15: A DCE reboot is required before the change takes effect
For ODIN-W2, the minimum value is 1.
Increasing the number of Bluetooth low energy links may reduce performance as the MTU size will be reduced:
NINA-W15, NINA-B2 | 2 links or more means MTU size is limited to 23 bytes.
NINA-B1/ ANNA-B1 | 3 links or more means MTU size</td><td>ANNA-B112, ODIN-W2, NINA-B1, NINA-B2, NINA-B31, NINA-B41, NINA-W15</td></tr>
</table>

Param tag	Default value	Min. value	Max. value	Description	Supported by
				is limited to 23 bytes. **NINA-B41** 4 links or more means MTU size limited to 23 bytes. **NINA-B31** 6 links or more means MTU size limited to 23 bytes.	
3	56602 (ODIN-W2) (0xDD1A) Bit 1: 2-DH1 Bit 3: DM1 Bit 4: DH1 Bit 8: 2-DH3 Bit 10: DM3 Bit 11: DH3 Bit 12: 2-DH5 Bit 14: DM5 Bit 15: DH5 65310 (NINA-B2, NINA-W15)			Bitmask containing allowed packet types. All bitmask combinations are allowed. Reserved bits will be ignored. **Calculation:** Bit 0: Reserved Bit 1: 2-DH1 Bit 2: 3-DH1 Bit 3: DM1 (DM1 is always on no matter if this bit is set) Bit 4: DH1 Bit 5: Reserved Bit 6: Reserved Bit 7: Reserved Bit 8: 2-DH3 Bit 9: 3-DH3 Bit 10: DM3 Bit 11: DH3 Bit 12: 2-DH5 Bit 13: 3-DH5 Bit 14: DM5 Bit 15: DH5 Example: AT+UBTCFG=3; 8 will allow DM1 packets only. AT+UBTCFG=3,1024 will allow DM3 packets (on top of the default DM1) ☞ The packet types - 3-DH1, 3-DH3, and 3-DH5 are not supported in ODIN-W2.	ODIN-W2, NINA-B2, NINA-W15
4				Maximum allowed output power in dBm. **For NINA-B1:** • The valid parameter values are -40, -20, -16, -12, -8, -4, 0, 3 and 4 dBm; the parameter value is linear to the output power (in dBm). • The default and maximum value is 4. The minimum value is -40. • No restart is required for the changes to take effect. **For ANNA-B112:**	ODIN-W2, NINA-B1, NINA-B31, NINA-B41, ANNA-B112, NINA-B2, NINA-W15

Param tag	Default value	Min. value	Max. value	Description	Supported by
				• The valid parameter values are -40, -20, -16, -12, -8, -4, 0, 3 and 4 dBm; the parameter value is linear to the output power (in dBm). • The default and maximum value is 4. The minimum value is -40. • No restart is required for the changes to take effect. **For NINA-B31 and NINA-B41:** • The valid parameter values are -40, -20, -16, -12, -8, -4, 0, 2, 3, 4, 5, 6, 7 and 8 dBm; the parameter value is linear to the output power (in dBm). • The default value is 6. Regulations in the European market require the maximum output power of the radio to be limited. Using an output power setting higher than 6 violates the European regulations. See the NINA-B3/B4 series System Integration Manual [8]/[9] for more information. • The minimum value is -40. • No restart is required for the changes to take effect. **For NINA-B2 and NINA-W15:** • The valid parameter values are -12, -9, -6, -3, 0, 3 and 6 dBm; the parameter value is linear to the output power (in dBm). • No restart is required for the changes to take effect. **For ODIN-W2:** • The default and maximum value is 127. The minimum value is -128. • A DCE reboot is required before the output power configuration will take effect. • Values outside the supported range show that the limit values are selected. • The parameter value is not linear to the output power. The table below shows how the parameter value and output power are linked for ODIN-W2:	

Parameter value	Output power
16 or higher	Approximately 10 dBm
10	Approximately 0 dBm
5	Approximately -5 dBm
0	Approximately -10 dBm
-5	Approximately -15 dBm
-10	Approximately -20 dBm

Param tag	Default value	Min. value	Max. value	Description	Supported by
				-20 or lower Approximately -25 dBm	
5	0	0	1	Quality of Service enabled. 0: QoS disabled 1: QoS enabled Affects incoming traffic for connections where the device is master. Quality of service level "Best effort" is used. QoS can also be enabled for a specific link, see the URL examples.	ODIN-W2 from software version 4.0.0 onwards, NINA-B2, NINA-W15
6	0	0	1	Connectability and discoverability turned off when maximum number of BR/EDR connections are reached. 0: Connectability and discoverability turned off during connection with maximum links. 1: Connectability and discoverability remains as set.	ODIN-W2 from software version 4.0.0 onwards, NINA-B2, NINA-W15
7	2000	1	40000	Link supervision timeout. 0: Disable link supervision timeout. This is not supported by NINA-B2. 1-40000: Time in milliseconds before the device detects a dropped connection.	ODIN-W2 from software version 4.0.0 onwards, NINA-B2, NINA-W15
8	0	0	1	Fast connections. 0: Disable fast connections. 1: Increased page scan activity for faster response to incoming connections.	ODIN-W2 from software version 4.0.0 onwards, NINA-B2, NINA-W15
9	0	0	1	Fast discovery. 0: Disable fast discovery. 1: Increased inquiry scan activity for faster detection of the device during inquiry or device discovery.	ODIN-W2 from software version 4.0.0 onwards, NINA-B2, NINA-W15
10	5000 ms	10 ms	40900 ms	Page timeout	ODIN-W2, NINA-B2, NINA-W15
11	1	0	1	Enable or disable sniff mode. 1: Enabled 0: Disabled	ODIN-W2 only from software version 5.0.0 onwards
12	0	0	2	RFCOMM Enhanced re-transmission mode (ERTM) 0: Disabled 1: Enabled, optional. ERTM is negotiated during connection. Frame Check Sequence(FCS) is enabled. 2: Enabled, mandatory. FCS is enabled.	NINA-B2 from software version 2.1.0 onwards, NINA-W15 from software version 2.1.0 onwards
13	669	48	1000	MTU for the RFCOMM Enhanced re-transmission mode ☞ The MTU in connection event will be 5 bytes less. ☞ The maximum number of connections can be lower than the maximum of +UBTCGF=1 for MTUs larger than the default value.	NINA-B2 from software version 2.1.0 onwards, NINA-W15 from software version 2.1.0 onwards

Param tag	Default value	Min. value	Max. value	Description	Supported by
14	1	1	4	Number of links reserved for peripheral role in Bluetooth low energy central and peripheral role. Only applicable in simultaneous central and peripheral role. A sufficient number of links must first be set with +UBTCFG=2,n.	NINA-B2 from software version 3.0 onwards, NINA-W15 from software version 3.0 onwards, ANNA-B1 from software version 3.0 onwards, NINA-B1 from software version 6.0 onwards, NINA-B31 from software version 3.0 onwards, NINA-B41
100	0	0	1	Active polling. 1: Enabled 0: Disabled Active polling should be enabled when short latency is important. Polling can be activated on either the client side or the server side.	ODIN-W2 only from software version 5.0.0 onwards

6.27 Bluetooth low energy configuration +UBTLECFG

+UBTLECFG				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

6.27.1 Description

Configures Bluetooth LE connection and advertising parameters. The values are kept in volatile memory and will have an immediate effect for all the upcoming connections (exceptions mentioned below). Maximum values and windows must always be greater than or equal to minimum values and intervals. Default values are taken from the Bluetooth Core Specification version 4.2.

6.27.2 Syntax

AT Command	Description
AT+UBTLECFG=<param_tag>,<param_val>	Write Bluetooth LE configuration.
AT+UBTLECFG=<param_tag>	Read Bluetooth LE configuration.

Response	Description
+UBTLECFG:<param_tag>,<param_val> OK	Successful read response for AT+UBTLECFG=<param_id>,<param_tag>
+UBTLECFG:<param_tag>,<param_val>... OK	Successful read response for the AT+UBTLECFG +UBTLECFG:<param_tag>,<param_val> is sent for all the param_tags.
OK	Successful write response.
ERROR	Error response.

6.27.3 Defined values

Param tag	Default value	Minimum value	Maximum value	Description	Calculation
1	1600 (1000 ms)	32	16384	Advertising interval minimum (must be <= Advertising interval maximum)	<param_val>*0.625 ms
2	2000 (1250 ms)	32	16384	Advertising interval maximum (must be >= Advertising interval minimum)	<param_val>*0.625 ms

Param tag	Default value	Minimum value	Maximum value	Description	Calculation
3	7 (ch 37,38,39)	1	7	Advertising channel map	Bit 0: channel 37 Bit 1: channel 38 Bit 2: channel 39
4	24 (30 ms)	6	3200	Connection interval minimum (must be <= Connection interval maximum). Final results will be a result of negotiation between devices.	<param_val>*1.25 ms
5	40 (50 ms)	6	3200	Connection interval maximum (must be >= Connection interval minimum). Final results will be a result of negotiation between devices.	<param_val>*1.25 ms
6	0	0	500	Connection peripheral latency	Number of connection events
7	2000	100	32000	Connect linkloss timeout Conditions: 1: Connect Linkloss timeout > (1 + Connection peripheral latency) * Connection interval maximum * 2) 2: Connect Linkloss Timeout/10*4 > (1 + slave_latency) * max_conn_interval	<param_val> ms
8	5000	0	65535	Connect create connection timeout	<param_val> ms
9	48 (30 ms)	16	16384	Connection scan interval (must be >= Connect Scan Window). If scanning is enabled over CODED PHY (S=8), connection scan interval = 2*Connection Scan Window	<param_val>*0.625 ms
10	48 (30 ms)	16	16384	Connect scan window (must be <= Connection scan interval)	<param_val>*0.625 ms
11	24 (30 ms)	6	3200	Bond connection interval minimum (must be lt;= Bond Connection interval maximum)	<param_val>*1.25 ms
12	40 (50 ms)	6	3200	Bond connection interval maximum (must be gt;= Bond Connection interval minimum)	<param_val>*1.25 ms
13	0	0	500	Bond latency for number of connection events	<param_val> ms
14	2000	100	32000	Bond linkloss timeout	<param_val> ms
15	5000	0	65535	Bond create connection timeout	<param_val> ms
16	48 (30 ms)	16	16384	Bond connection scan interval (must be gt;= Bond Scan Window)	<param_val>*0.625 ms
17	48 (30 ms)	16	16384	Bond scan window (must be lt;= Bond Scan Interval)	<param_val>*0.625 ms
18	24 (30 ms)	6	3200	Remote name request connection interval minimum (must be lt;= Remote Name Request Connection Interval Maximum)	<param_val>*1.25 ms
19	40 (50 ms)	6	3200	Remote name request connection interval maximum (must be gt;= Remote Name Request Connection Interval Minimum)	<param_val>*1.25 ms
20	0	0	500	Remote name request latency for number of connection events	<param_val> ms
21	2000	100	32000	Remote name request linkloss timeout	<param_val> ms
22	5000	0	65535	Remote name request create connection timeout	<param_val> ms
23	48 (30 ms)	16	16384	Remote name request connection scan interval (must be gt;= Remote Name Request Scan Window)	<param_val>*0.625 ms
24	48 (30 ms)	16	16384	Remote name request scan window (must be lt;= Remote Name Request Scan Interval)	<param_val>*0.625 ms
25	0 (cleared)	0	1	Set or clear BR and EDR not supported flag in advertising data. Note that this only affects this flag, BR and EDR will not actually be disabled. 0 = flag cleared, 1 = flag set	
26	0	0	2	LL PDU payload size (Data Length Extension) and ATT MTU size negotiation 0: Accept incoming requests to negotiate ATT MTU size (maximum size 247) and/or LL PDU payload size (maximum size 251)	

Param tag	Default value	Minimum value	Maximum value	Description	Calculation
				1: Same behaviour as 0; additionally, on peripheral side, send negotiation request for ATT MTU size 247 and LL PDU payload size 251. For ANNA-B1, NINA-B31 from SW 2.0.0, NINA-B41, NINA-B1 SW 5.0.0 and for NINA-B41 a MTU negotiation will be sent also when in Central role 2: Disabled, reject any requests to negotiate ATT MTU size or LL PDU payload size. There are product specific restrictions when it comes to how many Bluetooth low energy links that are possible to configure while still maintaining max MTU size using tag 26. See command AT+UBTCFG for more information.	
27	0	0	3	Preferred Transmitter PHY For NINA-B31 and NINA-B41, the maximum value is 7. 0: Let other side decide OR a bit field with three bits: Bit 0: 1 Mbps preferred Bit 1: 2 Mbps preferred Bit 2: Coded PHY (S=8). Supported by NINA-B31 and NINA-B41 only	
28	0	0	3	Preferred Receiver PHY For NINA-B31 and NINA-B41, the maximum value is 7. 0: Let other side decide OR a bit field with three bits: Bit 0: 1 Mbps preferred Bit 1: 2 Mbps preferred Bit 2: Coded PHY (S=8). Supported by NINA-B31 and NINA-B41 only	
29	0	0	2	Extended advertising and scanning 0: Scanning and advertising 1 Mbps, extended advertising disabled 1: Scanning and advertising 1 Mbps, extended advertising enabled 2: Scanning and advertising CODED, extended advertising enabled. Supported by NINA-B31 and NINA-B41 only. 3: Advertising 1 Mbps, 2 Mbps secondary. Will connect on 2 Mbps if available. This tag is not valid for scanning. 4: Scanning and advertising 1 Mbps, CODED secondary. Supported by NINA-B31 and NINA-B41 only.	
30	0	0	1	Force bond when security mode is enabled (see AT +UBTSM). 0: Disabled 1: Enabled	

6.27.4 Notes

- The table below lists the parameter tags for which module reset is needed for the settings to take effect and the products:

Parameter tags for which module reset is needed	Products
1-3 and 25	ODIN-W2 (all software versions) and NINA-B1 (until software version 3.0.1)

4,5,26, 29	NINA-B1, NINA-B31, NINA-B41, and ANNA-B112

- The products and their corresponding supported parameter tags are listed in the table below:

Products	Supported parameter tags	
ODIN-W2	1-25	
NINA-B1	**Parameter tags**	**Supported NINA-B1 software versions**
	1-7	1.0.0
	1-10	2.0.0
	1-10 and 26	3.0.1
	1-10 and 26-28	4.0.0
	29	5.0.0
	30	7.0.0
ANNA-B112	**Parameter tags**	**Supported ANNA-B112 software versions**
	1-10, 26-28	All
	29	2.0.0
	30	4.0.0
NINA-B31	**Parameter tags**	**Supported NINA-B31 software versions**
	1-10, 26-28	1.0.0, 1.0.1, 2.0.0,
	29	2.0.0
	30	4.0.0
NINA-B41	**Parameter tags**	**Supported NINA-B41 software versions**
	1-10, 26-29	All
	30	2.0.0
	30	4.0.0
NINA-B2, NINA-W15	1-2, 3-10, 25-26	
	For the parameter tags 1-2, in Simultaneous Central Peripheral role, the minimum value is 30 0 ms.	

- Automatic PHY adaptation (NINA-B31-SW-3.0.0 onwards and NINA-B41):

  For NINA-B31 and NINA-B41 there is an automatic switch between CODED PHY and 1 Mbps or 2 Mbps PHY based on the link quality. In order to enable this automatic switching CODED PHY and at least one of 1 Mbps or 2 Mbps PHY must be enabled in parameter tags 27 and 28.

RSSI value	PHY change
changes to less than -80 dBm (device going out of range)	PHY will change to CODED PHY if enabled
changes to more than -60 dBm (device coming into range)	PHY will change from CODED PHY to 1 Mbps or 2 Mbps PHY, based on preferred PHY settings

6.28 Device ID record +UBTDIR

+UBTDIR				
Modules	ODIN-W2			
	NINA-B2, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.28.1 Description

Read and write Device Identification Record.

6.28.2 Syntax

AT Command	Description
AT+UBTDIR=<vendor_id>,<vendor_id_source>, <product_id>,<vendor_version>	Write device record.
AT+UBTDIR?<param_tag>, <param_val>	Read device record.

Response	Description
+UBTDIR:<vendor_id>,<vendor_id_source>,<product_id>,<vendor_version> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

6.28.3 Defined values

Parameter	Type	Description
vendor_id	Byte_Array	Unique identifier for the vendor of the device. Used in conjunction with required attribute 0205 and VendorIDSource, which determines the organization that assigned the VendorID value. ☞ The Bluetooth Special Interest Group assigns Device ID Vendor ID and the USB Implementer's Forum assigns vendor IDs, either of which can be used for the VendorID value here. Device providers should procure the vendor ID from the USB Implementer's Forum or the company identifier from the Bluetooth SIG. The VendorID "FFFF" is reserved as the default VendorID when no Device ID Service Record is present in the device.
vendor_id_source	Integer	Organization that assigned the VendorID attribute: 1: Bluetooth SIG 2: USB Implementer's forum
product_id	Byte_Array	Identifies different products from the same vendor.
vendor_version	Byte_Array	A numeric expression identifying the device release number in Binary-Coded Decimal. This is a vendor-assigned field, which defines the version of the product identified by the VendorID and ProductID attributes. This attribute is intended to differentiate between the versions of products with identical VendorIDs and ProductIDs. The value of the field is JJMN for version JJ.M.N (JJ - major version number, M - minor version number, N - sub-minor version number). For example, version 2.1.3 is represented with value 0213 and version 2.0.0 is represented with a value of 0200 . When upward-compatible changes are made to the device, it is recommended to increment the minor version number. If incompatible changes are made to the device, it is recommended to increment the major version number.

6.28.4 Notes

☞ For the settings to take effect, use the commands - &W and +CPWROFF to store the configuration to start up database and reboot the module.

6.29 ACL Connection remote device +UBTACLC

+UBTACLC				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

6.29.1 Description

Make an ACL connection to a remote device with defined protocol type. Unsolicited events +UUBTACLC or +UUBTACLD will be sent out to confirm the connection establishment.

6.29.2 Syntax

AT Command	Description
AT+UBTACLC=<bd_addr>[,<protocol_type>]	Initiate connection

Response	Description
OK	Successful response.
ERROR	Error response.

6.29.3 Defined values

Parameter	Type	Description
bd_addr	Bd_Addr	Bluetooth device address of the device to connect.
protocol_type	Integer	0: GATT Client LE Connection (default)

6.30 Close ACL Connection +UBTACLD

+UBTACLD				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

6.30.1 Description

Used to close a connection done with +UBTACLC.

6.30.2 Syntax

AT Command	Description
AT+UBTACLD=<conn_handle>	Close an existing ACL connection.

Response	Description
OK	Successful response.
ERROR	Error response.

6.30.3 Defined values

Parameter	Type	Description
conn_handle	integer	Connection handle that identifies the connection.

6.31 Static link key +UBTLK

+UBTLK				
Modules	ODIN-W2			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

6.31.1 Description

Used to set a predefined link key for all the Bluetooth connections - LE and BR/EDR.

6.31.2 Syntax

AT Command	Description
AT+UBTLK=<link_key>	Writes static link key.
AT+UBTLK?	Checks if a static link key is stored.

Response	Description
+UBTLK:0	No static link key stored.
OK	Link key is written.
+UBTLK:1	Static link key stored.
OK	
ERROR	Error message.

6.31.3 Defined values

Parameter	Type	Description
Link key	Byte array	16 bytes hexadecimal byte array.

6.32 Bluetooth low energy PHY Request +UBTLEPHYR

+UBTLEPHYR				
Modules	NINA-B1-SW4.0.0 onwards, ANNA-B112			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.32.1 Description

Requests a new PHY configuration for a Bluetooth low energy connection. It will always generate a +UUBTLEPHYU event if successfully executed. If TxPHY or RxPHY is 0, then the module will select PHYs based on the peer requirements on that specific direction. If the peer does not support the PHY update procedure, then the resulting +UUBTLEPHYU event will have a status different from SUCCESS.

6.32.2 Syntax

AT Event	Description
+UBTLEPHYR=<conn_handle>,<TxPHY>,<RxPHY>	Requests Bluetooth low energy PHY update.
+UBTLEPHYR=<conn_handle>	Reads current PHYs for a connection.

Response	Description
+UBTLEPHYR:<conn_handle>,<TxPHY>,<RxPHY>	Successful read response.
OK	
OK	Successful request response.
ERROR	Error response.

6.32.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Connection handle that identifies the connection.
TxPHY	Integer	Requested PHY for Transmitter: 0: Let other side decide OR a bit field with the following threebits: Bit 0: 1 Mbps preferred Bit 1: 2 Mbps preferred Bit 2: Coded PHY (S=8). Supported by NINA-B31 and NINA-B41 only
RxPHY	Integer	Requested PHY for Receiver: 0: Let other side decide OR a bit field with with the following three bits: Bit 0: 1 Mbps preferred Bit 1: 2 Mbps preferred Bit 2: Coded PHY (S=8). Supported by NINA-B31 and NINA-B41 only

6.33 Bluetooth low energy Device Information Service +UBTLEDIS [DEPRECATED]

+UBTLEDIS [DEPRECATED]				
Modules	NINA-B1-SW4.0.0 onwards, ANNA-B112			
	NINA-B31			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	-	No	-

6.33.1 Description

This is an old format of UBTLEDIS and can be seen as deprecated but is still valid for NINA-B1 from software version 4.0.0 onwards, NINA-B31 (all u-connectXpress software versions) and ANNA-B112 (all software versions).

Write/Read the characteristics values of the Device Information Service (UUID 0x180A). It is possible to change the following characteristics using this command:

- Manufacturer name string
- Model number string
- Firmware revision string
- Software revision string

6.33.2 Syntax

AT Command	Description
+UBTLEDIS=<manufacturer>,<model>,<fw_ver>,<sw_ver>	Write the characteristics values of the Device Information Service.
+UBTLEDIS?	Read the characteristics values of the Device Information Service.

Response	Description
OK	Successful write response.
+UBTLEDIS:<manufacturer>,<model>,<fw_ver>,<sw_ver> OK	Successful read response.
ERROR	Error response.

6.33.3 Defined values

Parameter	Type	Description
manufacturer	String	Name of the manufacturer. Maximum 31 characters. The default name is "u-blox".
model	String	Model number. Maximum 15 characters. The default name is "NINA-B1" or "NINA-B3" or "ANNA-B1" or "NINA-B22" respectively.
fw_ver	String	Firmware revision. Maximum 15 characters. The default value is the current software version number.
sw_ver	String	Software revision. Maximum 15 characters. The default value is the current software version number.

6.33.4 Notes

For the settings to take effect, use the commands - &W and +CPWROFF to store the configuration to start up database and reboot the module.

6.34 Bluetooth low energy Device Information Service +UBTLEDIS

+UBTLEDIS				
Modules	NINA-B1-SW5.0.0 onwards, NINA-B2			
	ANNA-B112-SW2.0.0 onwards			
	NINA-B31-SW2.0.0 onwards, NINA-W15, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	< 1s

6.34.1 Description

Write, read and delete the module's Device Information Service (DIS) characteristics. Setting any of the parameters empty will remove it from the Device Information Service.

6.34.2 Syntax

AT Command	Description
AT+UBTLEDIS=<param_id>,<value>	Set a parameter value.
AT+UBTLEDIS	Reads all individual characteristics of the Device Information Service characteristics.
AT+UBTLEDIS=<param_id>	Reads a specific Device Information Service characteristics parameter.

Response	Description
+UBTLEDIS:<param_id>,<value> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

6.34.3 Defined values

Param Id	Default value	Parameter	Description
1	"u-blox"	Manufacturer_Name	Manufacturer name string. Maximum length of the custom string is 31 characters.
2	"PRODUCT-NAME"	Model_Number	Model number string. Maximum length of the custom string is 20 characters.
3	"VERSION-1.0.0-001"	Fw_Revision	Firmware revision string. Maximum length of the custom string is 20 characters.
4	"VERSION-1.0.0-001"	Sw_Revision	Software revision string. Maximum length of the custom string is 20 characters.
5	""	Serial_Number	Serial number string. Maximum length of the custom string is 20 characters.
6	""	System_ID	System ID string. Length of the custom hex string is 16 characters (8 bytes). The first 5 bytes represent Manufacturer Id and the next 3 bytes represent the Unique Id of the organization.
7	""	Hw_Revision	Hardware revision string. Maximum length of the custom string is 20 characters.
8	""	PnP_ID	PnP ID. Length of the custom hex string is 14 characters (7 bytes). The first byte represents vendor Id Source, the next two bytes represent Vendor Id, the next two bytes represent Product Id and the last two bytes represent Product Version.

Setting any of the parameters empty will remove it from the DIS.

6.34.4 Notes

For the settings to take effect, use the commands - &W and +CPWROFF to store the configuration to start up database and reboot the module.

6.35 Bluetooth low energy Connection List +UBTLELIST

+UBTLELIST				
Modules	NINA-W15-SW3.0.0 onwards, NINA-B1-SW6.0.0 onwards, NINA-B2-SW3.0.0 onwards			
	NINA-B2-SW3.0.0 onwards, NINA-B3-SW3.0.0 onwards, ANNA-B1-SW3.0.0 onwards, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.35.1 Description

List all active Bluetooth low energy ACL connections.

6.35.2 Syntax

AT Command	Description
AT+UBTLELIST	List all Bluetooth low energy ACL connections.

Response	Description
+UBTLELIST:<conn_handle>, <bd_addr>	Sent for every connection.
OK	Successful read response.
ERROR	Error response.

6.35.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Connection handle of the Bluetooth low energy ACL connection.
bd_addr	Bd_Addr	Bluetooth device address of the remote device

6.36 Bluetooth low energy Connection Status +UBTLESTAT

+UBTLESTAT				
Modules	NINA-W15-SW3.0.0 onwards, NINA-B1-SW6.0.0 onwards, NINA-B2-SW3.0.0 onwards			
	NINA-B31-SW3.0.0 onwards, ANNA-B1-SW3.0.0 onwards, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.36.1 Description

Read negotiated properties of a Bluetooth low energy ACL connection.

Some properties are a result of negotiation when a connection is set up, and this command gives the possibility to see what properties the connection actually uses.

6.36.2 Syntax

AT Command	Description
AT+UBTLESTAT=<conn_handle>[,<property_id>]	Read propertie(s) of an existing Bluetooth low energy ACL connection. If <property_id> is omitted all properties will be listed.

Response	Description
+UBTLESTAT:<property_id>, <status_val>	Successful read response.
OK	
ERROR	Error response.

6.36.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Connection handle of the Bluetooth low energy ACL connection.
property_id	Integer	1: status_val is Connection Interval used on this connection.

Parameter	Type	Description
		• Range: 6 to 3200 • Time = status_val * 1.25 ms • Time range: 7.5 ms to 4000 ms 2: status_val is Peripheral latency for the connection in number of connection events. • Range: 0 to 499 3: status_val is Supervision timeout (in ms) for this connection. • Range: 100 ms to 32000 ms 4: status_val is MTU size for this connection. 5: status_val is Data Channel PDU Payload Length. 6: status_val is data Length Extension State. • 0: Data Length Extension Off • 1: Data Length Extension On 7: status_val is local role on this connection. • 1: Low Energy Central • 2: Low Energy Peripheral 8: Reserved. 9: Reserved. 10: status_val is current L2CAP mode, possible values are: • 1: Basic L2CAP mode • 2: LE Credit Based Flow Control Mode

6.37 Bluetooth PAN configuration +UBTPANC

+UBTPANC				
Modules	ODIN-W2-SW5.0.x onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	NVM	No	-

6.37.1 Description

This command is used to configure the Bluetooth Personal Area Network (PAN) network settings. After configuring the PAN network, it must be activated (Bluetooth PAN Configuration Action +UBTPANCA) before use.

6.37.2 Syntax

AT Command	Description
AT+UBTPANC=<param_tag>, <param_val1>, [<param_val2>,..., <param_valn>]	Writes configuration.
AT+UBTPANC[=<param_tag>]	Reads configuration. If no <param_tag> parameters, all are listed.

Response	Description
+UBTPANC:<param_tag>,<param_val1>	Sent for every applicable param_tag.
OK	Successful response.
ERROR	Error response.

6.37.3 Defined values

Parameter	Type	Description
param_tag	Integer	0:<param_val1> decides if the configuration is active on start up. • 0: Inactive (default) • 1: Active 1: Local PAN role - <param_val1> is the local PAN role. • 0: PAN User (PANU)

Parameter	Type	Description
		• 1: Network Access Point (NAP) (default) 2: Remote PAN role - <param_val1> is the remote PAN role. • 0: PANU (default) • 1: NAP 3: Remote name - <param_val1> is the Bluetooth name of the remote device to connect. The factory default is no name and the maximum length is 30. 4: Remote address - <param_val1> is the Bluetooth address of the remote device to connect. The factory default is no address. 100: IPv4 Mode - <param_val1> to set the way to retrieve an IP address • 1: Static (default) • 2: DHCP 101: IPv4 address - <param_val> is the IPv4 address. The factory default value is 0.0.0.0 102: Subnet mask - <param_val> is the subnet mask. The factory default value is 0.0.0.0 103: Default gateway - <param_val> is the default gateway. The factory default value is 0.0.0.0 104: DNS server 1 - <param_val> is the primary DNS server IP address. The factory default value is 0.0.0.0 105: DNS server 2 - <param_val> is the secondary DNS server IP address. The factory default value is 0.0.0.0 106: <param_val> is the DHCP server configuration. • 0: Disable DHCP server (default) • 1: Enable DHCP server. 107: Address conflict detection. The factory default value is 0 (disabled). • 0: Disabled • 1: Enabled ☞ The param_tag - 107 is supported by ODIN-W2 from software version 6.0.0 onwards only.

6.38 Bluetooth PAN configuration action +UBTPANCA

+UBTPANCA				
Modules	ODIN-W2-SW5.0.x onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.38.1 Description

Execute an action based on the current PAN settings.

6.38.2 Syntax

AT Command	Description
AT+UBTPANCA=<action>	Executes an action for the Bluetooth PAN network.

Response	Description
OK	Successful response.
ERROR	Error response.

6.38.3 Defined values

Parameter	Type	Description
action	integer	0: reset; it clears the specified profile and resets all the parameters to their factory defaults. 1: Store; saves the configuration.

Parameter	Type	Description
		2: Load; it reads all the parameters from non-volatile memory to run-time memory 3: Activate; activates the specified profile from run-time memory 4: Deactivate; it deactivates the currently active configuration When the activate command triggers a connection attempt, the module will try to connect until successful or the user deactivates the action. It will send repeatedly the +UUBTPANLD while not successful. The same is true when a connection is lost. The module will automatically start reconnecting. To reconfigure a NAP configuration that is active, it needs to be deactivated, reconfigured, and stored (with the 1:store action) before restarting.

6.39 Bluetooth PAN Connection list +UBTPANLIST

+UBTPANLIST				
Modules	ODIN-W2-SW5.0.x onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.39.1 Description

Lists all the active Bluetooth PAN connections.

6.39.2 Syntax

AT Command	Description
AT+UBTPANLIST?	Lists all the active Bluetooth PAN connections.

Response	Description
+UBTPANLIST:<bd_addr>,<rssi>	This is sent for every connected device.
OK	Successful response.
ERROR	Error message.

6.39.3 Defined values

Parameter	Type	Description
bd_addr	Bd_Addr	Bluetooth address of the connected device.
rssi	integer	Received signal strength. The RSSI value is updated every 5 seconds.

6.40 Bluetooth PAN Link established +UUBTPANLU

+UUBTPANLU				
Modules	ODIN-W2-SW5.0.x onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.40.1 Description

Event for an established Bluetooth PAN connection.

6.40.2 Syntax

AT Event	Description
AT+UUBTPANLU:<connection_id>, <bd_addr>	A Bluetooth PAN connection is established.

6.40.3 Defined values

Parameter	Type	Description
connection_id	Integer	Bluetooth PAN connection id.
bd_addr	Bd_Addr	Bluetooth address of the connected device.

6.41 Bluetooth PAN Link disconnected +UUBTPANLD

+UUBTPANLD				
Modules	ODIN-W2-SW5.0.x onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.41.1 Description

Event for a lost Bluetooth PAN connection.

6.41.2 Syntax

AT Event	Description
AT+UUBTPANLD:<connection_id>, <reason>	Bluetooth PAN connection disconnected.

6.41.3 Defined values

Parameter	Type	Description
connection_id	Integer	Connection id.
reason	Enumerator	0: Unknown
		1: No device found with the configured remote name
		2: Out of range
		5: Network disabled as a response to a deactivated command.

6.42 Bond event +UUBTB

+UUBTB				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.42.1 Description

Unsolicited response code for Bluetooth. This event indicates that the bonding initiated by AT+UBTB is complete.

6.42.2 Syntax

AT Event	Description
+UUBTB:<bd_addr>,<status>	The status parameter indicates whether the bonding succeeded or failed.

6.42.3 Defined values

Event parameter	Type	Description
bd_addr	Bd_Addr	The remote Bluetooth Device address.
status	enumerator	0: Bonding succeeded.
		1: Bonding failed due to page timeout.
		2: Bonding failed because authentication or pairing failed. This could be due to incorrect PIN/passkey.
		3: Bonding failed because the protection against Man-In-The-Middle attack could not be guaranteed; the generated link key was too weak.
		4: Bond failed because one of the peers does not support FIPS mode (See AT+UBTST command). This tag is applicable for the following products only:
		• NINA-B1-SW5.0.0 onwards • ANNA-B112-SW2.0.0 onwards

Event parameter	Type	Description
		• NINA-B3-uX-SW2.0.0 onwards • NINA-B41 • NINA-B2 and NINA-W15 from SW 3.0

6.43 User confirmation event +UUBTUC

+UUBTUC				
Modules	ODIN-W2			
	NINA-B2, NINA-W15			
	NINA-B1-SW6.0.0 onwards			
	ANNA-B112-SW3.0.0 onwards			
	NINA-B31-SW3.0.0 onwards, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.43.1 Description

Unsolicited response code for Bluetooth.

This event is used while bonding with the security mode 4. The event indicates that the user confirmation of a numeric value is required. A positive response is sent with AT+UBTUC and should be issued only if the local and remote sides numeric values are equal.

6.43.2 Syntax

AT Event	Description
+UUBTUC:<bd_addr>,<numeric_value>	Response code.

6.43.3 Defined values

Event parameter	Type	Description
bd_addr	Bd_Addr	The remote Bluetooth Device address.
numeric_value	integer	An integer in the range of [0..999999].

6.44 User passkey display +UUBTUPD

+UUBTUPD				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.44.1 Description

Unsolicited response code for Bluetooth.

This event is used to indicate to the user that a passkey has to be entered on the remote device during a bonding procedure with the security mode "3 - Display only". No user interaction is needed.

6.44.2 Syntax

AT Event	Description
+UUBTUPD:<bd_addr>,<passkey>	Passkey event

6.44.3 Defined values

Event parameter	Type	Description
bd_addr	Bd_Addr	The remote Bluetooth Device address.

Event parameter	Type	Description
passkey	integer	An integer in the range of [0..999999].

6.45 User passkey entry +UUBTUPE

+UUBTUPE				
Modules	ODIN-W2			
	NINA-B1, ANNA-B112, NINA-B2			
	NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.45.1 Description

Unsolicited response code for Bluetooth.

This event is used during bonding with the security mode "5 - Keyboard only" to indicate that a passkey is required from the user. User should respond to this event with the AT+UBTUPE command.

6.45.2 Syntax

AT Event	Description
+UUBTUPE:<bd_addr>	Response event.

6.45.3 Defined values

Event parameter	Type	Description
bd_addr	Bd_Addr	The remote Bluetooth Device address.

6.46 ACL Connected +UUBTACLC

+UUBTACLC				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

6.46.1 Description

Unsolicited response code for successful Bluetooth ACL connection.

6.46.2 Syntax

AT Event	Description
+UUBTACLC:<conn_handle>,<type>,<bd_address>	Bluetooth ACL connection event.

6.46.3 Defined values

Parameter	Type	Description
conn_handle	integer	The peer handle that identifies the connection. The peer handle is -1 when connection attempt fails or is not used.
type	integer	0: GATT
bd_address	Bd_Addr	Remote Bluetooth address.

6.47 ACL Disconnected +UUBTACLD

+UUBTACLD				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

6.47.1 Description

Unsolicited response code indicating a disconnected Bluetooth ACL connection.

6.47.2 Syntax

AT Event	Description
+UUBTACLD:<conn_handle>	Bluetooth ACL disconnection event.

6.47.3 Defined values

Parameter	Type	Description
conn_handle	integer	The peer handle identifies the connection.

6.48 Bluetooth low energy PHY Update +UUBTLEPHYU

+UUBTLEPHYU				
Modules	NINA-B1-SW4.0.0 onwards, ANNA-B112			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

6.48.1 Description

Unsolicited response for Bluetooth low energy PHY updates.

Informs the result of a PHY update procedure. It may be generated as a result of the command AT+UBTLEPHYR or as a successful event, if the operation has been initiated by the remote peer.

6.48.2 Syntax

AT Event	Description
+UUBTLEPHYU:<conn_handle>,<status>,<TxPHY>,<RxPHY>	Response event

6.48.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Connection handle that identifies the connection.
status	Integer	Bluetooth status codes: 0: SUCCESS 0x01 - 0xFF: ERROR. See Bluetooth Core Specifications, Vol 2, Part D.
TxPHY	Integer	Negotiated PHY for Transmitter: 1: 1 Mbps 2: 2 Mbps 4: CODED
RxPHY	Integer	Negotiated PHY for Receiver: 1: 1 Mbps 2: 2 Mbps 4: CODED

6.49 Bluetooth mode +UBTMODE

+UBTMODE				
Modules	NINA-B1-SW6.0.0 onwards, ANNA-B112, NINA-B2-SW3.0.0 onwards			
	NINA-B31-SW3.0.0 onwards, NINA-B41, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Yes	No	-

6.49.1 Description

Read/Write Bluetooth mode.

6.49.2 Syntax

AT Command	Description
AT+UBTMODE?	Read the stored Bluetooth mode.
AT+UBTMODE=<mode>	Write the Bluetooth mode to settings

Response	Description
+UBTMODE:<mode>	Successful read response.
OK	Successful write response.
ERROR	Error message.

6.49.3 Defined values

Parameter	Type	Description
mode	Integer	0: Disabled. The mode is a bit field where bit 0: Bluetooth classic bit 1: Bluetooth low energy bit 2: Bluetooth mesh Integer values: 1: Bluetooth classic mode. 2: Bluetooth low energy mode. This is default for NINA-B31, NINA-B41, ANNA-B112, NINA-B1 3: Bluetooth low energy and classic mode. This is default for NINA-B2, NINA-W15, NINA-W13 6: Bluetooth low energy and Bluetooth mesh

6.49.4 Notes

- AT+UBTMODE is used to store the Bluetooth mode to settings. Use the commands - &W and +CPWROFF to store the configuration to start up database and reboot the module for the settings to take effect.
- The Bluetooth mesh bit is only applicable for NINA-B31 SW 3.0.0 and later.
- The Bluetooth mesh bit also requires the Bluetooth low energy bit to be set.
- Mode 1 and 3 are not applicable for NINA-B1, ANNA-B1, NINA-B31, NINA-B41.

7 Wi-Fi

7.1 Wi-Fi station configuration +UWSC

+UWSC				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	NVM	No	-

7.1.1 Description

This command is used to configure up to 10 different Wi-Fi networks. After configuring a network, it must be activated (Wi-Fi Station Configuration Action +UWSCA) before use.

This command will generate an error if the configuration id is active. Refer to "Wi-Fi Station Configuration Action +UWSCA" for instructions on how to deactivate a configuration.

7.1.2 Syntax

AT Command	Description
AT+UWSC=<configuration_id>, <param_tag>,<param_val1>[, <param_val2>,...,<param_valn>	Sets Wi-Fi station configuration.
AT+UWSC=<configuration_id>[, <param_tag>]	Reads Wi-Fi station configuration.

Response	Description
+UWSC:<configuration_id>, <param_tag>,<param_val1>	Sent for every applicable param_tag
OK	Successful response.
ERROR	Error response.

If more than one configuration has active on start up parameter enabled, the behaviour is undefined.

7.1.3 Defined values

Parameter	Type	Description
configuration_id	integer	Wi-Fi configuration id. 0-9
param_tag	integer	0:<param_val1> decides if the station is active on start up. • 0 (default): inactive • 1: active 2: SSID - <param_val1> is the Service Set Identifier. The factory default value is an empty string ("""). 4: Reserved 5: Authentication - <param_val> is the authentication type. • 1 (default): Open • 2: WPA/WPA2/WPA3* • 3: LEAP • 4: PEAP • 5: EAP-TLS • NINA-W13-SW1.0.0 supports Authentication 1, 2 only • NINA-W13-SW2.0.0 and onward support 1, 2, 4, 5 • NINA-W15 supports 1, 2, 4, 5

Parameter	Type	Description
		• WPA3 only supported by NINA-W13 and W15 software version 4.0.0 and onwards. 6:* WEP Keys - <param_val1>...<param_val4> are the WEP encryption keys. A WEP key is either 5 bytes (while using WEP 64), or 13 bytes (while using WEP 128) and if not used, it can be empty. The keys must be in HEX data format. For example, 0102030405 while using WEP 64, or 0102030405060708090A0B0C0D while using WEP 128. ☞ "WEP Shared Key Authentication" is not supported; only "WEP Open Key Authentication " is supported. ☞ To use WEP with open authentication, the WEP key index must be different from zero (0). 7: Active Key - <param_val1> is the WEP active TX key (factory default 0 means that Open authentication with WEP encryption is disabled). Range 1-4. 8:* PSK/Passphrase - <param_val1> is the PSK (32 HEX values) or Passphrase (8-63 ASCII characters as a string) for WPA/WPA2/WPA3. ☞ PSK is not supported by NINA-W13 and NINA-W15. 9:* Password - <param_val1> is the password for LEAP and PEAP; string with a maximum length of 31. 10: User name - <param_val1> is the public user name for LEAP and PEAP; string with a maximum length of 31. 11: Domain name - <param_val1> is the public domain name for LEAP and PEAP; string with a maximum length of 63. The domain name is an optional parameter. 12: Client certificate name - <param_val1> is the internal client certificate name for EAP-TLS as defined in the SSL/TLS certificates and private keys manager +USECMNG command; string with a maximum length of 32. 13: Client private key - <param_val1> is the internal client private key name for EAP-TLS as defined in the SSL/TLS certificates and private keys manager +USECMNG command; string with a maximum length of 32. 14: CA certificate name - <param_val1> is the internal CA certificate name for EAP-TLS as defined in the SSL/TLS certificates and private keys manager +USECMNG command; string with a maximum length of 32. 15: Validate CA certificate. The default value is 1; Setting this value to 0 means no CA Certificate validation has been done. For example at+uwsc=0,15,0 would mean that the server CA Certificate is not validated during authentication. 100: IPv4 Mode - <param_val1> to set the way to retrieve an IP address • 1: Static • 2 (default): DHCP 101: IPv4 address - <param_val> is the IPv4 address. The factory default value is 0.0.0.0. Valid only if param_tag 100 is set to Static. 102: Subnet mask - <param_val> is the subnet mask. The factory default value is 0.0.0.0. Valid only if param_tag 100 is set to Static. 103: Default gateway - <param_val> is the default gateway. The factory default value is 0.0.0.0. Valid only if param_tag 100 is set to Static. 104: DNS server 1 - <param_val> is the primary DNS server IP address. The factory default value is 0.0.0.0. Valid only if param_tag 100 is set to Static. 105: DNS server 2 - <param_val> is the secondary DNS server IP address. The factory default value is 0.0.0.0. Valid only if param_tag 100 is set to Static. 107: Address conflict detection. The factory default value is 0 (disabled). • 0: Disabled • 1: Enabled 200: IPv6 Mode - <param_val1> to set the way to retrieve an IP address • 1 (default): Link Local IpAddress 201: <param_val> is the IPv6 link local address. If the value is not set, the link local address is automatically generated from the interface IEEE 48 bit MAC identifier.

Parameter	Type	Description
		300: <param_val> is the Wi-Fi beacon listen interval in units of beacon interval. The factory default value is 0, listen on all beacons. If larger than 0, the module may enter SLEEP mode during the set beacon interval, consuming less power. • Valid values 0-16 301: <param_val> Enables DTIM. If the DTIM is enabled, the access point sends an indication when new data is available, allowing the module to consume less power. If disabled, the module polls for data every beacon listen interval. The factory default value is enabled. • 0: Disabled • 1: Enabled

7.1.4 Notes

Values marked with '*' above does not support reading.

The implementation of ACTIVE, STANDBY, SLEEP and other low power modes depends on the actual module.

For details regarding the implementation of SLEEP and other low power modes, see the u-connectXpress user guide [1], and the corresponding datasheet for the ANNA-B1 [23], NINA-B1 [24], NINA-B2 [25], NINA-B31 [26], NINA-B41 [27], NINA-W13 [28], NINA-W15 [29], ODIN-W2 [30] module.

For additional methods of tuning the power consumption based on use-case, also see AT+UPWRMNG.

For NINA-W13 and NINA-W15: The parameter tags supported by different software versions are listed in the table below:

Parameter tags	Supported software versions
0, 2, 4, 5, 8, 100-105, 107, 200, 201	All versions
9-15	NINA-W13: 2.0.0 onwards NINA-W15: All versions
300, 301	3.0.0 onwards

For ODIN-W2: The parameter tags supported by different software versions are listed in the table below:

Parameter tags	Supported ODIN-W2 software versions
0, 2, 5-11, 100-105, 200-201, 300-301	All versions
12-13	4.0.0 onwards
14-15	5.0.0 onwards
107	6.0.0 onwards

7.2 Wi-Fi station configuration action +UWSCA

+UWSCA				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.2.1 Description

Execute configurations actions for Wi-Fi Station.

7.2.2 Syntax

AT Command	Description
AT+UWSCA=<config_id>,<action>	Executes an action for the Wi-Fi network.

Response	Description
OK	Successful response.
ERROR	Error response.

☞ Only one configuration can be active at any point of time.

7.2.3 Defined values

Parameter	Type	Description
config_id	integer	Wi-Fi configuration id. 0-9
action	integer	0: reset; it clears the specified profile and resets all the parameters to their factory defaults. 1: store; validates the configuration, calculates the PSK for WPA and WPA2 (if not already calculated),and saves the configuration. 2: load: it reads all the parameters from non-volatile memory to run-time memory. 3:* activate; validates the configuration, calculates the PSK for WPA and WPA2 (if not already calculated), and activates the specified profile from run-time memory. It will try to connect, if not connected. 4: deactivate; it deactivates the specified profile. Disconnects the profile if connected, and may reconnect to other active network. ☞ * - When the activate triggers a STA to start connecting, it will continue until successful or until the deactivate action. During the ongoing connection attempt, the module will send +UUWLD events. This is true even when a connection is lost. The module will automatically reconnect.

7.3 Scan +UWSCAN

+UWSCAN				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.3.1 Description

Command to perform Wi-Fi scan operation for available networks.

This command will return the available networks in the immediate surroundings, then return OK or ERROR if unable to start scan. Channels scanned is given by the channel list. See +UWCL for more information. If the SSID is defined, a directed scan will be performed.

7.3.2 Syntax

AT Command	Description
AT+UWSCAN[=<ssid>]	Initiate Wi-Fi scan.

Response	Description
+UWSCAN:<bssid>,<op_mode>,<ssid>,<channel>,<rssi>,<authentication_suites>,<unicast_ciphers>,<group_ciphers> [,<rsn_cap>,<country_code>,<mob_domain>]	Successful read response.
OK	
ERROR	Error response.

7.3.3 Defined values

Parameter	Type	Description
ssid	String	The SSID name of the network.
channel	Integer	The channel that is used by the network.
bssid	Mac_Addr	The MAC address of the access point (AP).
op_mode	Integer	1 = Infrastructure

Parameter	Type	Description
		2 = Ad-hoc
rssi	Integer	Signal strength value for the network in dBm.
authentication_ suites	Byte_Array	Bit 0 = Shared secret Bit 1 = PSK Bit 2 = EAP Bit 3 = WPA Bit 4 = WPA2 Bit 5 = WPA3
unicast_ciphers and	Byte_Array	1 hexadecimal value Bit 0 = WEP64 Bit 1 = WEP128 Bit 2 = TKIP Bit 3 = AES/CCMP ☞ For NINA-W13-SW1.0.0, the value will be 255.
group_ciphers	Byte_Array	1 hexadecimal value Bit 0 = WEP64 Bit 1 = WEP128 Bit 2 = TKIP Bit 3 = AES/CCMP ☞ For NINA-W13-SW1.0.0, the value will be 255.
rsn_cap	Integer	RSN Capabilties. ☞ Only supported by ODIN-W2 software version 6.0.0 onwards
country_code	String	Country Code ☞ Only supported by ODIN-W2 software version 6.0.0 onwards
mob_domain	Byte_Array	Mobility Domain Name. 2 bytes long. ☞ Only supported by ODIN-W2 software version 6.0.0 onwards

7.3.4 Notes

- AT+UWSCAN will return ERROR if the channel list set by AT+UWCL is empty.
- Some authentication suites and ciphers are not displayed correctly in the scan response for NINA-W13.

7.4 Channel list +UWCL

+UWCL				
Modules	ODIN-W2, NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

7.4.1 Description

Writes the required channel list for station mode.

☞ For ODIN-W2 the channel list is used for scanning and connection in Station mode (STA) and the channel list can be restored to the default value by passing the command without parameters: AT+UWCL

☞ For NINA-W13 and NINA-W15 the channel list is only used for scanning and the channel list can only be restored to default value using command +UFACTORY.

7.4.2 Syntax

AT Command	Description
AT+UWCL[=<channel_list>]	Set required channel list.
AT+UWCL?	Reads the required channel list.

Response	Description
+UWCL:<ch1>,<ch2>,...,<chN>	Successful read response.
OK	
OK	Successful response.
ERROR	Error response.

7.4.3 Defined values

Parameter	Type	Description
channel_list	list of integer	Channels to use.

7.4.4 Notes

The actual channel list may differ from the wanted channel list. Depending on the physical location, the radio environment, and the product version, the actual channel list in use may be limited to comply with the regulatory approvals. Some sample scenarios are listed below:

- Channels 12 and 13 will be disabled until it has been determined that the module operates outside the FCC region.
- Channels 120, 124, and 128 will be disabled until it has been determined that the module operates outside the FCC region.
- Channels 149, 153, 157, 161, and 165 will be disabled until it has been determined that these are allowed for the current region.
- Any DFS channel will be disabled for active use until an appropriate authoritative source has been found for clearing each specific channel.

7.4.5 Example

Setting channel list to only use channels 1, 6 and 11:

AT+UWCL=1,6,11

OK

7.5 Wi-Fi station status +UWSSTAT

+UWSSTAT				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.5.1 Description

Read current status of the Wi-Fi interface.

7.5.2 Syntax

AT Command	Description
AT+UWSSTAT[=<status_id>]	Read status.

Response	Description
+UWSSTAT:<status_id>,<status_val>	This is sent for every applicable status.
OK	Successful response.
ERROR	Error message.

7.5.3 Defined values

Parameter	Type	Description
status_id	integer	0: The <status_val> is the currently used SSID. 1: The <status_val> is the currently used BSSID. 2: The <status_val> is the currently used channel. 3: The <status_val> is the current status of the station, possible values of status_val are: • 0: Disabled, • 1: Disconnected, • 2: Connected, 6: The <status_val> is the RSSI value of the current connection; will return-32768, if not connected. 7:* The <status_val> is the mobility domain of the last or current connection. 8:* The <status_val> is the region to which the module complies according to the accepted Wi-Fi channels: • 0: World • 1: FCC • 2: ETSI • 3: ALL (test modes only) * - This tag is supported by ODIN-W2 from software version 6.0.0 onwards only.

7.5.4 Notes

RSSI Calculation The Wi-Fi RSSI calculation is done by averaging the last 8 received data packets of the following types: MANAGEMENT, PROBE_RESPONSE, DATA, QOS_DATA, and EAPOL.

7.6 Wi-Fi Configuration +UWCFG

+UWCFG				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

7.6.1 Description

Write and read Wi-Fi configuration parameters.

7.6.2 Syntax

AT Command	Description
AT+UWCFG=<param_tag>,<value>	Writes configuration parameter.
AT+UWCFG[=<param_tag>]	Reads configuration parameter. If type is omitted, all the parameters are read.

Response	Description
+UWCFG:<type>,<value>	Sent for all configuration parameters.
OK	Successful response.
ERROR	Error message.

7.6.3 Defined values

Parameter	Type	Description
param_tag	enumerator	0: Wi-Fi enabled • 0: Disabled • 1 (default): Enabled • 2: Auto (Default for NINA-W13-SW1.0.0 only) 1: Lowest Wi-Fi power save mode

Parameter	Type	Description
		• 0: ACTIVE mode • 1: STANDBY mode • 2 (default): SLEEP mode ☞ On NINA-W13 or NINA-W15, after changing lowest Wi-Fi power save mode, use the commands &W and +CPWROFF to store the configuration to start up database and reboot the module, for the changes to take effect. ☞ On NINA-W13 or NINA-W15, the Lowest Wi-Fi power save mode STANDBY mode implies SLEEP mode. 2: <param_val> is the transmit power level in dBm. Valid values are 0-20 and 255. Adaptive transmit power level control is enabled with 255. The factory default value is 255. 3: Number of antennas • 1 (default): Use one antenna. This is the only valid choice for ODIN-W262 and ODIN-W263. • 2: Use two antennas. 4: Primary antenna • 1 (default): Main antenna. This is the only valid choice for ODIN-W262 and ODIN-W263. For ODIN-W260, the main antenna connector is the one that is on the middle of the edge. • 2: Auxiliary antenna - For ODIN-W260, the auxiliary antenna connector is the one that is at the corner of the module. 5: Good RSSI value When an AP is found with better or equal RSSI, the module will abort the scanning and connect to the AP. Valid values are -128 to 0. The default value is -55. 6: Bad RSSI value This value is defined when you are in an area with bad coverage. That is, the fast scan sleep timeout (param_tag 8) will be used to find a better alternative. Valid values are -128 to 0. The default value is -70. 7: Slow scan sleep timeout <param_val> is the timeout in ms for scanning two channels when the module is connected to an AP with an RSSI value that is above the Bad RSSI value (param_tag 6). Set to 0 to turn the neighborhood watch off when there is a good signal strength. Valid values are 0 - 2147483647. The default value is 2000. 8: Fast scan sleep timeout <param_val> is the timeout in ms for scanning two channels when the module is connected to an AP with an RSSI value that is below the Bad RSSI value (param_tag 6). Set to 0 to turn off roaming. Valid values are 0 - 2147483647. The default value is 150. 9: Last BSSID block time <param_val> is the time in seconds a switch to the last connected AP is blocked. Valid values are 0 - 2147483. The default value is 5. 10: Drop network on link loss • 0 (default): Do not drop the network when there is a Wi-Fi link loss • 1: Drop the network when the Wi-Fi link is lost; data may be lost with this option. 11: Force world mode • 0: Use all channels in the channel list; See +UWCL for more information. The channel list will be filtered by 802.11d. • 1 (default): Lock device to world mode. The channel list (+UWCL) is filtered and only the channels in the following ranges will be used - 1-11, 36-64, 100-116, 132-140. ☞ For the updated "Force world mode" settings to take affect, the Wi-Fi radio must be restarted. This can be done by the Wi-Fi disable/enable command (parameter 0) or by storing the setting (&W) to non-volatile memory and restarting the module. 12: Fast transition mode (802.11r) • 0: Disabled, never use fast transitions.

Parameter	Type	Description
		• 1: Over air, use fast transitions "Over air" instead of "Over DS", even though "Over DS" support is announced by the APs. • 2 (default): Over DS, follow the mode announced by the APs 14: Scan listen interval <param_val> is the timeout (in ms) between scanning one channel and another. The default value is 0 ms. 15: Remain on channel • 1 (default): Enable remain on channel • 0: Disable remain on channel 16: Station TX rates bit mask where bit masks are defined according to: 0x00000001: Rate 1 Mbps 0x00000002: Rate 2 Mbps 0x00000004: Rate 5.5 Mbps 0x00000008: Rate 11 Mbps 0x00000010: Rate 6 Mbps 0x00000020: Rate 9 Mbps 0x00000040: Rate 12 Mbps 0x00000080: Rate 18 Mbps 0x00000100: Rate 24 Mbps 0x00000200: Rate 36 Mbps 0x00000400: Rate 48 Mbps 0x00000800: Rate 54 Mbps 0x00001000: Rate MCS 0 0x00002000: Rate MCS 1 0x00004000: Rate MCS 2 0x00008000: Rate MCS 3 0x00010000: Rate MCS 4 0x00020000: Rate MCS 5 0x00040000: Rate MCS 6 0x00080000: Rate MCS 7 0x00100000: Rate MCS 8 0x00200000: Rate MCS 9 0x00400000: Rate MCS 10 0x00800000: Rate MCS 11 0x01000000: Rate MCS 12 0x02000000: Rate MCS 13 0x04000000: Rate MCS 14 0x08000000: Rate MCS 15 Default value is 0, which means that all rates are enabled. 17: Station short packet retry limit. Default value is 0x00141414. 18: Station long packet retry limit. Default value is 0x00141414. 19: AP short packet retry limit. Default value is 0x00141414. 20: AP long packet retry limit. Default value is 0x00141414. The definition of retry limits for the parameters 17 to 20 are listed below: • Bits 31-24: Reserved • Bits 23-16: EAPOL & Broadcast (0x01-0xFF) • Bits 15-8: MGMT (0x01-0xFF)

Parameter	Type	Description
		• Bits 7-0: Data (0x01-0xFF) 21: Scan Type • 1 (default): Active scan • 2: Passive scan 22: Scan Filter • 0 (default): Do not filter scan results • 1: Filter scan results; the module will try to only send one scan response for each BSSID. In environments with a high number of networks, this may not work. 23: Enable block acknowledgment • 0 (default): Disable block acknowledgment • 1: Enable block acknowledgment 24: Minimum TLS version • 1 (default): TLS v1.0 • 2: TLS v1.1 • 3: TLS v1.2 25: Maximum TLS version • 1: TLS v1.0 • 2: TLS v1.1 • 3 (default): TLS v1.2 26: Reserved for future use. 27: Wi-Fi Quality of Service • 0: Enable QoS • 1 (default): Disable QoS

7.6.4 Notes

☞ The implementation of STANDBY, SLEEP and other low power modes depends on the actual module.

For details regarding the implementation of STANDBY, SLEEP and other low power modes, see the u-connectXpress user guide [1], and the corresponding datasheet for the ANNA-B1 [23], NINA-B1 [24], NINA-B2 [25], NINA-B31 [26], NINA-B41 [27], NINA-W13 [28], NINA-W15 [29], ODIN-W2 [30] module.

For additional methods of tuning the power consumption based on use-case, also see AT+UPWRMNG.

☞ For ODIN-W2, the supported parameter tags for different software versions are listed in the table below:

Parameter tags	Supported ODIN-W2 software versions
0-2	All versions
3-11	5.0.0 onwards
12, 14, and 15	6.0.0 onwards
16-22	7.0.0 onwards
23-25	7.0.2 onwards
27	8.0.0 onwards

☞ For NINA-W13, the supported parameter tags for different software versions are listed in the table below:

Parameter tags	Supported NINA-W13 software versions
0-1	All versions
11	2.1.0 onwards
21	3.0.0 onwards

☞ For NINA-W15, the supported parameter tags for different software versions are listed in the table below:

Parameter tags	Supported NINA-W15 software versions
0-1, 11	All versions
21	3.0.0 onwards

7.7 Wi-Fi Watchdog settings +UWWS

+UWWS				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	Profile	No	-

7.7.1 Description

This command is deprecated and kept for backwards compatibility. Use +UDWS instead.

7.7.2 Syntax

AT Command	Description
AT+UWWS=<type>,<value>	Writes watchdog parameters.
AT+UWWS[=<type>]	Reads watchdog parameter; if type is omitted, all the parameters are read.

Response	Description
+UWWS:<type>,<value>	This is sent for all applicable watchdog setting.
OK	Successful response.
ERROR	Error message.

7.7.3 Defined values

Parameter	Type	Description
type	enumerator	1: disconnect reset: <value> defines if the DCE shall reset on dropped Wi-Fi connection to AP. • 0 (factory default): disabled • 1: enabled

7.8 Wi-Fi Access point configuration +UWAPC

+UWAPC				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	NVM	No	-

7.8.1 Description

This command is used to set up an access point network configuration. After configuring a network, it must be activated (Wi-Fi Access Point Configuration Action +UWAPCA) before using.

The command will generate an error if the configuration id is active. See "Wi-Fi Access Point Configuration Action +UWAPCA" for instructions on how to deactivate a configuration.

7.8.2 Syntax

AT Command	Description
AT+UWAPC=<configuration_id>,<param_tag>,<param_val1>[,<param_val2>,...,<param_valn>	Sets Wi-Fi access point configuration.
AT+UWAPC=<configuration_id>[,<param_tag>]	Reads Wi-Fi access point configuration.

Response	Description
+UWAPC:<configuration_id>,<param_tag>,<param_val1>	Sent for every applicable param_tag.
OK	Successful response.

Response	Description
ERROR	Error response.

7.8.3 Defined values

Parameter	Type	Description
configuration_id	integer	Wi-Fi configuration id. 0
param_tag	integer	0:<param_val1> decides if the access point is active on start up. • 0 (default): inactive • 1: active 2: SSID - <param_val1> is the Service Set identification of the access point. The factory-programmed value is ("UBXWifi"). 4:<param_val1> is the channel. Factory programmed value is 6. 5: Security mode <param_val1>: • 1: Open • 2 (default): WPA2 (AES-CCMP) • 3: WPA/WPA2 Mixed mode (RC4-TKIP + AES-CCMP) • 4: WPA (RC4-TKIP) <param_val2>: • 1: Open • 2 (default): Pre shared key PSK 8: PSK/Passphrase - <param_val1> is the PSK (32 HEX values) or Passphrase (8-63 ascii characters as a string) for WPA and WPA2, default: "ubx-wifi". This tag does not support reading. ☞ NINA-W13-SW2.0.0 supports passphrase only. 12:<param_val1> is a bitmask representing the mandatory 802.11b rates. • Bit 0 (default): 1 Mbit/s • Bit 1: 2 Mbit/s • Bit 2: 5.5 Mbit/s • Bit 3: 11 Mbit/s 13:<param_val1> is a bitmask representing the mandatory 802.11ag rates. • Bit 0 (default): 6 Mbit/s • Bit 1: 9 • Bit 2: 12 Mbit/s • Bit 3: 18 Mbit/s • Bit 4: 24 Mbit/s • Bit 5: 36 Mbit/s • Bit 6: 48 Mbit/s • Bit 7: 54 Mbit/s 14:<param_val1> Protected Management Frames (PMF) • 0: PMF Disable (PMF Capable = 0, PMF Required = 0) • 1 (default): PMF Optional (PMF Capable = 1, PMF Required = 0) • 2: PMF Required (PMF Capable = 1, PMF Required = 1) 15:<param_val1> Access point supported rates bit mask where the bit masks are defined according to: • 0x00000001: Rate 1 Mbit/s • 0x00000002: Rate 2 Mbit/s • 0x00000004: Rate 5.5 Mbit/s • 0x00000008: Rate 11 Mbit/s • 0x00000010: Rate 6 Mbit/s • 0x00000020: Rate 9 Mbit/s • 0x00000040: Rate 12 Mbit/s • 0x00000080: Rate 18 Mbit/s

Parameter	Type	Description
		• 0x00000100: Rate 24 Mbit/s • 0x00000200: Rate 36 Mbit/s • 0x00000400: Rate 48 Mbit/s • 0x00000800: Rate 54 Mbit/s • 0x00001000: Rate MCS 0 • 0x00002000: Rate MCS 1 • 0x00004000: Rate MCS 2 • 0x00008000: Rate MCS 3 • 0x00010000: Rate MCS 4 • 0x00020000: Rate MCS 5 • 0x00040000: Rate MCS 6 • 0x00080000: Rate MCS 7 • 0x00100000: Rate MCS 8 • 0x00200000: Rate MCS 9 • 0x00400000: Rate MCS 10 • 0x00800000: Rate MCS 11 • 0x01000000: Rate MCS 12 • 0x02000000: Rate MCS 13 • 0x04000000: Rate MCS 14 • 0x08000000: Rate MCS 15 The default value is 0, which means that all rates are enabled. 16:<param_val1> Hidden SSID configuration. • Bit 0 (default): Disable hidden SSID • Bit 1: Enable hidden SSID 19: White List - <param_val1>...<param_val10> List of MAC addresses of stations that is allowed to connect or 0 to allow all. The factory default is 0. 20: Black List - <param_val1>...<param_val10> List of MAC addresses of stations that will be rejected or 0 to not reject any. The factory default is 0. 100: IPv4 Mode - <param_val1> to set the way to retrieve an IP address • 1:(default) Static 101:<param_val> is the IPv4 address. The factory default value is 192.168.2.1 102: <param_val> is the subnet mask. The factory default value is 255.255.255.0 103: <param_val> is the default gateway. The factory default value is 192.168.2.1 104: <param_val> is the primary DNS server IP address. The factory default value is 0 .0.0.0 105: <param_val> is the secondary DNS server IP address. The factory default value is 0.0.0.0 106: <param_val> is the DHCP server configuration. • 0 (default): Disable DHCP server • 1 Enable DHCP server. The DHCP Server will provide addresses according to the following formula: (Static address and subnet mask) + 100 107: Address conflict detection. The factory default value is 0 (disabled). • 0: Disabled • 1: Enabled 200: IPv6 Mode - <param_val> to set the way to retrieve an IP address • 1 (default): Link Local IP address 201: <param_val> is the IPv6 link local address. If the value is not set, the link local address is automatically generated from the interface IEEE 48 bit MAC identifier. The factory default value is: 300: <param_val> is the DTIM interval. The factory default value is 1. Valid values are 1 to 100.

7.8.3.1 Notes

The products and supported parameter tags for different software versions are listed in the table below:

Products	Supported parameter tags	Supported software versions
ODIN-W2	0, 2, 4, 5, 8, 12, 13, 100-106, 200, 201, 300	All versions
ODIN-W2	14-16, 107	6.0.0 onwards
NINA-W13	0, 2, 4, 5, 8, 16, 100-107, 200-201	2.0.0 onwards
	19, 20	2.1.0 onwards
NINA-W15	0, 2, 4, 5, 8, 16, 19, 20, 100-107, 200-201	All versions

7.9 Wi-Fi Access point configuration action +UWAPCA

+UWAPCA				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.9.1 Description

Execute configuration actions for Wi-Fi networks.

7.9.2 Syntax

AT Command	Description
AT+UWAPCA=<config_id>, <action>	Executes an action for the Wi-Fi network.

Response	Description
OK	Successful response.
ERROR	Error response.

7.9.3 Defined values

Parameter	Type	Description
config_id	integer	Wi-Fi access point configuration id. 0
action	integer	0: reset; it clears the specified profile resetting all the parameters to their factory programmed values 1: store; validates the configuration, calculates the PSK for WPA and WPA2 (if not already calculated) and saves the configuration. 2: load: it reads all the parameters from memory 3: activate; validates the configuration, calculates the PSK for WPA and WPA2 (if not already calculated) and activates the specified profile. It will try to connect if not connected. 4: deactivate; it deactivates the specified profile. Disconnects the profile, if connected and may reconnect to other active networks

7.10 Wi-Fi Access point status +UWAPSTAT

+UWAPSTAT				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.10.1 Description

Read status of Wi-Fi interface.

7.10.2 Syntax

AT Command	Description
AT+UWAPSTAT[=<status_id>]	Read current status of the Wi-Fi interface.

Response	Description
+UWAPSTAT:<status_id>,<status_val>	This is sent for every applicable status.
OK	Successful response.
ERROR	Error message.

7.10.3 Defined values

Parameter	Type	Description
status_id	integer	0: The <status_val> is the currently used SSID. 1: The <status_val> is the currently used BSSID. 2: The <status_val> is the currently used channel. 3: The <status_val> is the current status of the access point. • 0: disabled • 1: enabled

7.11 Wi-Fi Access point station list +UWAPSTALIST

+UWAPSTALIST				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.11.1 Description

List all the stations connected to the Wireless access point.

7.11.2 Syntax

AT Command	Description
AT+UWAPSTALIST?	Lists all the stations connected to the Wireless access point.

Response	Description
+UWAPSTALIST:<id>,<mac_addr>,<rssi>	This is sent for every connected station.
OK	Successful response.
ERROR	Error message.

7.11.3 Defined values

Parameter	Type	Description
id	integer	Station identifier.
mac_addr	MAC_Addr	MAC address of the station.
rssi	integer	Received signal strength. Reserved for future use. Value of this parameter is currently invalid.

7.12 Wi-Fi MAC address +UWAPMACADDR

+UWAPMACADDR				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.12.1 Description

Shows the currently used Wi-Fi MAC address. The same MAC address is valid for both access point and station modes. For NINA-W13 and NINA-W15, the MAC address is different for access point and Wi-Fi. This command returns the MAC address for access point; use Local address +UMLA for Wi-Fi MAC address.

7.12.2 Syntax

AT Command	Description
AT+UWAPMACADDR	Lists the currently used MAC address.

Response	Description
+UWAPMACADDR:<mac_addr>	
OK	Successful response.
ERROR	Error message.

7.12.3 Defined values

Parameter	Type	Description
mac_addr	MAC_Addr	Wi-Fi MAC address used by the module.

7.13 Wi-Fi Vendor-specific Information Element extraction +UWSCANIE

+UWSCANIE				
Modules	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	Yes	-

7.13.1 Description

This command allows the user to discover vendor-specific Information Element(s) (IE), typically transmitted in beacons and probe responses. The vendor-specific IEs are tagged with 0xDD, followed by a length byte and an OUI of at least three bytes followed by the vendor-specific data.

7.13.2 Syntax

AT Command	Description
AT+UWSCANIE=<ssid>,<vs_ie_filter_0>,<vs_ie_filter_1>[,<vs_ie_filter_2>	Starts scanning for vendor-specific IEs.

Response	Description
+UWSCANIE:<source>,<channel>,<vs_ie>	Sent for every IE found according to filter(s). One filter can match several IEs from the same AP; in other words, one AP can trigger several responses.
OK	Successful request response.
ERROR	Error message.

7.13.3 Defined values

Parameter	Type	Description
ssid	String	SSID to retrieve vendor-specific IEs.

Parameter	Type	Description
		This parameter tag is reserved for future use.
vs_ie_filter_0 vs_ie_filter_1 vs_ie_filter_2	Byte_Array	IE Filter, a response is sent only if the first bytes of the <vs_ie> matches this filter. Valid length is 3-8 bytes.
vs_ie	Byte_Array	IE discovered, vendor-specific tag (0xdd) and length field are omitted. The length can be 3-255 bytes.
source	MAC_Addr	Transmitter of IE.
channel	Integer	The channel on which the IE is transmitted.

7.13.4 Notes

Some Windows OUI (0x00, 0x50, 0xF2) are used internally and might not be reported.

7.13.5 Example

AT+UWSCANIE="",004096

+UWSCANIE:AC7E8A6871D2,6,004096010104

+UWSCANIE:AC7E8A6871D1,6,004096010104

+UWSCANIE:AC7E8A9A51E2,6,004096010104

+UWSCANIE:AC7E8A6871D0,6,004096010104

+UWSCANIE:AC7E8A6871D2,6,004096010104

OK

7.14 Wi-Fi Vendor-specific Information Element insertion +UWVSIE

+UWVSIE				
Modules	NINA-W13-SW2.1.0 onwards, NINA-W15-SW2.1.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

7.14.1 Description

This command sets a Vendor-Specific Information Element (VSIE).

7.14.2 Syntax

AT Command	Description
AT+UWVSIE=<index>,<type>,<vendor_oui>,<vendor_type>,<payload>	Sets a vendor-specific information element.
AT+UWVSIE=<index>,<type>	Gets a previously set vendor-specific information element.
AT+UWVSIE=<index>,<type>,0	Clears a previously set vendor-specific information element.

Response	Description
+UWVSIE=<index>,<type>,<vendor_oui>,<vendor_type>,<payload>	Response to get command of the vendor-specific information element
OK	Response to a successful set, get or clear command.
ERROR	Response to a failed set, get or clear command.

7.14.3 Defined values

Parameter	Type	Description
index	Integer	0..1, to select which vendor-specific information element that is referred to.

Parameter	Type	Description
type	Integer	1=BEACON currently supported (included for future extensions).
vendor_oui	Byte_Array	3-byte hexadecimal (for example, 112233) vendor organization unique identifier
vendor_type	Byte_Array	1-byte hexadecimal vendor specific type (for example, 44)
payload	Byte_Array	1-248 byte hexadecimal payload (for example, 3132333435 corresponding to the string "12345")

7.14.4 Example

AT+UWVSIE=0,1,112233,44,55667788

OK

AT+UWVSIE=0,1

+UWVSIE=0,1,112233,44,55667788

OK

Another module doing an IE scan can look like:

AT+UWSCANIE="",11223344

+UWSCANIE:30AEA44EB83D,6,1122334455667788

OK

7.15 Wi-Fi Link connected +UUWLE

+UUWLE				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.15.1 Description

Unsolicited response code for Wi-Fi.

7.15.2 Syntax

AT Command	Description
+UUWLE:<connection_id>,<bssid>,<channel>	Wi-Fi connection established.

7.15.3 Defined values

Parameter	Type	Description
connection_id	integer	Wi-Fi Network configuration id.
bssid	MAC_Addr	BSSID of the connected network.
channel	integer	Connected channel.

7.16 Wi-Fi Link disconnected +UUWLD

+UUWLD				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.16.1 Description

Unsolicited response code for Wi-Fi.

7.16.2 Syntax

AT Command	Description
+UUWLD:<connection_id>, <reason>	Wi-Fi connection disconnected.

7.16.3 Defined values

Parameter	Type	Description
connection_id	integer	Wi-Fi Network configuration id.
reason	enumerator	0:Unknown
		1:Remote close
		2:Out of range
		3:Roaming
		4:Security problems
		5:Network disabled

7.17 Wi-Fi Access point up +UUWAPU

+UUWAPU				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.17.1 Description

Unsolicited response code for Wi-Fi.

7.17.2 Syntax

AT Event	Description
+UUWAPU:<id>	Wi-Fi access point is up.

7.17.3 Defined values

Parameter	Type	Description
id	integer	Wi-Fi access point configuration id.

7.18 Wi-Fi Access point down +UUWAPD

+UUWAPD				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.18.1 Description

Unsolicited response code for Wi-Fi.

7.18.2 Syntax

AT Event	Description
+UUWAPD:<id>	Wi-Fi access point is down.

7.18.3 Defined values

Parameter	Type	Description
id	integer	Wi-Fi access point configuration id.

Parameter	Type	Description
reason	enumerator	0:Unknown

7.19 Wi-Fi Access point station connected +UUWAPSTAC

+UUWAPSTAC				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.19.1 Description

Unsolicited response code for Wi-Fi.

7.19.2 Syntax

AT Event	Description
+UUWAPSTAC:<id>,<mac_addr>	Station connected to the access point.

7.19.3 Defined values

Parameter	Type	Description
id	integer	Station identifier.
mac_addr	MAC_Addr	Station MAC address.

7.20 Wi-Fi Access point station disconnected +UUWAPSTAD

+UUWAPSTAD				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

7.20.1 Description

Unsolicited response code for Wi-Fi.

7.20.2 Syntax

AT Event	Description
+UUWAPSTAD:<id>	Station disconnected from the access point.

7.20.3 Defined values

Parameter	Type	Description
id	integer	Station identifier.

8 Ethernet

8.1 Ethernet configuration +UETHC

+UETHC				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	NVM	No	-

8.1.1 Description

This command is used to set up an Ethernet configuration. After configuring the Ethernet, it must be activated (Ethernet Configuration Action +UETHCA) before using.

☞ The command will generate an error if the configuration is active. See "Ethernet Configuration Action +UETHCA" for instructions on how to deactivate a configuration.

8.1.2 Syntax

AT Command	Description
AT+UETHC=<param_tag>,<param_val>	Sets configuration.
AT+UETHC[=<param_tag>]	Reads network type.

Response	Description
+UETHC:<param_tag>,<param_val> OK	Successful read response for AT+UETHC[=<param_tag>]
OK	Successful write response.
ERROR	Error response.

8.1.3 Defined values

Parameter	Type	Description
param_tag	integer	0: <param_val> decides if the network is active on start up. • 0 (default): inactive • 1: active 1: <param_val> Phy support mode • 0: disabled • 1 (default): enabled 2: <param_val> Ethernet speed • 0 (default): 100 Mbit/s • 1: 10 Mbit/s 3: <param_val> Ethernet Duplex mode • 0 (default): Full duplex • 1: Half duplex 4: <param_val> Auto-negotiation (of speed and duplex mode) • 0: disabled • 1 (default): enabled 5: <param_val> is the Phy address. The factory default value is 0x3 (for ODIN) and 0x0 (for NINA-W13 and NINA-W15). 100: IPv4 Mode - <param_val1> to set the way to retrieve an IP address • 1 (default): Static • 2: DHCP 101:<param_val> is the IPv4 address. The factory default value is 0.0.0.0

Parameter	Type	Description
		102:<param_val> is the subnet mask. The factory default value is 0.0.0.0 103:<param_val> is the default gateway. The factory default value is 0.0.0.0 104:<param_val> is the primary DNS server IP address. The factory default value is 0 .0.0.0 105:<param_val> is the secondary DNS server IP address. The factory default value is 0.0.0.0 107: Address conflict detection. The factory default value is 0 (disabled). This tag is supported by ODIN-W2 from software version 6.0.0 onwards only. • 0: Disabled • 1: Enabled ☞ The param_tags - 1, 2, 3, and 4 are not available for ODIN-W2 software versions 2.0.0 or 2.0.1. Default PHY values will be used.

8.2 Ethernet configuration action +UETHCA

+UETHCA				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

8.2.1 Description

Actions on network configuration parameters.

8.2.2 Syntax

AT Command	Description
AT+UETHCA=<action>	Network configuration action.

Response	Description
OK	Successful response.
ERROR	Error response.

8.2.3 Defined values

Parameter	Type	Description
action	integer	0: reset; it clears the specified profile, resetting all the parameters to their factory programmed values 1: store; it saves all the current parameters 2: load: it reads all the parameters 3: activate; it activates the Ethernet, using the current parameters. 4: deactivate; it deactivates the Ethernet.

8.3 Ethernet link up +UUETHLU

+UUETHLU				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

8.3.1 Description

Unsolicited response code for Ethernet.

8.3.2 Syntax

AT Command	Description
+UUETHLU	Ethernet link is up.

8.4 Ethernet link down +UUETHLD

+UUETHLD				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

8.4.1 Description

Unsolicited response code for Ethernet.

8.4.2 Syntax

AT Command	Description
+UUETHLD	Ethernet link is down.

9 Point-to-Point protocol

9.1 Point-to-Point (PPP) configuration +UPPPC

+UPPPC				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	NVM	No	-

9.1.1 Description

This command is used to set up a Point-to-Point configuration. After configuring, it must be activated (PPP Configuration Action +UPPPCA) before using.

9.1.2 Syntax

AT Command	Description
AT+UPPPC=<param_tag>,<param_val>	Sets configuration.
AT+UPPPC[=<param_tag>]	Reads PPP type.

Response	Description
+UPPPC:<param_tag>,<param_val> OK	Successful read response for AT+UPPPC[=<param_tag>]
OK	Successful write response.
ERROR	Error response.

9.1.3 Defined values

Parameter	Type	Description
param_tag	integer	101: <param_val> is the IPv4 address for the PPP client. 102: <param_val> is the subnet mask. 104: <param_val> is the primary DNS server IP address. 105: <param_val> is the secondary DNS server IP address. The factory default is 0.0.0.0 for the param_tag 101, 102, 104 and 105. When the address is 0.0.0.0, the following addresses will be used for: • 101 - 172.30.0.252 • 102 - 255.255.255.0 107: <param_val> Setting <param_val> to 1 disables the DHCP relaying for the PPP public interface; traffic from the latest connected interface (Ethernet or Wi-Fi) will be routed to the PPP client. The default value is 1 for NINA-W13 and 0 for ODIN-W2, except for ODIN-W2 software version 7.0.x onwards, where DHCP relay cannot be enabled. Setting this tag to 0 on ODIN-W2 has no effect from software version 7.0.x onwards.

9.1.4 Notes

In the PPP interface, the static IP address is used. The PPP client will get the IPv4 address set with <param_tag> = 101 and the PPP server will get the IPv4 address <param_val> - 1.

If not configured, the primary DNS server address will be the PPP client address - 1 (same as the PPP server address).

No gateway is used in the PPP mode.

During a PPP session, the module accepts AT commands over the PPP interface over UDP on port 23 and it will send responses and URCs to the PPP client on port 23.

9.2 PPP configuration action +UPPPCA

+UPPPCA				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

9.2.1 Description

Action on PPP configuration parameters.

9.2.2 Syntax

AT Command	Description
AT+UPPPCA=<action>	Sets PPP action.

Response	Description
OK	Successful response.
ERROR	Error response.

9.2.3 Defined values

Parameter	Type	Description
action	integer	0: reset; it clears the specified profile and resets all the parameters to their factory programmed values 1: store; it saves all the current parameters 2: load: it reads all the parameters

9.3 Disconnect remote service +UDDRS

+UDDRS				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

9.3.1 Description

Disconnect a remote service.

9.3.2 Syntax

AT Command	Description
AT+UDDRS=<handle>	Disconnects the remote service, closes the port, and removes the links associated with it.

Response	Description
OK	Successful write response.
ERROR	Error response.

9.3.3 Defined values

Parameter	Type	Description
handle	integer	The handle identifies the connection and is used when closing the connection.

9.4 Remote service connected +UUDRSC

+UUDRSC				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

9.4.1 Description

Unsolicited response code for Point-to-Point protocol.

9.4.2 Syntax

AT Command	Description
+UUDRSC:<handle>,<local_url>,<remote_url>	Remote peer has connected and a "remote service" has been created.

9.4.3 Defined values

Parameter	Type	Description
handle	Integer	The handle identifies the connection.
local_url	String	The URL describing the "remote service". This service is used to send and receive data to the remote device. "udp://0.0.0.0:5000/" The remote device can be accessed using UDP port 5000.
remote_url	String	The URL describing the connected device. Example: "spp://0012f3000001p/" A remote device connected using the Bluetooth Serial Profile "sps://0012f3000001p/" A remote device connected using the Bluetooth low energy Serial Port Service

9.5 Remote service disconnected +UUDRSD

+UUDRSD				
Modules	ODIN-W2			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

9.5.1 Description

Unsolicited response code for Point-to-Point protocol.

9.5.2 Syntax

AT Command	Description
+UUDRSD:<handle>	Remote service disconnected.

9.5.3 Defined values

Parameter	Type	Description
handle	integer	The handle identifies the connection.

10 Network

10.1 Network host name +UNHN

+UNHN				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

10.1.1 Description

Read the host name.

10.1.2 Syntax

AT Command	Description
AT+UNHN?	Reads the current host name. The default values are listed below, where "xxxxxxxxxxxx" is a device-specific number: • For ODIN-W2 - "odin-w2-xxxxxxxxxxxx" • For NINA-W13 software version 1 - "nina-w1-xxxxxxxxxxxx" • For NINA-W13 software version 2 - "NINA-W13-xxxxxxxxxxxx" • For NINA-W15 - "NINA-W15-xxxxxxxxxxxx"
AT+UNHN=<param_tag>	Sets a new host name; the parameter must be a string with maximum 64 characters.

Response	Description
OK	Successful response.
ERROR	Error response.

10.2 Network status +UNSTAT

+UNSTAT				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

10.2.1 Description

Show current status of the network interface.

10.2.2 Syntax

AT Command	Description
AT+UNSTAT[=<interface_id>[,<status_id>]]	Show current status of the network interface id.

Response	Description
+UNSTAT=<interface_id>,<status_id>,<status_val>[,<ipv6_status_state>]	Sent for every applicable status.
OK	Successful response.
ERROR	Error response.

10.2.3 Defined values

Parameter	Type	Description
interface_id	integer	Network interface id.

Parameter	Type	Description
status_id	integer	0: The <status_val> is the interface hardware address (displayed only if applicable). 1: The <status_val> is the current status of the network interface (Layer-3). • 0: Network down • 1: Network up 2: The <interface_type> is the interface type. • 0: Unknown • 1: Wi-Fi Station • 2: Wi-Fi Access Point • 3: Ethernet • 4: PPP • 5: Bridge • 6: Bluetooth PAN - This interface type is supported by ODIN-W2 from software version 5.0.0 onwards only. 101: The <status_val> is the currently used IPv4_Addr (omitted if no IP address has been acquired). 102: The <status_val> is the currently used subnet mask (omitted if no IP address has been acquired). 103: The <status_val> is the currently used gateway (omitted if no IP address has been acquired). 104: The <status_val> is the current primary DNS server. 105: The <status_val> is the current secondary DNS server. 201: The <status_val> is the current IPv6 link local address. 210-212: The <status_val> is an IPv6 address. For ODIN-W2, the IPv6 addresses are only sent from software version 7.0.0 onwards.
ipv6_status_state	integer	This parameter is included only for the status_ids 210 to 212. The state can be one of the following: • 0: Invalid • 1: Tentative • 2: Preferred • 3: Deprecated For example, "FE80::D6CA:6EFF:FEC5:8C27,2" is a valid address (state 2) and "::,0" is an invalid address (state 0).

10.2.4 Notes

For PPP, the displayed IP addresses are public IP addresses and not the IP addresses used on the PPP link.

Note that the <interface_id> is an internal value and may vary. The user should always check the <interface_type> and not assume that the <interface_id> stays the same when disconnecting and reconnecting.

10.3 Layer-2 routing +UNL2RCFG

+UNL2RCFG				
Modules	ODIN-W2			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

10.3.1 Description

Handle layer 2 routing configuration.

10.3.2 Syntax

AT Command	Description
AT+UNL2RCFG[=<param_tag>	Reads configuration for layer-2 routing.

AT Command	Description
AT+UNL2RCFG=<param_tag>,<param_val>	Writes configuration for layer-2 routing.

Response	Description
+UNL2RCFG:<param_tag>,<param_val>	Successful read response.
OK	
OK	Successful write response.
ERROR	Error response.

10.3.3 Defined values

Parameter	Type	Description
param_tag	integer	0:<param_val> enable Layer-2 routing • 0 (default): disabled • 1: enabled

10.4 Bridge configuration +UBRGC

+UBRGC				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	NVM	No	-

10.4.1 Description

This command is used to configure a network bridge. After configuring a network bridge, it must be activated using Bridge Configuration Action +UBRGCA command.

A bridge is used to connect two or more layers of two interfaces together. The bridge can also have a network interface attached.

This command will generate an error if the bridge configuration is already active. Refer to Bridge Configuration Action +UBRGCA command for instructions on how to deactivate a configuration.

10.4.2 Syntax

AT Command	Description
AT+UBRGC=<configuration_id>,<param_tag>,<param_val1>[,<param_val2>,...,<param_valn>	Sets network bridge configuration.
AT+UBRGC=<configuration_id>[,<param_tag>]	Reads network bridge configuration.

Response	Description
+UBRGC:<configuration_id>,<param_tag>,<param_val1>	Sent for every applicable param_tag.
OK	Successful response.
ERROR	Error response.

10.4.3 Defined values

Parameter	Type	Description
configuration_id	integer	Bridge configuration id. 0-1
param_tag	integer	0:<param_val1> decides if the bridge is active on start up. • 0 (default): Inactive • 1: Active

Parameter	Type	Description
		1: <link_layer_list> Link layer list. The list defines the interfaces that shall be bridged. The factory default value is an empty list. The following interfaces can be bridged: • 1: Wi-Fi Station • 2: Wi-Fi Access Point • 3: Ethernet • 6: Bluetooth PAN - This interface is supported by ODIN-W2 from software version 6.0.0 onwards only. For example, AT+UBRGC = 0,1,1,3. This adds the Wi-Fi station and Ethernet interfaces to the bridge. 2: <ip_interface_list> IP interface list. This list defines the interfaces that accept IP traffic. The factory default value is an empty list. The following interfaces can accept the IP traffic: • 1: Wi-Fi Station • 2: Wi-Fi Access Point • 3: Ethernet • 6: Bluetooth PAN - This interface is supported by ODIN-W2 from software version 6.0.0 onwards only. For example, AT+UBRGC = 0,2,1,3. This allows the Wi-Fi station and Ethernet interfaces to accept IP traffic. 100: IPv4 Mode - <param_val1> to set the way to retrieve an IP address • 0 (default): None • 1: Static 101:<param_val> is the IPv4 address. The factory default value is 0.0.0.0 102:<param_val> is the subnet mask. The factory default value is 0.0.0.0 103:<param_val> is the default gateway. The factory default value is 0.0.0.0 104:<param_val> is the primary DNS server IP address. The factory default value is 0 .0.0.0 105:<param_val> is the secondary DNS server IP address. The factory default value is 0.0.0.0 106:<param_val> is the DHCP server configuration. • 0 (default): Disable DHCP server • 1: Enable DHCP server. The DHCP Server will provide addresses according to the following formula - "(Static address and subnet mask) + 100". If DHCP Server is enabled, the IPv4 Mode should be set to static. 107: Address conflict detection. The factory default value is 0 (disabled). This tag is supported by ODIN-W2 from software version 6.0.0 onwards only. • 0: Disabled • 1: Enabled

10.4.4 Notes

☞ If more than one configuration is active on start up parameter enabled, the behaviour is undefined.

10.5 Bridge configuration action +UBRGCA

+UBRGCA				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

10.5.1 Description

Execute configuration actions for bridge configuration.

10.5.2 Syntax

AT Command	Description
AT+UBRGCA=<config_id>,<action>	Executes an action for the network bridge configuration.

Response	Description
OK	Successful response.
ERROR	Error response.

10.5.3 Defined values

Parameter	Type	Description
config_id	integer	Bridge configuration id. 0-1
action	integer	0: Reset; clears the configuration and reset all parameters to factory defaults. 1: Store; validates and saves the configuration. 2: Load; reads the configuration from non-volatile memory to run-time memory. 3: Activate; validates and activates the configuration. • When a bridge is activated, the data on all network interfaces connected to the bridge is handled by the bridge. The IP configuration set in the individual network interface configurations is not used while the IP configuration of the bridge is used. • The MAC address of the bridge will be set to the Ethernet MAC address but with the U/L bit set to 1 for a locally administered address. 4: Deactivate; deactivates the configuration. After deactivating a bridge configuration, the network interfaces connected to the bridge must be deactivated and activated to restore the IP settings.

10.6 Network up +UUNU

+UUNU				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

10.6.1 Description

Unsolicited response code for Network.

10.6.2 Syntax

AT Command	Description
+UUNU:<interface_id>	Network is up.

10.6.3 Defined values

Parameter	Type	Description
interface_id	integer	Interface id number.

10.7 Network down +UUND

+UUND				
Modules	ODIN-W2			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

10.7.1 Description

Unsolicited response code for Network.

10.7.2 Syntax

AT Command	Description
+UUND:<interface_id>	Network is down.

10.7.3 Defined values

Parameter	Type	Description
inteface_id	integer	Interface id number.

10.8 Network error +UUNERR

+UUNERR				
Modules	ODIN-W2			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

10.8.1 Description

Unsolicited error code for Network.

10.8.2 Syntax

AT Command	Description
+UUNERR:<interface_id>,<error_code>	An error has occured.

10.8.3 Defined values

Parameter	Type	Description
inteface_id	integer	Interface id number.
error_code	integer	128: IP address conflict detected.

10.9 IPv4 address conflict detection timing +UNACDT

+UNACDT				
Modules	ODIN-W2-SW6.0.x onwards			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

10.9.1 Description

Sets parameters for IPv4 address conflict detection as described in RFC5227.

10.9.2 Syntax

AT Command	Description
AT+UNACDT=<Parameter id>,<value>	Set IPv4 address conflict detection parameters.
AT+UNACDT=<Parameter id>	Read value of a parameter.
AT+UNACDT?	Read values of all parameters.

Response	Description
+UNACDT:<Parameter id>,<value>	Successful read response.
OK	
OK	Successful write response.
ERROR	Error response.

10.9.3 Defined values

Parameter	Type	Description
Parameter id	Integer	Timing value parameter.
		0: Max initial probe delay [ms] (default: 1000 ms)
		1: Number of probes (default: 3)
		2: Minimum probe interval [ms] (default: 1000 ms)
		☞ The probe Interval is a random value between minimum probe interval and minimum probe interval plus 1000. That is, if set to 1000, the delay will be between one and two seconds for each additional probe request.
		3: Announce wait time after last probe [ms] (default: 2000 ms)
		4: Number of announce messages (default: 2)
		5: Announce interval [ms] (default: 2000 ms)

10.9.4 Notes

☞ When IPv4 address conflict detection is enabled and an address conflict is detected, no +UUNU event will be received. If no conflict is detected, a +UUNU event should be received within the delays determined by the AT+UNACDT command. With default settings, this is approximately 7 seconds after starting of the address negotiation; thus typically within 8 to 10 seconds from link up event.

11 Security

11.1 SSL/TLS certificates and private keys manager +USECMNG

+USECMNG				
Modules	ODIN-W2-SW4.0.0 onwards			
	NINA-W13-SW2.0.0 onwards, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

11.1.1 Description

Manages the X.509 certificates and private keys with the following functionalities:

- Validation and import of certificates and private keys
- List and information retrieval of the imported certificates and private keys
- Removal of the certificates and private keys
- MD5 calculation of the imported certificate or private key

☞ The command accepts certificates and private keys both in DER (Distinguished Encoding Rules) and in PEM (Privacy-Enhanced Mail) formats. If the provided format is PEM, the imported certificate or private key will be automatically converted to DER format for the internal storage.

☞ The certificates and private keys, kept in the DER format and are not retrievable (that is, cannot be downloaded from the module); for data validation purposes, an MD5 hash string of the stored certificate or private key (stored in DER format) can be retrieved.

☞ Up to 5 certificates in one chain can be uploaded in PEM format. They are then stored as DER in the order of how they will be transmitted to the server. That is, the lowest order first; this is important to know when verifying the MD5 hash string.

☞ Up to 16 certificates or private keys can be imported.

☞ Data for certificate or private key import can be provided with a stream of bytes.

☞ When using the stream of byte import functionality:

- If the data transfer is stopped before its competition, a guard timer of 20 s will ensure the termination of the data transmission. In this case, the prompt will switch back in AT command mode and an error result code will be returned.
- If the module shuts down during data transfer, all bytes are discarded.
- If any error occurs during data transfer, all bytes are discarded.
- The RTS/CTS DTE flow control must be enabled (see +UMRS command description).

☞ All the imported certificates or private keys are listed if type of the security data is omitted.

11.1.2 Syntax

Type	Syntax	Response	Example
Generic syntax:			
Action	AT+USECMNG=<op_code>,[<type>[,<internal_name>[,<param1>[,<param2>]]]]	OK	-
Import a certificate or private key from serial I/O:			
Action	AT+USECMNG=0,<type>,<internal_name>,<data_size>[,<password>]	> Start transfer of data ... +USECMNG: 0,<type>,<internal_name>,<md5_string> OK	AT+USECMNG=0,1,"JohnDoeCC",1327 >-----BEGIN CERTIFICATE----- (...other certificate data bytes...)

Type	Syntax	Response	Example
			+USECMNG:0,1,"JohnDoeCC","7710 7370ec4db40a08a6e36a64a1435b" OK
Remove an imported certificate or private key:			
Action	AT+USECMNG=2,<type>,<internal_ name>	OK	AT+USECMNG=2,1,"JohnDoeCC" OK
List the imported certificates or private keys:			
Read	AT+USECMNG=3[,<type>]	<type>,<internal_name>[, <common_name>,<expiration_ date>] ... OK	AT+USECMNG=3 "CC", "JohnDoeCC" "PK", "JohnDoePK" OK
Retrieve the MD5 of an imported certificate or private key:			
Read	AT+USECMNG=4,<type>,<internal_ name>	+USECMNG: 4,<type>,<internal_ name>,<md5_string> OK	AT+USECMNG=4,1,"JohnDoeCC" +USECMNG: 4,1,"JohnDoeCC","7710 7370ec4db40a08a6e36a64a1435b" OK

11.1.3 Defined values

Parameter	Type	Description
<op_code>	Number	Type of operation: • 0: import a certificate or a private key (data provided by the stream of byte) • 2: remove an imported certificate or private key • 3: list the imported certificates or private keys • 4: retrieve the MD5 of an imported certificate or private key
<type>	Number	Type of the security data: • 0: root certificate • 1: client certificate • 2: client private key
<internal_name>	String	Unique identifier of an imported certificate or private key. If an existing name is used, the data will be overridden. The maximum length is 32 characters.
<data_size>	Number	Size in bytes of a certificate or private key being imported. The maximum allowed size is 8192 bytes.
<password>	String	Decryption password; applicable only for PKCS8 encrypted client private keys. The maximum length is 64 characters.
<md5_string>	String	MD5 formatted string.
<param1>	Number/String	Type and supported content depend on the related <op_code> parameter; see the <op_code> specification.
<param2>	Number/String	Type and supported content depend on the related <op_code> parameter; see the <op_code> specification.

12 GATT server

12.1 GATT Define a service +UBTGSER

+UBTGSER				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.1.1 Description

Command to enable a GATT service according to a 16-bit Service Assigned Number from Bluetooth SIG or a 128-bit user defined service number.

☞ In NINA-B31, NINA-B41, ANNA-B112, and NINA-B1 from software version 4.0.0 onwards, the maximum possible number of user defined services depends on the current configuration. Setting Peripheral role (AT+UBTLE), disabling the SPS server (AT+UDSC), using the smallest MTU size (AT+UBTLECFG), limiting the number of Characteristic properties (AT+UBTGCHA), and using a 16-bit UUID for Services (AT +UBTGSER), Characteristics (AT+UBTGCHA) and Descriptors (AT+UBTGDES) will give the best results.

12.1.2 Syntax

AT Command	Description
AT+UBTGSER=<uuid>	Configures and sets up a service.

Response	Description
+UBTGSER:<ser_handle>	Successful write response.
OK	
ERROR	Error response.

12.1.3 Defined values

Parameter	Type	Description
ser_handle	Integer	Handle of the created service.
uuid	Byte array	UUID of the service. This can be either 16 bit or 128 bit.

12.2 GATT Define a characteristic +UBTGCHA

+UBTGCHA				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.2.1 Description

Command to add a GATT characteristic into the most recent GATT service record created with AT+UBTGSER.

☞ In NINA-B31, NINA-B41, ANNA-B112, and NINA-B1 from software version 4.0.0 onwards, the maximum possible number of user defined characteristics depends on the current configuration. Setting Peripheral role (AT+UBTLE), disabling the SPS server (AT+UDSC), using the smallest MTU size (AT+UBTLECFG), limiting the number of Characteristic properties (AT+UBTGCHA), using the smallest characteristics max length, and using a 16-bit UUID for Services (AT+UBTGSER), Characteristics (AT+UBTGCHA) and Descriptors (AT+UBTGDES) will give the best results.

12.2.2 Syntax

AT Command	Description
AT+UBTGCHA=<uuid>,<properties>,<security_read>,<security_write>[,<value>[,<read_auth>,<max_length>]]	Creates a new characteristic into the GATT table for a GATT server. The CCCD for the characteristic, if applicable, is created here. Extended Properties such as CPFD, CUDD, and SCCD are not supported.

Response	Description
+UBTGCHA:<value_handle>,<cccd_handle>	Successful write response.
OK	
ERROR	Error response.

12.2.3 Defined values

Parameter	Type	Description
value_handle	Integer	Handle of the added characteristic.
cccd_handle	Integer	Handle of the CCCD characteristic. This value is zero if there is no CCCD.
uuid	Byte array	UUID of the characteristic. This can be either 16 bit or 128 bit. For example, 2A00.
value	Byte array	Default characteristic value before any value is pushed to the characteristic. A characteristic value can be 244 bytes long. If a value is not provided, every read from any remote client will result in a +UUBTGR event.
properties	Byte array	Property value (a bit field):

Properties	Value	Description
Broadcast	0x01	If set, permits broadcasts of the Characteristic Value using Characteristic Configuration Descriptor.
Read	0x02	If set, permits reads of the Characteristic Value.
Write Without Response	0x04	If set, permits write of the characteristic value without response.
Write	0x08	If set, permits write of the characteristic value with response.
Notify	0x10	If set, permits notification of a characteristic value without acknowledgement.
Indicate	0x20	If set, permits indication of a characteristic value with acknowledgement.
Authenticated Signed Writes	0x40	If set, permits signed writes to the characteristic value.
Reserved Bit	0x80	Do not use. Reserved for future use.

security_read	Integer

Level	Value	Description
None	1	No encryption required (Security Mode 1, Level 1)
Unauthenticated	2	Unauthenticated encryption required (Security Mode 1, Level 2)
Authenticated	3	Authenticated encryption required (Security Mode 1, Level 3)
Authenticated LESC	4	Authenticated encryption LESC required (Security Mode 1, Level 4)

Valid only for NINA-B1 from software version

Parameter	Type	Description
		5.0.0 onwards, ANNA-B112 from software version 2.0.0 onwards and NINA-B31 from software version 2.0.0 onwards, and NINA-B41.
security_write	Integer	**Level** / **Value** / **Description** None / 1 / No encryption required (Security Mode 1, Level 1) Unauthenticated / 2 / Unauthenticated encryption required (Security Mode 1, Level 2) Authenticated / 3 / Authenticated encryption required (Security Mode 1, Level 3) Authenticated LESC / 4 / Authenticated encryption LESC required (Security Mode 1, Level 4) ☞ Valid only for NINA-B41, NINA-B1 from software version 5.0 .0 onwards, ANNA-B112 from software version 2.0.0 onwards and NINA-B31 from software version 2.0.0 onwards.
read_auth	Integer	GATT read authorization status for all GATT clients. • 0: Read Authorized. Any client can read data without host intervention. • 1: Read Unauthorized; the host will have to respond to each read request (+UUBTGR) on this characteristic. When set to 1, the parameter "value" will not have any effect. ☞ Valid only for NINA-B1 from software version 5.0.0 onwards, ANNA-B112 from software version 2.0.0 onwards and NINA-B31 from software version 2.0.0 onwards and NINA-B41
max_length	Integer	Maximum length of the characteristic in bytes. The maximum value is 512 bytes. ☞ Valid only for NINA-B1 from software version 5.0.0 onwards, ANNA-B112 from software version 2.0.0 onwards and NINA-B3 from software version 2.0.0 onwards and NINA-B41

12.2.4 Examples

Sample combinations	Explanation
AT+UBTGCHA=<uuid>,<prop>,<read_perm>,<write_perm>	Triggers +UUBTGR event for every remote read. Size of the characteristic is 512 bytes.
AT+UBTGCHA=<uuid>,<prop>,<read_perm>,<write_perm>,<initial-value>	Sets initial value for the characteristic. No +UUBTGR event. Size of the characteristic is 512 bytes.
AT+UBTGCHA=<uuid>,<prop>,<read_perm>,<write_perm>,<initial-value>,<read_auth>,<max_length>	Sets initial value, enables, or disables the +UUBTGR event and sets a configurable size.

12.3 GATT Define a descriptor +UBTGDES

+UBTGDES				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.3.1 Description

Defines a vendor defined descriptor. Standard Bluetooth low energy descriptors such as CCCD are created while creating the characteristic in +UBTGCHA command.

12.3.2 Syntax

AT Command	Description
AT+UBTGDES=<uuid>,<security_read>,<security_write>,<value>[,<max_length>]	Define descriptor.

Response	Description
+UBTGDES:<des_handle>	Successful write response.
OK	
ERROR	Error response.

In NINA-B31, NBINA-B41, ANNA-B112, and NINA-B1 from software version 4.0.0 onwards, the maximum possible number of user defined characteristics depends on the current configuration. Setting Peripheral role (AT+UBTLE), disabling the SPS server (AT+UDSC), using the smallest MTU size (AT+UBTLECFG), limiting the number of Characteristic properties (AT+UBTGCHA), and using a 16-bit UUID for Services (AT +UBTGSER), Characteristics (AT+UBTGCHA) and Descriptors (AT+UBTGDES) will give the best results.

12.3.3 Defined values

Parameter	Type	Description		
des_handle	Integer	Handle of the created descriptor.		
uuid	Byte Array	UUID of the descriptor. This can be either 16 bit or 128 bit.		
value	Byte Array	Descriptor value. This can be 23 bytes long.		
security_read	Integer	**Level**	**Value**	**Description**
		Open	1	No encryption required (Security Mode 1, Level 1)
		Unauthenticated	2	Unauthenticated encryption required (Security Mode 1, Level 2)
		Authenticated	3	Authenticated encryption required (Security Mode 1, Level 3)
		Authenticated LESC	4	Authenticated encryption LESC required (Security Mode 1, Level 4)
				Valid only for NINA-B41, NINA-B1 from software version 5.0.0 onwards, ANNA-B112 from software version 2.0.0 onwards and NINA-B31 from software version 2.0.0 onwards.
security_write	Integer	**Level**	**Value**	**Description**
		Open	1	No encryption required (Security Mode 1, Level 1)

Parameter	Type	Description		
		Unauthenticated	2	Unauthenticated encryption required (Security Mode 1, Level 2)
		Authenticated	3	Authenticated encryption required (Security Mode 1, Level 3)
		Authenticated LESC	4	Authenticated encryption LESC required (Security Mode 1, Level 4)
				Valid only for NINA-B41, NINA-B1 from software version 5.0.0 onwards, ANNA-B112 from software version 2.0.0 onwards and NINA-B31 from software version 2.0.0 onwards.
max_length	Integer	Maximum length of the characteristic in bytes. The maximum value is 512 bytes.		
		Valid only for NINA-B41, NINA-B1 from software version 5.0.0 onwards, ANNA-B112 from software version 2.0.0 onwards and NINA-B31 from software version 2.0.0 onwards.		

12.4 GATT Respond to read +UBTGRR

+UBTGRR				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.4.1 Description

Responds to an unsolicited request to read (see +UUBTGRR) from a remote GATT client.

12.4.2 Syntax

AT Command	Description
AT+UBTGRR=<conn_handle>,<value>	Responds to read request.

Response	Description
OK	Successful response.
ERROR	Error response.

12.4.3 Defined values

Parameter	Type	Description
conn_handle	Integer	GAP handle of the connected device.
value	Byte array	Characteristic value. This can be 244 bytes long.

12.5 GATT Send notification +UBTGSN

+UBTGSN				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.5.1 Description

Sends notifications to a remote client. This also updates the value of the characteristic.

12.5.2 Syntax

AT Command	Description
AT+UBTGSN=<conn_handle>,<char_handle>,<value>	Send notification.

Response	Description
OK	Successful response.
ERROR	Error response.

12.5.3 Defined values

Parameter	Type	Description
conn_handle	Integer	GAP handle of the connected device.
char_handle	Integer	Characteristic value handle.
value	Byte array	Characteristic value. This can be 20 bytes long. For NINA-B31, NINA-B41, ANNA-B112, and NINA-B1 from software version 3.0.1 onwards, the maximum length is the current MTU size - 3.

12.6 GATT Send indication +UBTGSI

+UBTGSI				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.6.1 Description

Sends indications to a remote client. This also updates the value of the characteristic. When the remote client confirms, an +UUBTGIC event is received.

12.6.2 Syntax

AT Command	Description
AT+UBTGSI=<conn_handle>,<char_handle>,<value>	Send Indication.

Response	Description
OK	Successful response.
ERROR	Error response.

12.6.3 Defined values

Parameter	Type	Description
conn_handle	Integer	GAP handle of the connected device.
char_handle	Integer	Characteristic value handle.

Parameter	Type	Description
value	Byte array	Characteristic value. This can be 20 bytes long. For NINA-B31, NINA-B41, ANNA-B112, and NINA-B1 from software version 3.0.1 onwards, the maximum length is the current MTU size - 3.

12.7 GATT Set attribute value +UBTGSV

+UBTGSV				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.7.1 Description

Updates the value of an attribute. In case of characteristics which permit indications and notifications this command will update the value without sending any indications or notifications to the remote side.

12.7.2 Syntax

AT Command	Description
AT+UBTGSV=<attr_handle>,<value>	Set attribute value.

Response	Description
OK	Successful response.
ERROR	Error response.

12.7.3 Defined values

Parameter	Type	Description
attr_handle	Integer	Attribute handle.
value	Byte array	Characteristic value. This can be 244 bytes long.

12.8 GATT Service changed indication +UBTGSCI

+UBTGSCI				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.8.1 Description

Sends an indication to the remote client that the attribute table of the local GATT server has changed.

12.8.2 Syntax

AT Command	Description
AT+UBTGSCI=<conn_handle>,<start_handle>,<end_handle>	Send Service Changed Indication.

Response	Description
OK	Successful response.
ERROR	Error response.

12.8.3 Defined values

Parameter	Type	Description
<conn_handle>	Integer	GAP handle of the remote connected device.

Parameter	Type	Description
<start_handle>	Integer	Start of the affected attribute handle range.
<end_handle>	Integer	End of the affected attribute handle range.

12.9 GATT Request to Read +UUBTGRR

+UUBTGRR				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.9.1 Description

Unsolicited response code for GATT Server. This event occurs when a remote client reads an attribute over the air. The event should be responded with AT+UBTGRR.

12.9.2 Syntax

AT Event	Description
+UUBTGRR:<conn_handle>,<char_handle>	Request to read event received.

12.9.3 Defined values

Parameter	Type	Description
<conn_handle>	Integer	GAP handle of the connected device.
<char_handle>	Integer	Handle that identifies the characteristic value.

12.10 GATT Request to Write +UUBTGRW

+UUBTGRW				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.10.1 Description

Unsolicited response code for GATT Server. This event occurs when a remote client writes to an attribute.

12.10.2 Syntax

AT Event	Description
+UUBTGRW:<conn_handle>,<char_handle>,<value>,<options>	Request to Write event.

12.10.3 Defined values

Parameter	Type	Description
<conn_handle>	Integer	GAP handle of the connected device.
<char_handle>	Integer	Handle that identifies the characteristic value.
value	Byte array	Characteristic or descriptor value.
options	Integer	• 0: Write without Response performed • 1: Write with Response performed • 2: Write long performed.

12.11 GATT Indication confirmation +UUBTGIC

+UUBTGIC				
Modules	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

12.11.1 Description

Unsolicited response code for GATT Server. This event occurs when a remote GATT client confirms the receipt of an indication message made with +UBTGSI.

12.11.2 Syntax

AT Event	Description
+UUBTGIC:<conn_handle>,<char_handle>	Indication confirmation received.

12.11.3 Defined values

Parameter	Type	Description
<conn_handle>	Integer	GAP handle of the connected device.
<char_handle>	Integer	Handle that identifies the characteristic value.

13 GATT client

13.1 Low Energy GATT

13.1.1 GATT Mode

The Generic Attribute Profile (GATT) AT commands are enabled as part of the Bluetooth low energy feature. Indications for service changed can be received unsolicited if the remote device supports the Serial port service. The GATT AT commands can be used when having an ACL connection to the remote device.

☞ **You cannot use the GATT and SPS connections simultaneously in ODIN-W2.**

13.1.2 GATT Security

Security modes are not used when using the GATT AT commands. Security is triggered if an attribute on the server side requires it and cannot be enforced by the client.

13.2 GATT Discover all primary services +UBTGDP

+UBTGDP				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.2.1 Description

List all GATT services on the GATT server.

13.2.2 Syntax

AT Command	**Description**
AT+UBTGDP=<conn_handle>	Discovers all primary services on the remote device.

Response	**Description**
+UBTGDP:<conn_handle>,<start>,<end>,<uuid>	This response is sent for every service found.
OK	Successful response.
ERROR	Error response.

13.2.3 Defined values

Parameter	**Type**	**Description**
conn_handle	integer	Connection handle of the connected device.
start	integer	Start handle of the service.
end	integer	End handle of the service.
uuid	hex string	UUID of the service. This can either be 16-bit or 128-bit.

13.3 GATT Discover primary services by UUID +UBTGDPU

+UBTGDPU				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.3.1 Description

Discovers all primary services by UUID on the remote device.

13.3.2 Syntax

AT Command	Description
AT+UBTGDPU=<conn_handle>,<uuid>	Start discovery.

Response	Description
+UBTGDPU:<conn_handle>,<start>,<end>	This response is sent for every service found.
OK	Successful response.
ERROR	Error response.

13.3.3 Defined values

Parameter	Type	Description
conn_handle	integer	Connection handle of the connected device.
start	integer	Start handle of the service.
end	integer	End handle of the service.
uuid	hex string	UUID of the service. This can either be 16-bit or 128-bit.

13.4 GATT Find included services +UBTGFI

+UBTGFI				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.4.1 Description

Finds all included services on a remote device.

13.4.2 Syntax

AT Command	Description
AT+UBTGFI=<conn_handle>,<start>,<end>	Start search between start handle and end handle.

Response	Description
+UBTGFI:<conn_handle>,<attr_handle>,<start>,<end>, <uuid>	This response is sent for every service found.
OK	Successful response.
ERROR	Error response.

13.4.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Connection handle of the connected device.
attr_handle	Integer	Attribute handle of the included service.
start	Integer	Start handle of the service.
end	Integer	End handle of the service.
uuid	String	UUID of the service. This can either be 16-bit or 128-bit.

13.5 GATT Discover all characteristics of service +UBTGDCS

+UBTGDCS				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.5.1 Description

This command will list all characteristics belonging to a service on the GATT server.

13.5.2 Syntax

AT Command	Description
AT+UBTGDCS=<conn_handle>,<start>,<end>	Discovers all characteristics of a service.

Response	Description
+UBTGDCS:<conn_handle>,<attr_handle>,<properties>,<value_handle>, <uuid>	This response is sent for every characteristic found.
OK	Successful response.
ERROR	Error response.

13.5.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Handle of the connected device.
start	Integer	Start handle of the service.
end	Integer	End handle of the service.
attr_handle	Integer	Attribute handle of the characteristic.
properties	Byte array	Bit mask describing the properties of the characteristic • Bit 0: Broadcast • Bit 1: Readable • Bit 2: Writable with no response • Bit 3: Writable • Bit 4: Notify • Bit 5: Indicate • Bit 6: Authenticated signed write • Bit 7: Extended property available
value_handle	Integer	Attribute handle of the characteristic value.
uuid	String	UUID of the characteristic. This can either be 16-bit or 128-bit. For example, 2A00.

13.6 GATT Discover all characteristic descriptors +UBTGDCD

+UBTGDCD				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.6.1 Description

Discover Characteristics Descriptors. This command will list all descriptors of a characteristic on the GATT server.

13.6.2 Syntax

AT Command	Description
AT+UBTGDCD=<conn_handle>,<value_handle>,<service_end_handle>	Discovers all descriptors of a characteristic.

Response	Description
+UBTGDCD:<conn_handle>,<char_handle>,<desc_handle>,<uuid>	This response is sent for every descriptor found.
OK	Successful response.
ERROR	Error response.

13.6.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Handle of the connected device.
char_handle	Integer	Handle for the characteristic.
service_end_handle	Integer	End handle of the service to which the characteristic belongs.
desc_handle	Integer	Handle of the descriptor.
value_handle	Integer	Handle of the characteristic value.
uuid	String	UUID of the descriptor. This can either be 16-bit or 128-bit.

13.7 GATT Read characteristic +UBTGR

+UBTGR				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.7.1 Description

Read a characteristic value.

13.7.2 Syntax

AT Command	Description
AT+UBTGR=<conn_handle>,<value_handle>	Reads the characteristic; all bytes included.

Response	Description
+UBTGR:<conn_handle>,<value_handle>,<hex_data>	This response is sent if the read data is found. If the data length is larger than the current MTU size - 1, the data will continue as a new response but with the same value handle.

Response	Description
OK	Successful response.
ERROR	Error response.

13.7.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Handle of the connected device.
value_handle	Integer	Handle of the characteristic value.
hex_data	String	The read data as hex string. For example, 070809AABBCC.

13.8 GATT Read characteristic by UUID +UBTGRU

+UBTGRU				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.8.1 Description

Read GATT characteristic values by UUID.

13.8.2 Syntax

AT Command	Description
AT+UBTGRU=<conn_handle>,<start>,<end>,<uuid>	Reads all the characteristics by UUID. It will read all the bytes in each characteristic.

Response	Description
+UBTGRU:<conn_handle>,<value_handle>,<hex_data>	This response is sent if the read data is found. If the data length is larger than the current MTU size - 1, the data will continue as a new response but with the same value handle.
OK	Successful response.
ERROR	Error response.

13.8.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Handle of the connected device.
value_handle	Integer	Handle of the characteristic value.
start	Integer	Start handle.
end	Integer	End handle.
uuid	String	UUID of the characteristic. This can either be 16-bit or 128-bit. For example, 2A00
hex_data	String	The read data as hex string. For example, 070809AABBCC.

13.9 GATT Read multiple characteristics +UBTGRM

+UBTGRM				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.9.1 Description

Read multiple characteristics from a GATT server.

This command is supported by NINA-B1, NINA-B31, NINA-B41, and ANNA-B112 on the client side only.

13.9.2 Syntax

AT Command	Description
AT+UBTGRM=<conn_handle>,<attrHandleList>	Reads all the characteristics in the attrHandleList. It will not be possible to distinguish individual values in the response. Thus, the length of all attributes except the last one must be known beforehand.

Response	Description
+UBTGRM:<conn_handle>,<value_handle>,<hex_data>	This response is sent if the read data is found. If all the bytes do not fit on one response line, the data will continue as a new response but with the same value handle.
OK	Successful response.
ERROR	Error response.

13.9.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Handle of the connected device.
value_handle	Integer	Handle of the first characteristic value that is read.
attrHandleList	String	The attribute handles as a list. For example, 00010002.
hex_data	String	The read data as hex string. For example, 070809AABBCC.

13.10 GATT Write characteristic +UBTGW

+UBTGW				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.10.1 Description

Writes a characteristic value.

Used for data transfers up to 20 bytes in length. For large writes, use +UBTGWL.

For NINA-B31, NINA-B41, ANNA-B112, NINA-B2, NINA-W15, and NINA-B1 from software version 3.0.1 onwards, the maximum length is the current MTU size - 3

13.10.2 Syntax

AT Command	Description
AT+UBTGW=<conn_handle>,<value_handle><hex_data>	Writes the characteristic.

Response	Description
OK	Successful response.
ERROR	Error response.

13.10.3 Defined values

Parameter	Type	Description
handle	integer	Handle of the connected device.
conn_handle	integer	Connection handle of the connected device.
value_handle	integer	Handle of the characteristic value.
hex_data	Byte array	The data as hex string. For example, 070809AABBCC.

13.11 GATT Write client characteristic configuration +UBTGWC

+UBTGWC				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.11.1 Description

Write characteristic configuration, in order to for example enable notifications or indications.

13.11.2 Syntax

AT Command	Description
AT+UBTGWC=<conn_handle>,<desc_handle><config>	Writes the client characteristic configuration.

Response	Description
OK	Successful response.
ERROR	Error response.

13.11.3 Defined values

Parameter	Type	Description
conn_handle	integer	Handle of the connected device.
desc_handle	integer	Handle of the descriptor.
config	integer	Client configuration: • 0: None • 1: Enable notifications • 2: Enable indications • 3: Enable notifications and indications Server configuration: • 0: None • 1: Enable broadcasts

13.12 GATT Write characteristic with No Response +UBTGWN

+UBTGWN				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.12.1 Description

Writes the characteristic with no notification from the remote side.

13.12.2 Syntax

AT Command	Description
AT+UBTGWN=<conn_handle>,<value_handle>,<hex_data>	Write characteristic. ☞ This can only be used for data transfers up to 20 bytes in length. For larger writes, use +UBTGWL. ☞ For NINA-B31, NINA-B41, ANNA-B112, NINA-B2, NINA-W15, and NINA-B1 from software version 3.0.1 onwards, the maximum length is the current MTU size - 3.

Response	Description
OK	Successful response.
ERROR	Error response.

13.12.3 Defined values

Parameter	Type	Description
conn_handle	integer	Handle of the connected device.
value_handle	integer	Handle of the characteristic value.
hex_data	Byte array	The data as hex string. For example, 070809AABBCC

13.13 GATT Write long characteristic +UBTGWL

+UBTGWL				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.13.1 Description

Write a long characteristic.

This is used to write a characteristic longer than 20 bytes or whenever a reliable write is required.

☞ For NINA-B31, NINA-B41, ANNA-B112, NINA-B2, NINA-W15, and NINA-B1 from software version 3.0.1 onwards, +UBTGWL shall be used for data transfers larger than the current MTU size - 3. The maximum length of a single +UBTGWL packet is the current MTU size - 5

13.13.2 Syntax

AT Command	Description
AT+UBTGWL=<conn_handle>,<value_handle>,<hex_data>,<reliable>,<flag>,<offset>	Writes long characteristic.

Response	Description
OK	Successful response.
ERROR	Error response.

13.13.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Handle of the connected device.
value_handle	Integer	Handle of the characteristic value.
hex_data	String	The data as hex string. For example, 070809AABBCC
reliable	Integer	Send the data as reliable or not. If you use reliable, the returned data will be verified. • 0: Not reliable • 1: Reliable
flag	Integer	This flag is used while sending several packets or when the data is cancelled. If you send several packets, all but the last packet should set the flag to more data. The last data packet should set the flag to final. • 0: Final data • 1: More data • 2: Cancel data writing
offset	Integer	Offset of the data to write. This offset is used when several packets must be sent to write a complete data value.

13.14 GATT Notification +UUBTGN

+UUBTGN				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.14.1 Description

Unsolicited response code for GATT Client. This event is received when the remote side sends a notification.

13.14.2 Syntax

AT Event	Description
+UUBTGN:<conn_handle>,<value_handle>,<hex_data>	A notification is received.

13.14.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Handle of the connected device.
value_handle	Integer	Handle of the characteristic value.
hex_data	String	The data as hex string. For example, 070809AABBCC

13.15 GATT Indication +UUBTGI

+UUBTGI				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW2.0.0 onwards, ANNA-B112			
	NINA-B2, NINA-B31, NINA-B41, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

13.15.1 Description

Unsolicited response code for GATT Client. This event is received when the remote side sends an indication.

13.15.2 Syntax

AT Event	Description
+UUBTGI:<conn_handle>,<value_handle>,<hex_data>	An indication is received.

13.15.3 Defined values

Parameter	Type	Description
conn_handle	Integer	Handle of the connected device.
value_handle	Integer	Handle of the characteristic value.
hex_data	String	The data as hex string. For example, 070809AABBCC

14 GPIO

14.1 GPIO Configuration +UGPIOC

+UGPIOC				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW4.0.0 onwards, ANNA-B112			
	NINA-W13, NINA-B2, NINA-W15			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

14.1.1 Description

Configures the GPIOs as input or output, pull up or pull down resistors when applicable, and modifies its value.

14.1.2 Syntax

AT Command	Description
AT+UGPIOC=<gpio_id>, <gpio_mode>[,<gpio_config>]	Configure GPIO. ☞ Before changing a GPIO from input to output or vice versa, the GPIO must be disabled.
AT+UGPIOC?	Reads configuration of the GPIOs.

Response	Description
OK	Successful write configuration response.
For ODIN-W2:	
+UGPIOC:<gpio_id>,<gpio_mode>[<gpio_id>,<gpio_mode>[...]]	Successful read configuration response.
For NINA-W13, NINA-B2, NINA-W15, ANNA-B112, NINA-B31, NINA-B41, and NINA-B1 software version 4.0.0 onwards:	
+UGPIOC:<gpio_id>,<gpio_mode>	Successful read configuration response. This message is sent for every gpio id.

14.1.3 Defined values

Parameter	Type	Description
gpio_id	integer	GPIO pin identifier. See the Data Sheet of the respective module for GPIO pin id mapping.
gpio_mode	integer	Number mode identifier: Configured function. Allowed values are: • 0: Output • 1: Input • 255: Disabled (default)
gpio_config	integer	GPIO output <gpio_mode>=0: • 0 (default value): Low • 1: High GPIO input <gpio_mode>=1: • 0 (default value): No resistor activated • 1: Pull up resistor active • 2: Pull down resistor active

14.2 GPIO Read +UGPIOR

+UGPIOR				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW4.0.0 onwards, ANNA-B112			
	NINA-W13, NINA-B2, NINA-W15			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

14.2.1 Description

Reads the current value of an enabled GPIO pin, independent of input or output configuration.

14.2.2 Syntax

AT Command	Description
AT+UGPIOR=<gpio_id>	Read GPIO value.

Response	Description
+UGPIOR:<gpio_id>,<gpio_val>	Successful response for reading value of GPIO.
OK	

14.2.3 Defined values

Parameter	Type	Description
gpio_id	integer	GPIO pin identifier. See the Data Sheet of the respective module for GPIO pin id mapping.
gpio_val	integer	GPIO value: • 0: Low • 1: High

14.3 GPIO Write +UGPIOW

+UGPIOW				
Modules	ODIN-W2-SW3.0.x onwards			
	NINA-B1-SW4.0.0 onwards, ANNA-B112			
	NINA-W13, NINA-B2, NINA-W15			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

14.3.1 Description

Writes the value of an enabled GPIO pin configured as output.

14.3.2 Syntax

AT Command	Description
AT+UGPIOW=<gpio_id>,<gpio_out_val>	Write GPIO value.

Response	Description
OK	Successful response for setting the output value of a GPIO.

14.3.3 Defined values

Parameter	Type	Description
gpio_id	integer	GPIO pin identifier. See the Data Sheet of the respective module for GPIO pin id mapping.

Parameter	Type	Description
gpio_out_val	integer	GPIO value: • 0: Low • 1: High

15 HTTP Client

15.1 HTTP Request +UDHTTP

+UDHTTP				
Modules	NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	15 s

15.1.1 Description

Make a direct HTTP request. Typically useful for the HTTP GET and DELETE request methods. Connect the peer using AT+UDCP with the <scheme> set to "http-tcp", and wait until the +UUDPC URC has been issued prior to issuing this command. Any associated TCP/TLS stream is connected only during the request/response transaction.

The HTTP responses will be parsed into status code, content type (if any), length and content as part of a +UUDHTTP URC.

For request that need longer paths or larger content messages - such as the POST, PUT or PATCH methods - use +UDHTTPE instead.

15.1.2 Syntax

AT Command	Description
AT+UDHTTP=<peer_handle>, <operation>, < path> [,<content_type>, <content>]	Issue a direct HTTP request.

Response	Description
OK	HTTP request sucessfully sent.
+UUDHTTP:<peer_handle>, <status_code>,<length> [, <content_type>, <content>]	HTTP response received.
ERROR	Error response. HTTP request not sent.

15.1.3 Defined values

Parameter	Type	Description
peer_handle	Integer	Handle from the +UUDPC response.
operation	Enumerator	0: GET 1: POST 2: PUT 3: PATCH 4: DELETE
path	String	Path of the request on format "/[<path>/][?<query_string>]". Maximum length is 30 characters.
content_type	String	Type of the content, such as "application/json". Maximum length is 50 characters.
content	Byte_Array	Content. Maximum length is 450 characters.

15.2 HTTP Request Extended +UDHTTPE

+UDHTTPE				
Modules	NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	15 s

15.2.1 Description

Make a direct HTTP request with extended content. Typically useful for the HTTP PUT, POST and PATCH request methods. Connect the peer using AT+UDCP with the <scheme> set to "http-tcp", and wait until the +UUDPC URC has been issued prior to issuing this command. Any associated TCP/TLS stream is connected only during the request / response transaction.

When the command is executed, the module will respond with the prompt '>', allowing the host to send a Blob to the module. The Blob must contain <content_length> bytes, and either an "OK" final result or an "ERROR" is returned. The feed process cannot be interrupted. If the data transfer stops, after 10s the command is stopped and ERROR is returned.

The HTTP responses will be parsed into status code, content type (if any), length and content as part of a +UUDHTTP URC.

☞ For request that don't need long paths, any or large content messages - such as the HTTP GET or DELETE request methods - the +UDHTTP method can be used instead.

15.2.2 Syntax

AT Command	Description
AT+UDHTTPE=<peer_handle>, <operation>, < path> [,<content_type>, <content_length>]	Issue a direct HTTP request with extended content.
<data>	Send binary data in the HTTP request's content as-is.

Response	Description
>	Prompt for <data>
OK	HTTP request sucessfully sent.
+UUDHTTP:<peer_handle>, <status_code>,<length> [, <content_type>, <content>]	HTTP response received.
ERROR	Error response. HTTP request not sent.

15.2.3 Defined values

Parameter	Type	Description
peer_handle	Integer	Handle from the +UUDPC response.
operation	Enumerator	0: GET 1: POST 2: PUT 3: PATCH 4: DELETE
path	String	Path of the request on format "/[<path>/][?<query_string>]". Maximum length is 300 characters.
content_type	String	Type of the content, such as "application/json". Maximum length is 50 characters. If omitted, there will be no prompt for content, and the host must not supply any.
content_length	Integer	Length of the content, in bytes.
data	Blob	<content_length> bytes of binary data to include in the HTTP request's content, as-is. If more data than <content_length> is sent before the OK or ERROR response, excess data is dropped.

15.3 HTTP Response Event +UUDHTTP

+UUDHTTP				
Modules	NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

15.3.1 Description

An unsolicited event containing an HTTP response to a +UDHTTP or +UDHTTPE command.

The HTTP responses are parsed into status code, content type (if any), length and content.

15.3.2 Syntax

AT Event	Description
+UUDHTTP:<peer_handle>, <status_code>,<length> [, <content_type>, <content>]	URC containing the HTTP response.

15.3.3 Defined values

Parameter	Type	Description
peer_handle	Integer	Handle from the +UUDPC response.
status_code	Integer	HTTP status code in integer format (I.e. "200 OK" is 200).
length	Integer	Length of the content, in bytes. If 0, no content_type or content is present.
content_type	String	Type of the content, such as "application/json".
content	Blob	<content_length> bytes of binary data that was returned in the HTTP response's content, as-is.

16 NFC

16.1 NFC enable +UNFCEN

+UNFCEN				
Modules	NINA-B1-SW3.0.1 onwards, ANNA-B112			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

16.1.1 Description

Enable NFC and set mode.

16.1.2 Syntax

AT Command	Description
AT+UNFCEN=<mode>	Writes NFC mode.
AT+UNFCEN?	Reads NFC mode.

Response	Description
+UNFCEN=<mode>	Successful read response.
OK	
ERROR	Error response.

16.1.3 Defined values

Parameter	Type	Description
mode	enumerator	0: Disabled (default)
		1: OOB pairing
		2: URI

16.2 NFC URI tag content +UNFCURI

+UNFCURI				
Modules	NINA-B1-SW3.0.1 onwards, ANNA-B112			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

16.2.1 Description

Write a URI to NFC tag.

16.2.2 Syntax

AT Command	Description
AT+UNFCURI=<type>,<uri>	Writes NFC URI tag content.
AT+UNFCURI?	Reads NFC URI tag content.

Response	Description
+UNFCURI:<uri>	Successful read response.
OK	
ERROR	Error response.

16.2.3 Defined values

Parameter	Type	Description
type	Enumerator	0: Disable 1: URL 2: Application link
uri	String	URI. The maximum length is:

SW versions	Supported URI length
NINA-B1 SW 7.0.0, ANNA-B112,NINA-B31 SW 4.0.0, NINA-B41 SW 2.0.0	250
Previous versions	80

16.3 NFC Read event+UUNFCRD

+UUNFCRD				
Modules	NINA-B1-SW3.0.1 onwards, ANNA-B112			
	NINA-B31, NINA-B41			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

16.3.1 Description

Unsolicited response code for NFC. This event is used to indicate that a remote device with NFC reader functionality has read the NFC tag content.

16.3.2 Syntax

AT Event	Description
+UUNFCRD	NFC read event.

17 PING

17.1 Ping command +UPING

+UPING				
Modules	ODIN-W2-SW5.0.x onwards			
	NINA-W13, NINA-W15			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Partial	No	No	-

17.1.1 Description

The ping command is the common method to know if a remote host is reachable on the Internet.

The ping functionality is based on the Internet Control Message Protocol (ICMP); it is part of the Internet Protocol Suite as defined in RFC 792 . The ICMP messages are typically generated in response to the errors in IP datagrams or for diagnostic/routing purposes.

The ping command sends an ICMP echo request to the remote host and waits for its ICMP echo reply. If the echo reply packet is not received, it means that the remote host is not reachable.

The ping command is also used to measure:

- The Round Trip Time (RTT), the time needed by a packet to go to the remote host and come back and
- The Time To Live (TTL), the value to understand how many gateway a packet has gone through.

The AT+UPING allows the user to execute a ping command from the module to a remote host. The results of the ping command execution is notified through the +UUPING: URC, which reports the +UPING command result (when there is no error).

⚠ Some remote hosts might not reply to the ICMP echo request for security reasons (for example, firewall settings).

⚠ Some remote hosts might not reply to the ICMP echo request if the data size of the echo request is too big.

⚠ If a remote host does not reply to an ICMP echo request, it does not mean that the host cannot be reached in another way.

17.1.2 Syntax

AT Command	Description
AT+UPING=<remote_host>[,<retry_num>[,<p_size>[,<timeout>[,<ttl>[,<interval>]]]]]	Start ping of remote host.

Response	Description
+UUPING: <retry_num>,<p_size>,<remote_hostname>,<remote_ip>,<ttl>,<rtt>	Ping response received from the remote host.
+UUPINGER: <error_code>	Ping failure response.
OK	Successful response. Sending ping packets.
ERROR	Error response.

17.1.3 Defined values

Parameter	Type	Description
<remote_host>	String	IP address (dotted decimal representation) or domain name of the remote host • Maximum length: 64 characters
<retry_num>	Number	Indicates the number of iterations for the ping command. • Range: 1-2147483647 • Default value: 4

Parameter	Type	Description
<p_size>	Number	Size in bytes of the echo packet payload. • Range: 4-1472 • Default value: 32
<timeout>	Number	The maximum time in milliseconds to wait for an echo reply response. • Range: 10-60000 • Default value: 5000
<ttl>	Number	The value of TTL to be set for the outgoing echo request packet. In the URC, it provides the TTL value received in the incoming packet. • Range: 1-255 • Default value: 32
<interval>	Number	The time in milliseconds to wait after an echo reply response before sending the next echo request. • Range: 0-60000 • Default value: 1000
<remote_hostname>	String	String representing the domain name (if available) of the remote host. If this information is not available, it will be an empty string (that is, "").
<remote_ip>	String	String representing the remote host IP address in dotted decimal form.
<rtt>	Number	RTT value, the time elapsed in milliseconds before receiving the echo reply response from the remote host.
<error_code>	Number	3: Timeout 8: Could not resolve remote host 17: Network not available ☞ Other values means internal error.

☞ If the +UUPING URC reports <rtt> = -1, the timeout has elapsed (no response received).

18 Time

18.1 Module System Time +UMST

+UMST				
Modules	NINA-B2-SW3.0.0 onwards, NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

18.1.1 Description

Gets the module system time. The time is handled as Unix time aka. epoch time, or POSIX time. This is the number of seconds since 1970-01-01T00:00:00. There is no handling of timezone. The time is always GMT.

Set the module system time using +UMSTS.

On NINA-W13 and NINA-W15, enable the NTP client using +UNNT to obtain the system time from an NTP server.

☞ After power off or hardware reset, the system time is restored to 1970-01-01T00:00:00.

18.1.2 Syntax

AT Command	Description
AT+UMST=<format>	Get module system time.

Response	Description
+UMST:<time>	Successful read response.
OK	
ERROR	Error response.

18.1.3 Defined values

Parameter	Type	Description
format	enumerator	0: Unix time in 32-bit hex format (e.g 5EE8C0E5, equals to 2020-06-16T12:53:57), MSB first.
		1: Formatted string (2020-06-16T12:53:57)
time	String	Time according to selected format

18.2 Module System Time Set +UMSTS

+UMSTS				
Modules	NINA-B2-SW3.0.0 onwards, NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	No	No	-

18.2.1 Description

Set the module system time. The time is handled as Unix time aka. epoch time or POSIX time. This is the number of seconds since 1970-01-01T00:00:00. There is no handling of timezone. The time is always GMT. Get the current module system time using +UMST.

☞ After power off or hardware reset, the module system time is restored to 1970-01-01T00:00:00.

18.2.2 Syntax

AT Command	Description
AT+UMSTS=<time>	Set module system time.

Response	Description
OK	Successful set response.
ERROR	Error response.

18.2.3 Defined values

Parameter	Type	Description
time	ByteArray	Unix time in 32-bit hex format (e.g 5EE8C0E5, equals to 2020-06-16T12:53:57), MSB first.

18.3 NTP Time +UNNT

+UNNT				
Modules	NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

18.3.1 Description

Configures the network time client. This is used to update the module system time using an NTP server.

Set the NTP servers to use with +UNNTS.

Get the module system time using +UMST.

The network time client is implemented according to SNTP.

18.3.2 Syntax

AT Command	Description
AT+UNNT=<enable>,<operating_mode>	Set NTP configuration.
AT+UNNT?	Read current NTP configuration.

Response	Description
+UNNT:<enable>,<operating_mode> OK	Successful read response.
OK	Successful write response.
ERROR	Error response.

18.3.3 Defined values

Parameter	Type	Description
enable	Enumerator	0: disabled (default) 1: enabled
operating_mode	Enumerator	0 (default): Poll mode. Module will poll the time server to get updated module system time according to the NTP protocol. 1: Listen only mode. Module will only listen for broadcast time updates. The NTP server must support this and accuracy may suffer when using this mode.

18.3.4 Notes

To get an immediate update of the network time, ensure the network is up and it is possible to reach at least one of the configured NTP servers before the network time client is enabled in poll mode.

18.4 NTP Time Servers +UNNTS

+UNNTS				
Modules	NINA-W13-SW3.0.0 onwards, NINA-W15-SW3.0.0 onwards			
Attributes	**Syntax**	**Settings saved**	**Can be aborted**	**Response time**
	Full	Profile	No	-

18.4.1 Description

Set the NTP servers to use for network time.

Up to 5 time servers can be set.

Default time server with ntp_server_id 0 is "pool.ntp.org", but can be overwritten. ntp_server_id 0 will be selected first. If a server is unreachable (no response within the required time according to the NTP specifications), the next ntp_server_id will be tried and so on.

Enable the NTP client using +UNNT.

Get the module system time using +UMST.

18.4.2 Syntax

AT Command	Description
AT+UNNTS=<ntp_server_id>,<remote_host>	Set NTP server.
AT+UNNTS?	Read currently set NTP servers.

Response	Description
+UNNTS:<ntp_server_id>,<remote_host>,<remote_ip>,<reachable> OK	Successful read response.
OK	Successful set response.
ERROR	Error response.

18.4.3 Defined values

Parameter	Type	Description
ntp_server_id	Integer	NTP server index. Range: 0..4.
remote_host	String	Hostname or IP adress of NTP server. Maximum 64 characters.
remote_ip	String	Resolved IP number of NTP server. Maximum 42 characters.
reachable	Integer	0: Server not reached. >= 1 server has been reached.

18.4.4 Notes

To get an immediate update of the network time, ensure the network is up and it is possible to reach at least one of the configured NTP servers before the network time client is enabled in poll mode.

A Appendix: Glossary

ACL	Asynchronous Connection-Less
AES	Advanced Encryption Standard
AFA	Automatic Frequency Adaption
AP	Access point
ASCII	American Standard Code for Information Interchange
BR/EDR	Basic rate/enhanced data rate
CCCD	Client characteristic configuration descriptor
CCMP	Cipher block chaining message authentication code protocol
CPFD	Characteristic presentation format descriptor
CUDD	Characteristic user description descriptor
CR	Carriage return
CRC	Cyclic redundancy check
DCE	Data communication equipment
DFU	Device firmware upgrade
DHCP	Dynamic host configuration protocol
DNS	Domain name system
DSR	Data set ready
DTE	Data terminal equipment
DTR	Data terminal ready
DUN	Dial-up networking
EAP	Extensible authentication protocol
FCC	Federal Communications Commission
GAP	Generic access profile
GATT	Generic attribute profile
GPIO	General-purpose input/output
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICMP	Internet control message protocol
ID	Identification
JSON	JavaScript Object Notation
LAN	Local area network
LE	Low energy
LEAP	Lightweight extensible authentication protocol
LPO	Low power oscillator
MAC	Media access control
MCU	Micro controller unit
MQTT	Message queuing telemetry transport
MQTT-SN	MQTT Sensor Network
MTU	Maximum transmission unit
NAP	Network access point
NFC	Near field communication
NTP	Network Time Protocol
OOB	Out of band
PAN	Personal area network
PANU	Personal area network user
PMF	Protected management frames
PPP	Point-to-point protocol
PSK	Pre-shared key
RTT	Round trip time
SCCD	Servers characteristic configuration descriptor
RSN	Robust Security Network
SNTP	Simple Network Time Protocol
SPP	Serial port profile

SPS	Serial port service
SSID	Service set identifier
SSL	Secure Socket Layer
TCP	Transmission control protocol
TE	Terminal equipment
TKIP	Temporal key integrity protocol
TLS	Transport layer security
TTL	Time to live
UDP	User datagram protocol
UID	Unique identification number
URC	Unsolicited response code
URL	Uniform resource locator
UUID	Universally unique identifier
WEP	Wired equivalent privacy
WPA	Wi-Fi Protected Access
WPA2	Wi-Fi Protected Access II
WPA3	Wi-Fi Protected Access III

Related documents

1. u-connectXpress user guide, UBX-16024251
2. u-connectXpress extended data mode protocol specification, UBX-14044126
3. u-connectXpress low energy serial port service protocol specification, UBX-16011192
4. u-connectXpress bootloader protocol specification, UBX-17065404
5. ANNA-B112 system integration manual, UBX-18009821
6. NINA-B1 series system integration manual, UBX-15026175
7. NINA-B2 series system integration manual, UBX-18011096
8. NINA-B3 series system integration manual, UBX-17056748
9. NINA-B4 series system integration manual, UBX-19052230
10. NINA-W1 series system integration manual, UBX-17005730
11. ODIN-W2 series system integration manual, UBX-14040040
12. u-connectXpress MQTT application note, UBX-19005066
13. u-connectXpress IoT cloud connectivity application note, UBX-19010078
14. u-connectXpress Bluetooth security application note, UBX-16022676
15. u-connectXpress Bluetooth mesh application note, UBX-19025268
16. ODIN-W2 Bluetooth and WiFi coexistence application note, UBX-18021138
17. u-connectXpress SPI peripheral protocol specification, UBX-20028725
18. s-center user guide, UBX-16012261
19. u-connectXpress host library, example sources u-connectXpress-host-library
20. u-blox Bluetooth LE application for Android, example sources Android-u-blox-BLE
21. u-blox Bluetooth LE application for iOS, example sources iOS-u-blox-BLE
22. Bluetooth Specification Version 4.0: The Bluetooth specification including Bluetooth low energy
23. ANNA-B112 data sheet, UBX-18011707
24. NINA-B1 series data sheet, UBX-15019243
25. NINA-B2 series data sheet, UBX-18006649
26. NINA-B3 series data sheet, UBX-1705209
27. NINA-B41 series data sheet, UBX-20035327
28. NINA-W13 series data sheet, UBX-17006694
29. NINA-W15 series data sheet, UBX-18006647
30. ODIN-W2 series data sheet, UBX-14039949

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Revision history

Revision	Date	Name	Comments
R01	14-Nov-2014	pber	Initial release
R02	10-Feb-2015	hreh	Major update
			Added ATZ
			Updated +UMRS
			Updated Bluetooth security
			Updated/Added Wi-Fi Commands
			Added +UDCFG
			Added +UBTCFG
			Added +UBTBD
			Added +UBTSTAT
			Channel parameter removed from +UWSC command. Use channel list +UWCL instead
			Removed +UDNRP (Use +UBTCFG instead)
			Added active on start up parameter to +UNC and +UWSC
R03	31-Mar-2015	hreh	Updated +UDSC
			Removed +UBTSN. Functionality added to +UDSC
			Added ATI
			Channel parameter removed from +UWSCAN command. Use channel list +UWCL instead
R04	22-Apr-2015	hreh	Updated +UDCP (DNS resolver is now implemented)
			Basic IPv6 functionalilty added. Updated +UNC and +UNSTAT.
R05	2-Jun-2015	hwin	Updated +UWSC, +UNC and +UNSTAT. Note: These changes are not backwards compatible!
			Removed +AT&F. Functionality added to +UFACTORY.
			Clarified description of AT&S and AT&D.
R06	3-Jul-2015	plin	Updated +UBTBD
			Added +UWAPC
			Added +UWAPCA
			Added +UWAPSTAT
			Added +UWAPSTALIST
			Added +UUWAPU
			Added +UUWAPD
			Added +UUWAPSTAC
			Added +UUWAPSTAD
			Added +UETHCA
			Added +UETHC
			Added +CSGT
R07			Moved features not supported in 00B release to a separate document
R08	20-Sep-2015	vull	Added data type "list".
			Removed connection scheme "connect on data".
			Renamed a lot of factory-programmed value to factory default.
			General updates after review.
			Removed time and date from ATI9.
			Added unique identifier to ATI9.
R09	01-Apr-2016	hwin	Added ATI0
			Added ATI9

Revision	Date	Name	Comments
			Clarified SWITCH_0 signal behavior for Just works Clarified SWITCH_0 signal behavior for external connect scheme (+UDDRP) Clarified DSR and DTR pin behavior (AT&D, AT&S) Removed limitations on UURPC & UURPD so that +UDCP and +UDCPC are asynchronous Deprecated +UBTWS and +UWWS, use +UDWS instead Clarified AT&W, AT&S, AT+UDDRP, +UWSCA Changed Recommended baudrates Updated AT+UDCP, AT+UDSC for IPv6 Updated +UUDPC Updated AT+UNSTAT and result +UUNU Added the following new commands - AT+UWDS, AT+UBTDIR, AT +UWSSTAT. Wi-Fi Access Point: • Added the following new commands - AT+UWAPC, AT+UWAPCA, AT +UWAPSTAT, AT+UWAPSTALIST, AT+UWAPMACADDR • Added the following new events - +UUWAPU, +UUWAPD, +UUWAPSTAC, +UUWAPSTAD Ethernet: • Added the following new commands - AT+UETHC, AT+UETHCA PPP (Point-to-Point Protocol): • Added the following new commands - AT+UPPPC, AT+UPPPCA, AT +UDDRS Terminal Server: • Added the following new commands - AT+UDDRS and response +UUDRSC, +UUDRSD L2 routing: • Added the following new command - AT+UNL2RCFG
R10	29-Apr-2016	hwin	Changed command description and supported output power values in +UBTCFG Updated +UDSC command and added a new function Updated +UWSCA command and added a new function Included new command - +UWCFG in Wi-Fi configuration Clarified +UETHCA command; added limitations for version 2 Updated +UNSTAT command with new function PPP Clarified +UNL2RCFG Command.
R11	11-May-2016	chek	Added a new option in +UPPPC.
R12	15-Jun-2016	chek, pber, hwin, plin, kgom	Renamed "ODIN-W2 AT Commands Manual" as "u-blox Short Range Modules AT Commands Manual". This manual will be a common document that will describe the AT commands used with Short Range stand-alone modules such as ODIN-W2 and NINA-B1. Updated Preface section. Included Glossary. Included summary table for all the AT commands. Updated the description for the parameters in +UPPPC, +UETHC and +UBTSM commands. Modified the parameters for +UMSTAT Added transmit power level control in +UWCFG. Included new command - plusUUETHLU for unsolicited response codes for Ethernet.
R13	28-Jun-2016	pber, hwin, kgom	Removed the AT commands that were not applicable for ODIN-W2 firmware version 2.0.0
R14	20-Sep-2016	pber, hwin, plin, lhau, objo, kkar, hvig, cekh,	Updated the Applicable products table in Preface. Updated the description for parameters in +UUWLD, +UMLA, and +UWSC. Updated the description for the parameters in +UETHC and +UBRGC. Added

Revision	Date	Name	Comments
		mhan, cmag, kgom	transmit power level control in +UWCFG. Added BLE mode in +UFWUPD. Added description for parameter tag 25 in +UBTLECFG. Included the following new commands: • +UBTACLC, +UBTACLD in Bluetooth. +UUBTACLC and +UUBTACLD for unsolicted response codes in Bluetooth. • +UUETHLU for unsolicited response codes in Ethernet. • +UBRGC and +UBRGCA in Network. • +UBTGDP, +UBTGDPU, +UBTGFI, +UBTGDCS, +UBTGDCD, +UBTGR, +UBTGRU, +UBTGRM, +UBTGW, +UBTGWC, +UBTGWN, +UBTGWL, +UUBTGN, and +UUBTGI in GATT. • +UGPIOC, +UGPIOR, and +UGPIOW in GPIO.
R15	10-Jan-2017	pber, mtho, hwin, kkar, lhau, lalb, mlju, cekh, pber, ecar, kgom	In the Document Information table on page 2, replaced "Status" ("Early Production Information") with "Disclosure restriction". Updated the Applicable products table in Preface. Included support for ODIN-W2 firmware versions - 2.0.2 and 3.0.1. In all the AT commands, modified the first row second column value to include: • The product series name, if an AT command is applicable for all the firmware versions • The product series name with the firmware version number, if an AT command is applicable from certain firmware versions only. In the Summary table section in Preface, modified the value in the first row second column of the sample summary table and explained the same with examples in the first bullet below the summary table. Included the product series name (instead of the product variants) in the Note. Reorganized the GATT section as GATT Client and GATT Server. Minor change in +UBRGC. Removed support for DFU over BLE in +UFWUPD. Updated description for the parameters in +UBTLE, O, +UDCP, +UFWUPD, +UDDRP, +UBTLECFG, +UUBTACLC, and +UWSSTAT. Included support for NINA-B1 (with firmware version 2.0.0 onwards) in +UBTACLC, +UBTACLD, +UUBTACLC, and +UUBTACLD. Modified the summary tables for the following AT Commands to include support for NINA-B1: +UDSC, +UBTND, +UBTD, +UBTB, and +UBTCFG. Added parameters for Bluetooth Quality of Service in +UBTCFG and +UDCP. In +UDCP, added keepAlive query to tcp and udp. Included the following new commands: • +UDSF in Data Mode. • 9 AT commands in GATT Server.
R16	19-Jan-2017	mhan, kgom	Renamed the command "Firmware update Over AT command (FOAT) +UFWUPD" as "Firmware update +UFWUPD".
R17	31-Mar-2017	pber, paha, hvig, kkar, hvig, cmag, lalb, mtho, hwin, kgom	Included support for FW version 4.0.0 for ODIN-W260 and ODIN-W262. Added options for certificate and key name and included notes with respect to supported products in the parameter description for +UWSC. Added param_tag 2 in +UDCFG. Modified the note in +UWSCAN. Modified description for the parameters in +UWSC. Included +UBTLK in Bluetooth and +USECMNG command in Security. Modified description for +UFWUPD. Included 3 new commands for NFC. Included OOB to +UBTSM in Bluetooth. Included additional information in the description for +UBTACLC. Minor changes in the description of the parameters for +UMSM, +UMRS, O, +UBTLE, +UBRGCA, and +UDDRP. Included a note with respect to NINA-B1 in S2. Modified the second note in +UMRS to include the silence time for NINA-B1. In +UBTCFG, added configuration options 7, 8, and 9. Also, modified the maximum value and description for the parameter 2, modified the default, minimum, maximum values and description for 4, modified the configuration option for 3 and included notes with respect to supported products.
R18	30-Jun-2017	hwin, mtho, hreh, pber,	Included support for NINA-B1 software version 3.0.1. Replaced firmware with software.

Revision	Date	Name	Comments
		lhau, alar, objo, paha, kgom	Updated Summary table section in Preface. In the summary table, updated values for the Modules field and included Response time column. Included unsolicted result code AT commands as separate AT commands at the end of each section. Included +UBTOTK in Bluetooth and 3 new commands in NFC. Included OOB to +UBTSM in Bluetooth. Many minor changes in the AT Commands that are in System and GATT Server sections. In Wi-Fi section, modified description for the parameters in +UWSC and +UWAPC. In +UDCP, modified description for the url parameter to include supported products; also removed support for gatt connection scheme from the example URLs. In Bluetooth section, made minor changes in the parameters/description for +UBTD, +UBTSM, +UBTOTK, +UBTB, +UBTBD, and +UBTSS. Also modified description for +UBTMSR, +UBTRSS, +UBTLQ, +UBTSD, +UBTLK, and +UUBTUC. In +UBTLECFG, added a new parameter tag and also modified the notes (section 6.26.4). In +UBTCFG, included valid parameter values for output power for NINA-B1. Included the new default name for the parameter "device_name" in +UBTLN applicable from NINA-B1-SW3.0.1 onwards. Modified description in +UBTSM and +UBTGRM. Modified length of the parameter value to 244 in +UBTGCHA. Modified description for SWITCH_0 in +UDDRP and +UBTSM. Updated description for +UBTGSN, +UBTGSI, +UBTGW, +UBTGWL and +UBTGWN to match the new software capabilities of NINA-B1 (to handle longer MTU size).
R19	30-Aug-2017	kgom	Included support for ODIN-W2 software version 4.0.1.
R20	16-Nov-2017	lhau, hwin, rraz, jkra, hreh, hvig, kgom	Included support for NINA-W1 software version 1.0.0 and NINA-B3 software version 1.0.0. Added syntax and parameters for software update with secure boot in +UFWUPD. Included notes with respect to applicability of NINA-W1 in the following AT commands: +UMRS, O, +UDSC, +UWSC, +UWSCAN, +UDDRP, +UWCFG, +UGPIOC, +UGPIOW, and +UGPIOR. Modified the notes section in +UDSC. Updated the parameter description in +UBTD and +UBTND. In &S, included a note with respect to NINA-B3. Added a new parameter tag in +UDCFG. In +UBTLECFG, added two new parameter tags, added bits 2 and 3 for the parameter tags 27 and 28 in +UBTLECFG for NINA-B3 series, modified the valid software versions for some tags, and also modified the notes section. Included a note in the description for +UGPIOR and +UGPIOW. Added a new AT Command - +UDLP for NINA-W1. Included +UBTLEPHYR command and +UUBTLEPHYU event in Bluetooth, which will be applicable for NINA-B3. Updated +UFWUPD.
R21	14-Dec-2017	rraz, pber, lhau, hwin, hreh, paha, lhau, hvig, apet, kgom	Included support for NINA-B1 software version 4.0.0. In &S, +UFWUPD, +UBTLECFG, and +UGPIOC, modified the notes for some parameters with respect to applicability for NINA-B1. In +UBTCFG, modified note for the parameter tag 2. Modified the applicable products in the summary tables for +UUBTLEPHYU and +UBTLEPHYR to include support for NINA-B1 (from version 4.0 onwards). Updated the description for +UBTB to include information about the number of bonded devices. Added a note with respect to memory limitations for GATT Server in +UBTGSER, +UBTGCHA, and +UBTGDES. Modified description for the parameters in +UDCP, +UDDRP, +UWCFG, +UMLA, O, +UDCP, +UBTCFG, +UBTLECFG, +UGPIOC, +UGPIOR, +UGPIOW, and +UWSCAN. Included note with respect to NINA-W1 in the parameter description for +UWSC. Modified the description for the following AT Commands - +UBTGSER, +UBTGCHA, and +UBTGDES. Included a note with respect to delay before the start of data transmission in O command. Added the following new commands - +UPING in PING and +UBTLEDIS in Bluetooth.

Revision	Date	Name	Comments
			Modified the description for the following parameter tags with respect to NINA-B3: • 27 and 28 in +UBTLECFG • TxPHY and RxPHY in +UBTLEPHYR • status, TxPHY, and RxPHY in +UUBTLEPHYU Updated the summary table for the following AT commands - +UUDPC, +UUDPD, +UUWLD, +UUNU, +UGPIOR, +UGPIOW, +UPING, and +UUND.
R22	19-Dec-2017	pber, tfri, cekh, kgom	Included support for ODIN-W2 software version 5.0.0. Modified the description for the parameters in +UDCP, +UETHC, +UWSCA, and +UWSC. Updated the syntax section in +UGPIOC. Added param_tag 3 to 11 in +UDCFG, which are supported by ODIN-W2 from software version 5.0.0 onwards only. In +UBRGC, +UNSTAT, +UBTCFG, and +UDWS, included new parameter values in the description for the parameters, which will be applicable for ODIN-W2 from software version 5.0.0 onwards. Updated the bridge action command (+UBRGCA) with a note on MAC address generation. In Bluetooth, added the following new AT commands - +UBTPANC, +UBTPANCA, +UBTPANLIST and the following two AT events - +UUBTPANLU and +UUBTPANLD.
R23	17-Jan-2018	kgom	Included support for ODIN-W2 software version 5.0.1. Minor changes in the description for param_tag in +UWCFG.
R24	29-Mar-2018	apet, lalb, pber, hisa, hwin, kgom	Included support for ANNA-B1. Modified note in the description section for the following AT commands - +UBTGSER, +UBTGCHA, and +UBTGDES. Also updated description for the param_tag in +UWAPC.
R25	18-Apr-2018	mlju, apet, kgom	In Applicable products section, updated the type number and u-blox connectivity software version for NINA-W13x with NINA-W13x-00B-01 and 1.0.1 respectively. Modified description for the parameter "connect_scheme" in +UDDRP.
R26	21-May-2018	mtho, hwin, cekh, apet, kgom	In Data Mode, added two new AT commands - +UDBIND and +UDBINDC. In +UBTLECFG, updated description for the parameter tags - 27 and 28 for NINA-B3. In +UBTD, included a new note for the discovery_tape parameter. In +UBTLEPHYR, updated description for the parameter tags - TxPHY and RxPHY for NINA-B3. Included a note in +UGPIOC. In +UBTCFG: • Moved the information in "Calculation" column to "Description" • Included a new column - "Supported by" and included information about the supported modules. • Modified description for the parameter tag 4.
R27	12-Jun-2018	objo, jkra, lhau, cekh, hwin, kgom	Included support for NINA-B2. Included a note for the "type" parameter in +UBTSS, "timeout" parameter in +UBTND and "discoverability_mode" parameter in +UBTDM. Modified the notes section in +UBTLECFG. Updated description for the "interface_id" parameter in +UMLA. In +UBTLECFG, added a new parameter tag - 29 and also modified the notes (section 6.26.4). In +UBTCFG, modified description for the parameter tag 4 with respect to NINA-B3. Modified description for the following parameters with respect to NINA-B2: • 1, 2, 4 to 9 in +UBTCFG • 1 and 2, 3 to 10, and 25-26 in +UBTLECFG • role in +UBTLE • security_mode (Security Enabled - Out of band) in +UBTSM
R28	27-Jun-2018	tfri, pber, cmag, vull, lhau, rraz, kgom	Included support for ODIN-W2 software version 6.0.0. In Network, added a new AT command - +UNACDT. Included a note for the parameter tag 11 in +UWCFG. In +UBTCFG, modified minimum value for the parameter tags 1 and 2 for ODIN-W2. Minor changes in +UDBIND and +UDBINDC. Updated description for the parameter - interface_id in +UMLA. Updated description for the parameter - data in +UBTAD.

Revision	Date	Name	Comments
			Added parameter 107 for address conflict detection in the following AT commands - +UWSC, +UWAPC, +UETHC, +UBRGC, +UBTPANC, which will be applicable for ODIN-W2 from Software version 6.0.0 onwards. Included the following new parameter tags, which will be applicable for ODIN-W2 from software version 6.0.0 onwards: • Parameter tag 16 in +UWAPC • Parameter tags 12, 14, and 15 in +UWCFG • A new query_string entry and an example for udp in +UDCP • Parameter tags 7 and 8 in +UWSSTAT
R29	4-Sep-2018	mape, hvig, hwin, kgom	Included <conn_handle> parameter in +UUBTGIC. Modified description for the parameter in +UBTAD and +UBTLECFG (for param tag 9). In +UBTLECFG, for the parameter tag 29, included a note that module reset is needed for the settings to take effect for NINA-B3.
R30	17-Oct-2018	pber, lhau, mape, hvig, mtho, paha, hwin, tfri, mhan, jkra, kgom	Included support for NINA-W1 software version 2.0.0. Included support for NINA-B2 in +UDSF, +UGPIOC, +UGPIOR, +UGPIOW and +UDBIND. Updated description in +UWAPMACADDR, +UNHN, +UMLA, +UFWUPD, +UBTGW, +UBTGWN, and +UBTGWL. In +UWCFG, removed "Auto Enabled" option for the param_tag. Included +UWSCANIE AT command in Wi-Fi section. Made a minor change related to the bootloader mode in +UFWUPD. Modified notes for the Baud_rate parameter in +UFWUPD. Included supported variant information for Coded PHY. In +UBTBD, included information about the maximum number of bonded devices supported for different Bluetooth modules. Modified description for the role parameter in +UBTLE. In +UBTLECFG, for the parameter tag 26, included a note that module reset is needed for the settings to take effect for NINA-B1, NINA-B3, and ANNA-B1. Also included notes section in +UBTSM, +UBTLE, +UBTDIR, and +UBTLEDIS. In +UBTCFG: • Modified the valid parameter values for NINA-B2 • Included a table to indicate the maximum number of LE links for different products for the parameter tag 2 Updated description for the following parameters w.r.t NINA-W1-SW2.0.0: • baud_rate in +UMRS • param_tag 5 in +UETHC • param_tag 8, 12 and 13 in +UWAPC • param_tag 0 in +UWCFG • param_tag 107 in +UPPPC • interface_id in +UMLA • id and type in +UDSC • param_tag in +UBRGC Updated description for the following parameters w.r.t NINA-B2: • baud_rate in +UMRS • Signature in +UFWUPD • device_name in +UBTLN • model in +UBTLEDIS and +UBTLN • url in +UDCP • peer_id and connect_scheme in +UDCP
R31	7-Nov-2018	kgom	Included support for ODIN-W2 software version 6.0.1.
R32	4-Dec-2018	jkra, cmag, hwin, kgom	In +UBTCFG, modified description for the parameter tag 4 with respect to NINA-B2 and added information about parameter tag 10 in Defined values. In +UWAPC, included description for the parameter tag 14. Modified the notes in +UBTSM. Updated description for the rssi parameter in +UBTRSS.
R33	13-Feb-2019	mhan, cmag, pber, kgom	Modified the title as "u-connect AT Commands Manual". Replaced all instances of "connectivity software" with "u-connect software". In +UDCFG, modified description for the parameter tag 2 with respect to NINA-W1. In +UDSC, included information about "url" parameter in description and defined values.

Revision	Date	Name	Comments
R34	5-Mar-2019	akar, hwin, jkra, hvig, paha, mape, lalb, kgom	Added the following new commands: • +UMRSIG and +UPWRREG in System • +UBTST in Bluetooth Included support for NINA-B1 software version 5.0.0 and ANNA-B1 software version 2.0.0. Marked the old +UBTLEDIS as deprecated and included the updated +UBTLEDIS AT command. Modified description for the Baud_rate parameter in +UFWUPD. Updated the default packet type for NINA-B2 in +UBTCFG parameter tag 3. In +UBTLECFG, updated description for the parameter tags 7 and 29. Modified note for the security_mode parameter in +UBTSM. Added additional parameters in +UBTGCHA and +UBTGDES. Also included an examples section in +UBTGCHA.
R35	19-Mar-2019	tfri, pber, chka, mtho, cmag, mape, kgom	Included support for ODIN-W2 software version 7.0.0. Included support for ODIN-W2 software version 7.0.0 in +UDLP. Added a new command - AT+UMLPO in System. In +UDCP, added four new queries to tcp. In +UWCFG, added parameter tags 16 to 22. In +UWAPC, added parameter tag 15. Included a note for the url parameter in +UDSC. In +UDCFG, included information about tags 4 and 5. In +UDCP, updated description for the url parameter, added information about MQTT connect scheme and also added more examples for tcp. In +UBTLECFG, updated description for the parameter tag 29. In +UBTGWL, modified the parameters - flag and offset as mandatory.
R36	17-Apr-2019	hwin, hisa, mtho, hvig, mape, kgom	Included information about u-connectXpress and uConnectScript software variants for all modules including NINA-B3. Included support for the following in the Applicable products section: • u-connectXpress version 2.0.0 for NINA-B31x • u-connectScript version 1.0.1 for NINA-B311 and NINA-B312 Updated Summary table section in Preface with sample representation of NINA-B3 software variants. Updated the summary tables for many AT commands with respect NINA-B3. Included the following new AT commands in Javascript: • +UJSCFG • +UJSCOMPLETE Included the following new AT commands in File System: • +UDWNFILE • +ULSTFILE • +URDFILE • +UDELFILE In +UBTGR, modified description for the response. In +UDDRP, updated description for the connect_scheme parameter (Bit 1). Included an optional parameter (max_length) in +UBTGDES.
R37	24-May-2019	pber, hwin, lhau, mape, mtho, kgom	Included support for ODIN-W2 software version 7.0.x in the summary table for many AT commands that were applicable for earlier software versions of ODIN-W2. In Preface, updated the text below "Applicable products" table and Summary table section w.r.t NINA-B3 software variants. Made the following replacements: • "NINA-W1" with "NINA-W13" • "ANNA-B1" with "ANNA-B112" Made a minor change in the parameter description for &D and description for +UPWRREG. Added DTIM parameter in +UWAPC. In +UDDRP, modified description for connect_scheme parameter (Bit 1). Updated the second Note in +UWSC with respect to NINA-W13.
R38	26-Jun-2019	pber, lhau, hvig, cekh, mekm, kgom	Included support for the following in the Applicable products section: • ODIN-W2 software version 7.0.2 • NINA-W15 software version 1.0.0 Updated the summary table for many AT commands. In +UWCFG, included new parameter tags - 23, 24, and 25, which will be applicable

Revision	Date	Name	Comments
			for ODIN-W2 from software version 7.0.2 onwards. In +UWAPC, added parameter tags - 19 and 20. Also included a table for products and their corresponding supported parameter tags. Modified the syntax for setting Bluetooth security mode in +UBTSM. Added a new parameter tag in +UUBTB. In +UWSC, updated the supported software versions for NINA-W13. In +UWCFG, modified note for the param_tag 0.
R39	11-Sep-2019	hwin, tfri, mekm, cekh, lhau, mape, flun, kgom	Included support for ODIN-W2 software version 7.1.0. Included a new command - +UUNERR for unsolicited error code for Network. Made a few changes related to ODIN-W2 software versions in the syntax section in +UGPIOC. Modified description for Bit 1 for the connect_scheme parameter in +UDDRP. Updated the supported modules in the summary table for +UDLP. Updated description for the param_tags 101 to 105 in +UWSC. Updated description for the param_tag 107 in +UPPPC. In +UWCFG, updated information about the supported parameter tags for different software versions for NINA-W13 and NINA-W15. In +UNSTAT, updated description for the <interface_type> parameter. Added description for the parameter <status_id> 210 to 212 in +UNSTAT and also updated the syntax. In +UDCFG, modified description for param_tag and added param_tag 6; also included a table for products and their corresponding supported parameter tags.
R40	25-Oct-2019	tfri, mekm, lhau, hwin, flun, mape, kgom	Included support for u-connectXpress version 2.1.0 for NINA-W13, NINA-B2 and NINA-W15 in the Applicable products section. Added parameters 12 and 13 in +UBTCFG. Included a new AT command +UWVSIE in Wi-Fi. In +UDCFG, updated the supported parameter tags table for NINA-W13 and NINA-W15. Updated "security_mode_BT2.0" and "fixed_pin" parameters in +UBTSM. Updated "url" and "type" parameters in +UDSC. In +UWAPC, updated supported parameter tags for NINA-W15 in the table in Notes section. In +UWCFG, updated the note for the param_tag 0; also updated the values in the supported parameter tags table for NINA-W13. Included default value for the parameter tag 13 in +UBTCFG. In +UBTLECFG, modified description and calculation for parameter 6 and also changed the miniumum value for parameter 3 to 1. In +UWSCANIE, included a note for the parameter ssid and also added a new notes section. In +UBTCFG, included a note for the parameter tag 1.
R41	19-Dec-2019	flun	Updated Abstract. Added ODIN-W263 supporting u-connectXpress version 7.1.0. Cleaned up the Applicable products table and improved Summary table examples in How to use this manual. Clarified +UPING.
R42	30-Jun-2020	flun, mape, mhan, paha, mtho	Added documents to Related Documents chapter. Updated glossary. AT+UDDRP: Parameter ac-to now supported by NINA-B1 SW 6.0, ANNA-B1 SW 3.0. Updated Glossary. Added AT+UDHTTP, AT+UDHTTPE, +UUDHTTP and added "http-tcp" scheme to AT+UDCP, AT+UDDRP and parameter data type Blob, to support of direct HTTP(S) requests for NINA-W13, NINA-W15 SW 3.0. Added AT+UBTLESTAT and AT+UBTLELIST Added AT+UDUV. Updated AT+UDCP. Added MQTT example URLs to AT +UDCP. AT+UMLA: Setting MAC address now supported by products ANNA-B1+NINA-B3 SW 3.0, NINA-B1 SW 6.0. All commands in chapters Javascript and File system marked as deprecated since u-connectScipt software has been discontinued. Added AT+UBTMODE AT+UBTCFG: Updated parameter 2 since peripheral mode can now have more than one link. Added parameter 14 for reserving/setting number of

Revision	Date	Name	Comments
			peripheral links. Both changes are supported from ANNA-B1+NINA-B3 SW 3.0, NINA-B1 SW 6.0.
			AT+UMRSCFG: New command for secondary UART, AT+UDCP updated with example and new scheme
			Added spi scheme to A+UDCP
			AT+UWCFG: Passive scanning (parameter 21) now supported by NINA-W13, NINA-W15 SW 3.0
			AT+UWSCAN: Optional parameters added in the response.
			Added power management for improved low power performance on NINA-B2, NINA-W13, NINA-W15 SW 3.0: AT&D3, AT&D4 now supported. Added AT+USTOP, AT+UPWRMNG. Updated AT+UWCFG and AT+UWSC.
			Low Energy Secure connections available for NINA-W15 SW 3.0, NINA-B2 SW 3.0
			User Confirmation command and event AT+UBTUC, +UUBTUC available for NINA-B1-SW6.0.0, ANNA-B112-SW3.0.0, NINA-B3-uX-SW3.0.0
			AT+UBTLECFG: Automatic PHY adaptation for NINA-B3-SW-3.0.0.
			System time is supported for NINA-W13, NINA-W15 and NINA-B2 SW 3.0: Added AT+UMST and AT+UMSTS for system time.
			Network time is supported for NINA-W13, NINA-W15 SW 3.0 as an NTP compatible client: Added AT+UNNT and AT+UNNTS for network time.
R43	18-Nov-2020	mape, mhan	Updated description of AT+UBTLECFG tag 29 value 3 and 4, and AT +UBTLECFG tags 4, 5 and 26.
			AT+UBTCFG tag 2 updated and tag 14 added.
			AT+UBTSM updated with fixed pin pairing for Bluetooth low energy.
			Added NINA-B41 product.
			AT+UBTOTK updated with second parameter optional.
			AT+UBTMODE command updated.
			AT+UDSC description updated.
			AT+UDCFG tag 3 updated.
			AT+UBTLN length for Bluetooth low energy corrected to 29.
			AT+UBTGRR max characteristic size updated to 244.
			AT+UBTSD has added the value '00' to clear scan response data.
			Removed deprecated chapters Javascript and File system.
R44	22-Jan-2021	flun	Added NINA-W156 as supported product from u-connectXpress 3.1.0 onwards.
R45	22-Apr-2021	mape,mhan, cmag	Abstract updated.
			Added note that AT&D values 3 and 4 are not valid for ODIN-W2.
			AT+UBTLE updated with simultaneous Central+Peripheral support for ODIN-W2.
			RSSI parameter in +UWAPSTALIST documented as not valid.
			Updated description of AT+UDSC option 2.
			Added to AT&D3 description that UART can be enabled also by incoming Bluetooth SPP and TCP connections.
			Added more examples for packet type to AT+UBTCFG tag 3.
			Added data type root certificate to AT+USECMNG.
			Added parameter value MQTT to +UUDPC.
			Add note that interface id is variable to AT+UNSTAT.
			Add information about store and restart necessary for AT+UDCFG param_tag 2 (Number of allowed TCP links).
			Updated +UPING error codes.

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			Added note about scatternet to AT+UBTMSP.
			AT+UDCP: Clarified length of <domain> to 64.
			Added NINA-B411 as applicable product.
			+UBTMODE updated with note about mesh.
			Description sub-chapter added to AT&S, AT+UWSCA and AT+UBRGCA.
			Replaced slave with peripheral for commands AT+UBTAD, AT +UBTLECFG and AT+UBTLESTAT.
			AT+UBTCFG param_tag 2 updated.
			AT+UWCFG added param_tag for Wi-Fi Quality of Service.
			AT+UDCFG added parameter to configure escape sequence timing for ODIN-W2.
R46	21-Jun-2021	make, mhan, flun	Added u-connectXpress version 4.0.0 for products NINA-B22, NINA-W13 and NINA-W15.
			Minor updates to +UBTSD, +UDCP, +UDSC, +UDSF and +UDCFG.
			Added commands for writing data in AT command mode +UDATR, +UDATW and +UUDATA.
			Added +UWCL supported by NINA-W13 and NINA-W15.
			Added note about domain name length for NINA-W13 and NINA-W15 in +UDCP.
R47	12-Jul-2021	mape	Added handling of random resolvable addresses to +UBTBD and +UBTD. Added new parameter tag 9 to +UDCFG.
			Added new parameter tag 30 to +UBTLECFG.
			New baud rate 38400 for B1 products in +UFWUPD.
			Increased NFC URI length to 250 characters for latest SW version.
			Bluetooth low energy pairing with fixed pin added to +UBTSM.

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