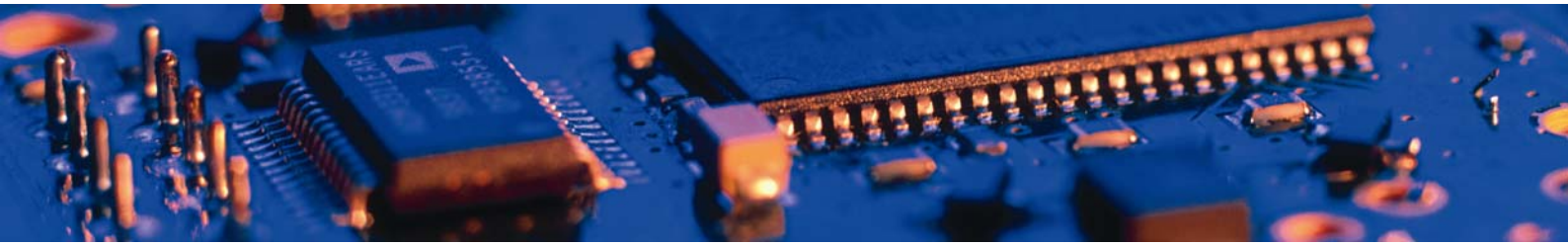


Serial Port Adapter™

Version 2 and 3

AT Commands

connectBlue

Serial Port Adapter™ Version 2 and 3

AT Commands

Release:	2008 09
Document version:	3.17
Document number:	cBProject-0501-11 (25)

Printed in Sweden.

Trademarks

The BLUETOOTH trademarks are owned by their proprietor and used by connectBlue under license.

Third party brands and names are the property of their respective owners.

Contents

11. AT Commands Reference 22

Chapter 1
Introduction

1.1 Related Documents

- The **Serial Port Adapter AT Commands** document, this document, contains a description of the AT commands supported in the Serial Port Adapter. It also contains information on how to use the AT commands to create Bluetooth applications.
- The **OEM Serial Port Adapter Electrical & Mechanical Datasheet** contains important information about the OEM Serial Port Adapter. Read this document if you are using the OEM Serial Port Adapter.

Chapter 2

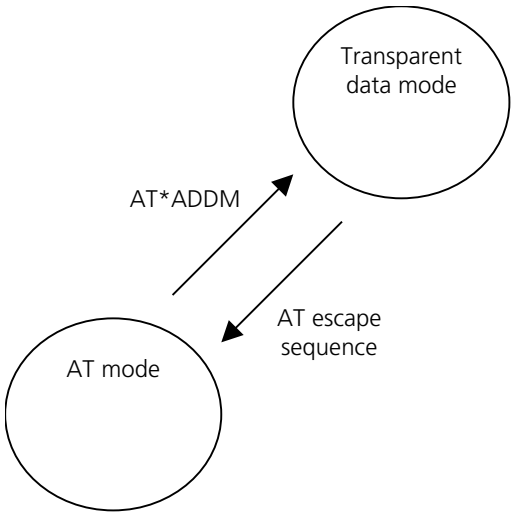
Data Mode and AT Mode

The Serial Port Adapter can be in two different modes AT mode and data mode[1]. The Serial Port Adapter starts up in data mode and can be requested to move to AT mode by sending an escape sequence. The default escape sequence consists of three consecutive forward slash characters '/'. The escape sequence character can be changed using the ATS2 command. Pressing the restore-button on the Serial Port Adapter, when it is powered up, restores the default escape character.

The following criteria must be met for the Serial Port Adapter to interpret the sequence as a valid escape sequence:

- Before the escape sequence there must be silence for 1 second. This time can be changed using the AT*AMET command.
- After the escape sequence there must be silence for 1 second. This time can be changed using the AT*AMET command.
- The entire escape sequence must be sent within 200 ms.

To move from AT mode to data mode, use the "AT*ADDM" command.



[1] Some serial port adapter models also support the ECI mode, which is not covered in this document.

Chapter 3

Baud Rate

The Serial Port Adapter does not support auto baud rate. The baud rate is set using the "Write_RS232_Settings" command.

The default RS232 settings are 57600 bits/s, 8 data bits, no parity, 1 stop bit, and hardware flow control. Pressing the restore-button on the Serial Port Adapter, when it is powered up, restores the default serial settings.

Chapter 4

Configuration and Operation

This chapter gives some guidelines on how to perform basic configuration and operation.

There are several request packets that can be used to configure the Serial Port Adapter. Many of these request packets take a boolean parameter called <store_in_startup_database>. If this parameter is set to 1 the setting will be applied immediately and also when the Serial Port Adapter starts up in the next power cycle. If this parameter is set to 0 the setting will be applied immediately but it will not be applied when the Serial Port Adapter starts up in the next power cycle.

Note that for some of the version 3 modules there is a constraint on some AT commands, which means that the module must be restarted for the command to take affect. For those commands the <store_in_startup_database> parameter must always be 1.

Note that for applications that always configure the serial port adapter at startup, it is not necessary to store settings in the startup database. It is intended for applications where the serial port adapter is configured once before installation.

4.1 LED Indication

The LED indicates what mode is currently active and what activity that is currently in progress.

The following color indications are used.

- *Green*: The current mode is data mode and no connection attempt is in progress.
- *Orange*: The current mode is AT mode.
- *Purple*: A connection attempt is in progress.
- *Blue*: A connection is currently active.
- *Blue Blinking*: A connection is active and data is transmitted or received over air.
- *Red Blinking*: Buffer overflow, parity or framing error detected on the UART.

4.2 Bluetooth Settings

A Bluetooth device can be in several different operation modes. The operation mode determines whether or not a device can be connected to and whether or not other devices performing searches can discover a device. Use the "Write_Discoverability_Mode" and "Write_Connectability_Mode" commands to set the operation mode.

All Bluetooth devices have a user-friendly name. Use the "Write_Local_Name" command to set the local device name.

All Bluetooth devices have a 'class-of-device' indicator that can be discovered by other devices when they are performing searches. Use the "Write_Local_COD" command to set the 'class-of-device'.

4.3 Searching for Other Bluetooth Devices

Two commands are available to search for other devices:

- The "Inquiry" command returns the Bluetooth device address and the class of device of all the devices in the vicinity that are in discoverable mode.
- The "Device Discovery" command returns the Bluetooth device address, the class of device and the name of all the devices in the vicinity that are in discoverable mode.

The "Inquiry" command is faster than the "Device_Discovery" command. A "Device_Discovery" is an "Inquiry" followed by a "Name_Discovery" on each found device.

4.4 Searching for Services

It is possible to search for services on remote devices. A service search is performed using the "Service_Search" command.

4.5 Creating Serial Connections and Sending Data

Serial connections are Bluetooth connections based on the Serial Port Profile, the Dial-up Networking Profile and the LAN Access Profile[2].

How to Select What Profile to Use

It is important that the same profile is used on both devices wanting to communicate. If the remote device is not a Serial Port Adapter, refer to the documentation of that device to determine what profile it uses or to find out how to select what profile to use.

Client or Server

First decide if your device is supposed to act as a client (initiator of connections), a server (acceptor of connections) or both.

Wireless Multidrop™

The Wireless Multidrop™ feature allows the Serial Port Adapter to simultaneously communicate with several devices even when it is in data mode. If Wireless Multidrop™ is used all data sent to the Serial Port Adapter via the serial interface will be forwarded to all connected devices. All data received from any of the connected devices will be forwarded on the serial interface in the order that the data was received.

The Wireless Multidrop™ feature can be used if the Serial Port Adapter has been configured as a server as well as if it has been configured as a client. When configured as a server several devices are able to connect to your Serial Port Adapter and

[2] Only supported in version 2 of the serial port adapter models.

join the wireless multidrop network. If configured as a client you must tell the Serial Port Adapter which devices to connect to.

Exactly how to configure for Wireless Multidrop™ see Connection Establishment – Server and Connection Establishment – Client.

Connection Establishment – Server

In AT mode, use the "Write_Default_Server_Profile" command to select what profile to use when acting as a server.

If you want to use the Wireless Multidrop™ feature and allow several devices to simultaneously connect to your device you must enable Wireless Multidrop™ using the "Write_Wireless_Multidrop_Configuration" command. In addition, the Serial Port Adapter must be configured to perform a master/slave switch every time a device connects to it. This is done using the "Write_MasterSlaveRole_Policy" command.

After configuring the Serial Port Adapter for server operation, move to data mode.

Connection Establishment – Client

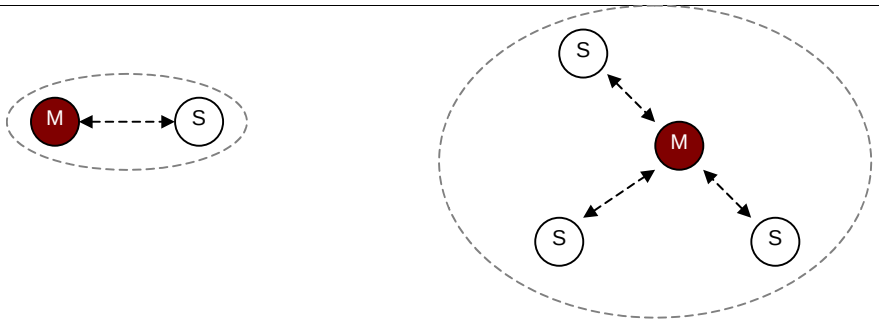
For clients there are two methods that can be used to create connections to a remote device:

1. Establish the connection in AT mode using the "Connect_To_Serial_Service_Data_Mode" command. Then move to data mode and utilize the connection as a transparent data mode connection. It is possible to utilize the Wireless Multidrop™ feature and connect to several devices. Note that Wireless Multidrop™ must be enabled to be able to connect to more than one device.
2. Configure the Serial Port Adapter in AT mode then move to data mode.
    a. Select the number of devices to connect to using the "Write_No_Of_Remote_Peers" command. Select 1 for point-to-point operation and more than 1 for Wireless Multidrop™ operation. Note that Wireless Multidrop™ must be enabled to be able to use a value higher than 1. The maximum number of remote peers can be determined by calling the "Read_Max_No_Of_Remote_Peers" command.
    b. Select what device(s) to communicate with using the "Write_Default_Remote_Peer" command.
    c. Then use the "Write_Default_Client_Profile" command to select what profile to use when connecting to the selected default remote peer.
    d. Finally move to data mode and send data. The Serial Port Adapter will connect to the selected remote peer(s) using the selected profile according to the connect scheme setting (connect on data, always connected or connect on external signal).

Specify zero number of remote peers using the "Write_No_Of_Remote_Peers" command if you do not want to act as a client.

4.6 Master/Slave Handling

When a device communicates with several other devices it is called the master. The other devices are called slaves.



A master can:

- Setup a connection to another device.
- Perform searches.
- Accept connections from other devices.

A slave cannot:

- Connect to another device.
- Perform searches.
- Accept connections from other devices.

There are a few settings and parameters that affect how the roles master and slave are assigned to the devices communicating.

First, it is possible for a device to request to become the master when another device connects to it. This setting is called the master/slave role policy. Use the "Write_MasterSlaveRole_Policy" command to set the policy to either:

- 0, the device will request to become the master every time another device tries to connect.
- 1, the device will become the slave every time another device tries to connect.

Second, when connecting to another device using the "Connect_To_Serial_Service" command the parameter <must_be_master> indicates whether or not the connecting device allows the server to become the master of the connection.

NOTE: If <must_be_master> is 1 and the server has set master/slave role policy to 0 (become master) the connection will *not* be established.

If you do not specifically need to become the master the <must_be_master> parameter should be set to 0 to allow the server to select which role to take.

4.7 Bluetooth Security

Bluetooth has support for security. The Bluetooth security is based on authentication during connection establishment and encryption of sent and received data.

Security Modes

A Bluetooth device can be in two different security modes, security enabled (authentication and encryption turned on) and security disabled (authentication and encryption turned off). If at least one of the two devices wanting to communicate has security enabled, security will be used. Use the "Write_Security_Mode" command to set the security mode for the device.

Only the highest security level, security level 3 (link level security) and not security level 2 (service level), is supported.

Bonding and Pairing

To be able to communicate if security has been enabled, bonding has to be performed. The bonding procedure creates a link key, valid between two devices, which is used during the authentication procedure. Once bonded the two devices can establish connections with each other using security enabled.

During bonding both devices must be in pairable mode (able to accept bonding). Use the "Write_Pairing_Mode" command to set the device(s) in pairable mode.

During bonding a pin code is used. Use the "Write_Fixed_PIN" command to set the PIN code to use.

To perform bonding use one of the following methods:

- Create a connection. If authentication or encryption is turned on, on either device, bonding will be performed automatically.
- On one device use the "Bond" command. Not supported in all versions of the serial port adapter.

It is possible for the Serial Port Adapter to store link keys for several devices at the same time. Use the "Read_Bonded_Devices" command to get a list of the currently bonded devices.

It is also possible to remove a device from the list of bonded devices. To do this, use the "Un_Bond" command.

Chapter 5

Power Save Modes

The Serial Port Adapter is optimized to consume as little power as possible.

However, the deepest power save mode, called stop mode, is not turned on by default. Instead an AT command (AT*AMPM) is available to allow the host system to turn on the stop mode feature.

When the Serial Port Adapter is in stop mode:

- It can accept incoming connections over Bluetooth.
- The host system cannot send data to the Serial Port Adapter.
- The Serial Port Adapter will send data received over air to the host

The Serial Port Adapter will only enter stop mode if:

- The stop mode feature has been turned on using the AT*AMPM AT command
- The DSR pin on the Serial Port Adapter is not active.
- If the "Always connected" feature has not been turned on.

The Serial Port Adapter will exit stop mode if:

- The host system moves the DSR pin from non-active to active.

Note: The Serial Port Adapter needs 10 ms to leave stop mode. As a consequence the host system must not send data to the Serial Port Adapter until 10 ms after the host system has activated the DSR pin.

5.1 Version 3 vs. Version 2

- In version 2 of the Serial Port Adapter the device will exit stop when there is an active Bluetooth connection.
- In version 3 of the Serial Port adapter the device will stay in stop when there is an active Bluetooth connection.

5.2 How to Use the Stop Mode Feature

When the Serial Port Adapter is in stop mode, the UART is disabled and all data sent to it is lost. This means that the host system has to wake up the Serial Port Adapter before sending any data over the serial interface. Data received over air by the Serial Port Adapter will be written to the host even when it is in stop mode.

Chapter 6

Restoring Default Configuration

6.1 Serial Settings

In some situations it is necessary to restore some settings to their default values. The following settings can be restored using the procedure described below:

- **Serial settings**: 57600 baud, 8 data bits, no parity, 1 stop bit, hardware flow control.
- **Serial interface type**: RS232.
- **AT escape sequence**: '///'.
- **Escape sequence timing**: 1000 ms of no data transmission required before and after the escape sequence for the escape sequence to be valid.

Procedure:

1. Remove power from the Serial Port Adapter.
2. Press and hold the default settings button on the Serial Port Adapter.
3. Apply power to the Serial Port Adapter.

When powered up the default settings will be stored in the Serial Port Adapter.

6.2 Factory Settings

The factory setting is the configuration of the serial port adapter when it is produced. For some modules it may be possible to set a new factory setting configuration by using the "Store_Factory_Settings" command.

To restore the factory settings configuration use the "AT&F" command or perform the below described procedure. The latter only applies to the following version 3 Serial Port Adapters:

- CB-OEMSPA310
- CB-OEMSPA311
- CB-OEMSPA331
- CB-OEMSPA312
- CB-OEMSPA332

Restore procedure using buttons:

1. Remove power from the OEM Serial Port Adapter.
2. Press and hold both the Default settings and Function buttons on the OEM Serial Port Adapter.
3. Apply power to the OEM Serial Port Adapter.

Note that this command should not be used at every startup to restore the factory settings. Instead it is better not to write to the startup database at all.

Chapter 7

AT Commands Over Bluetooth

It is possible to configure and control a remote Serial Port Adapter via Bluetooth using AT commands.

Criteria for using AT commands over Bluetooth:

- A Bluetooth connection to the remote device (the device to configure) must exist. The Bluetooth connection can e.g. be established using another Serial Port Adapter, a device with a PC-card/compact flash or a device with embedded Bluetooth support.
- The remote Serial Port Adapter must have turned on the support for configuration over Bluetooth, for more information see the "Write_Allow_Configuration_Over_Bluetooth" command.
- Once the connection has been established, the escape sequence must be sent over the Bluetooth connection to the remote Serial Port Adapter to move it into AT mode.
    - The same escape sequence rules apply to AT over Bluetooth as for AT over cable, for more information see the section about Data Mode and AT Mode.
    - Note that the same escape sequence is used for cable and Bluetooth. Therefore, if you are using two Serial Port Adapters one of the Serial Port Adapters must have its escape sequence changed using the ATS2 command. This is to keep the first Serial Port Adapter to enter AT mode instead of the remote Serial Port Adapter.

Chapter 8

Optimization

On some versions of the serial port adapter there are some limited optimization support regarding throughput, response time and power consumption.

Typically consider the following settings for the "Write_Link_Policy" command:

- *High throughput*: Link policy 1 and 2 depending on which side is transmitting and receiving. Note that this will only be useful to improve performance in one direction.
- *Short Response times*: Link policy 3. Note that this will increase power consumption. Link policy 4 may also be an option.
- *Low Power Consumption*: Link policy 6-8. A longer sniff period will decrease power consumption more but provide longer response times. To get even better results combine link policy 6-8 with stop mode.

Note that there is no guarantee that the configuration will improve performance for a specific case. There may, for example, be some negotiation with the remote device that forces some other parameters than the selected ones.

For best interoperability it is recommended to use the default link policy. For other configurations make sure to test the specific application.

On some versions of the serial port adapter it is possible to shorten the time for connection establishment and discovery of the serial port adapter when it is acting as a server. Consider the possibilities in the Write Feature Mask command when the time for connection setup and discovery needs to be shortened.

Chapter 9

Version 3 vs. Version 2

If you are migrating from using the version 2 (second generation) of Serial Port Adapters from connectBlue to version 3 there are some AT commands/events that have been changed, added or removed. Each AT command description will include a table to clarify what the differences are (if any) between different models.

Specifically some version 3 models (cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332) do not support multipoint connections. Hence wireless multidrop is not supported.

Chapter 10

Syntax

10.1 Command Line Format

Each command line sent from the DTE to the DCE is made up of a prefix, body and terminator. As prefix for the Serial Port Adapter AT commands, only "AT" (ASCII 065, 084) and "at" (ASCII 097, 116) can be used. There is no distinction between upper and lower case characters. The body is a string of characters in the range ASCII 032-255. Control characters other than <CR> (carriage return; ASCII 013) and <BS> (back space; ASCII 008) in a command line are ignored. The terminator is <CR>.

Commands denoted with a "*" character are extended AT commands, i.e. Serial Port Adapter specific AT commands.

S-registers are not used and not supported, except for the S2 register.

Multiple commands in the same command line are not supported. Each command has to be terminated by a <CR> before a new command can be sent. A command must not be larger than 300 characters.

A command can either be:

- Read commands without parameters:
  AT<command>?<CR>
- Write commands without parameters:
  AT<command><CR>
- Read and write commands with parameters:
  AT<command>=<parameter1>, parameter2>, …<parameterN><CR>

Responses are sent back to the host and can be any of the following:

- Successful final message:
  <CR><LF>OK<CR><LF>
- Successful intermediate/final message with parameters follows an OK message in some commands. In these cases the OK message works as a confirm message only.
  <CR><LF><result_response>:<parameter1>, parameter2>, …<parameterN>
- Error message:
  <CR><LF>ERROR<CR><LF>

10.2 Data Types

The definition of each command specifies the data types used for values associated with the command.

There are four data types:

- String
- Integer
- Enumerator
- Bluetooth Device Address

String

A string shall consist of a sequence of displayable characters from the ISO 8859-1 (8-bit ASCII) character set, except for characters “\” and “"“ and characters below 32 (space). A string constant shall be delimited by two double-qoute (“"“) characters, e.g. “Donald Duck”. If the double-quote character (“"“) is to be used within a string, e.g. "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, "".

Integer

An integer value consists of a sequence of characters all in the range {0..9}.

Numeric constants are expressed in decimal format only.

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.

Bd_Addr

This type is used to represent the Bluetooth Device Address. The type is composed of six fields, each representing a hexadecimal value using two characters. For example, the Bluetooth Device Address 0x112233AABBCC is represented as 112233AABBCC or 112233aabbcc. Note that the Bluetooth Device Address is **not** delimited with by two double-qoute (“"“) characters.

Chapter 11

AT Commands Reference

11.1 Standard AT Commands

Command "AT"

AT Command	Description
AT<CR>	Attention command determining the presence of a DCE, i.e. the Serial Port Adapter.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Command "AT*"

AT Command	Description
AT*<CR>	Lists the supported AT commands.

Responses	Description
<CR><LF><command>	This response is sent to the host for every supported command.
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Command "ATZ"

AT Command	Description
ATZ<CR>	Does nothing.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA310	Not supported.

cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	

Command "AT&F"

AT Command	Description
AT&F<CR>	Restore all settings to the factory settings. When the command Store_Factory_Settings has been used to update the factory settings database then this command will restore all the settings to the stored factory settings. Note that this command should not be used at every startup to restore the factory settings. Instead it is better not to write to the startup database at all.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	The Store_Factory_Settings command is not available. Instead, the command will restore the settings to default factory settings. After the AT&F command has been sent, the module must be reset for the restored settings to take affect.

Command "ATS2"

AT Command	Description
ATS2=<esc_char><CR>	Changes the escape character to esc_char.

Command Parameters	Type	Description
esc_char	integer	esc_char is the ASCII value of the new escape character. E.g. 47 equals '/'. The default value is '/'. Note that the escape sequence will be "///". Hence, the character is used three times.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Command "ATE"

AT Command	Description
ATE<echo><CR>	Set whether or not the Serial Port Adapter shall echo incoming characters.

Command Parameters	Type	Description
echo	integer	0: Incoming characters will not be echoed. 1: Incoming characters will be echoed.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

11.2 GAP Commands

Read_Discoverability_Mode (AT*AGDM?)

AT Command	Description
AT*AGDM?<CR>	This command reads the current GAP discoverability mode.

Responses	Description
<CR><LF>*AGDM:<discoverability_mode><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Response Parameters	Type	Value
discoverability_mode	enumerator	1: GAP non-discoverable mode 2: GAP limited discoverable mode 3: GAP general discoverable mode (default value)

Write_Discoverability_Mode (AT*AGDM=)

AT Command	Description
AT*AGDM=<discoverability_mode>, <store_in_startup_database><CR>	This command writes the current GAP discoverability mode.

Command Parameters	Type	Value

discoverability_mode	enumerator	1: GAP non-discoverable mode 2: GAP limited discoverable mode 3: GAP general discoverable mode (default value)
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Limited discoverability mode not supported.

Read_Connectability_Mode (AT*AGCM?)

AT Command	Description
AT*AGCM?<CR>	This command reads the current GAP connectability mode.

Responses	Description
<CR><LF>*AGCM:<connectability_mode><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Result Parameters	Type	Value
connectablilty_mode	enumerator	1: GAP non-connectable mode 2: GAP connectable mode (default value)

Write_Connectability_Mode (AT*AGCM=)

AT Command	Description
AT*AGCM=<connectability_mode>, <store_in_startup_database><CR>	Writes the GAP connectability mode.

Command Parameters	Type	Value

connectablilty_mode	enumerator	1: GAP non-connectable mode 2: GAP connectable mode (default value)
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Read_Pairing_Mode (AT*AGPM?)

AT Command	Description
AT*AGPM?<CR>	Reads the pairing mode.

Responses	Description
<CR><LF>*AGPM:<pairing_mode><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Result Parameters	Type	Value
pairing_mode	enumerator	1: GAP non-pairing mode 2: GAP pairing mode (default value)

Write_Pairing_Mode (AT*AGPM=)

AT Command	Description
AT*AGPM=<pairing_mode>,<store_in_startup_database><CR>	Writes the GAP pairing mode.

Command Parameters	Type	Value
pairing_mode	enumerator	1: GAP non-pairable mode. 2: GAP pairable mode (default value).
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.

<CR><LF>ERROR<CR><LF>	Error response.

Read_Security_Mode (AT*AGSM?)

AT Command	Description
AT*AGSM?<CR>	Reads the GAP security mode.

Responses	Description
<CR><LF>*AGSM:<security_mode><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Result Parameters	Type	Value
security_mode	enumerator	1: Link level authentication and encryption disabled (GAP security mode 1 with encryption disabled). (default value) 2: Link level authentication and encryption enabled (GAP security mode 3 with encryption enabled).

Write_Security_Mode (AT*AGSM=)

AT Command	Description
AT*AGSM=<security_mode>,<store_in_startup_database><CR>	Writes the GAP security mode.

Command Parameters	Type	Value
security_mode	enumerator	1: Link level authentication and encryption disabled (GAP security mode 1 with encryption disabled). (default value) 2: Link level authentication and encryption enabled (GAP security mode 3 with encryption enabled).
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Name_Discovery (AT*AGND=)

AT Command	Description
AT*AGND=<bd_addr><CR>	Retrieves the device name of a remote device given its Bluetooth device address.

Command Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the device from which to retrieve the name.

Responses	Description
<CR><LF>*AGND:<device_name><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
device_name	string	Null terminated string of maximum 240 characters (8-bit ASCII).

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Device names longer than 31 bytes will be truncated.

Device_Discovery (AT*AGDD=)

AT Command	Description
AT*AGDD=<inquiry_Type>,<inquiry_length><CR>	Performs device discovery.

Command Parameters	Type	Description
inquiry_type	enumerator	1: Limited inquiry 2: General inquiry
inquiry_length	integer	Maximum amount of time specified before the inquiry is halted. Range: 8-48 Time = inquiry_length*1.28 seconds Range in seconds: 10.24-61.44

Responses	Description
<CR><LF>*AGDD: <no_of_devices><CR><LF>OK<CR><LF>	Successful response

*AGDDE:<bd_addr>, <cod>, <device_name_valid>, <device_name><CR><LF>	This response is sent for every found device.
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
no_of_devices	integer	Value in range {0..255}. Number of devices discovered during the inquiry procedure.
bd_addr	Bd_Addr	Bluetooth device address of a discovered device.
cod	integer	See Read_Local_COD command.
device_name_valid	enumerator	1: device_Name parameter valid. 0: Device was discovered, but its name could not be retrieved. device_name is parameter invalid and should be ignored.
device_name	string	Name of discovered device. ASCII represented string of maximum 240 bytes.

Inquiry (AT*AGI=)

AT Command	Description
AT*AGI=<inquiry_Type>,<inquiry_length>, <max_no_of_devices_to_find><CR>	Performs an inquiry procedure to find any discoverable devices in the vicinity.

Command Parameters	Type	Description
inquiry_type	enumerator	1: Limited inquiry 2: General inquiry
inquiry_length	integer	Maximum amount of time specified before the inquiry is halted. Range: 1-48 Time = inquiry_length*1.28 seconds Range in seconds: 1.28-61.44
max_no_of_devices_to_find	integer	0: No limitation on the number of devices to find. 1-255: Maximum number of devices to find.

Responses	Description
<CR><LF>*AGI:<bd_addr>,<cod>	This response is sent for every found device.
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
Bd_addr	Bd_Addr	Bluetooth device address of a found device.
cod	integer	See Read_Local_COD command.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	If more than 20 devices are found, then devices may be listed several times.

Bond (AT*AGB=)

AT Command	Description
AT*AGB=<bd_addr><CR>	Performs a GAP bond procedure with another Bluetooth device. During the bonding procedure the fixed PIN code is used, see the Write_Fixed_PIN and Read_Fixed_PIN commands. Note that to be able to perform bonding the remote device must be in pairable mode.

Command Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the device to bond with.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported. Bonding is automatic when connecting if either of the sides enforces security. The link keys are stored in a FIFO of size five.

Un_Bond (AT*AGUB=)

AT Command	Description
AT*AGUB=<bd_addr><CR>	This command un-bonds a previously bonded device.

Command Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the device subject to un-bond. If address FFFFFFFFFFFF is selected all bonded devices will be remove.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA333	Bluetooth address of FFFFFFFFFFFF to remove all bonded devices is not supported.

Read_Bonded_Devices (AT*AGBD?)

AT Command	Description
AT*AGBD?<CR>	Read the bonded devices.

Responses	Description
<CR><LF>*AGBD:<no_of_devices><CR><LF>OK<CR><LF>	Successful response
*AGBDE:<bd_addr>,<device_name_valid>,<device_name> <CR><LF>	This response is sent for every found device.
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
no_of_bonded_devices	integer	Number of bonded devices.
bd_addr	Bd_Addr	Bluetooth device address of the device from which to retrieve the name.
device_name_valid	enumerator	0: device_Name parameter valid. 1: Device is bonded but its name is not available. Device_Name is parameter invalid.
device_name	string	Name of discovered device. Null terminated ASCII represented string.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	The command will always return an empty string as device name with the device_name_valid parameter always set to 1.

Read_Fixed_PIN (AT*AGFP?)

AT Command	Description
AT*AGFP?<CR>	Read the fixed PIN code used by the Serial Port Adapter during bond and pairing.

Responses	Description
<CR><LF>*AGFP:<pin_code><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
pin_code	string	The PIN code is a string of one to sixteen alphanumerical characters. It is recommended to use a pin code of at least eight characters of mixed type, e.g. “12w35tg7”. The default value is “0”.

Write_Fixed_PIN (AT*AGFP=)

AT Command	Description
AT*AGFP=<pin_code>, <store_in_startup_database><CR>	Writes the fixed PIN code used by the Serial Port Adapter during bond.

Command Parameters	Type	Value
pin_code	string	The PIN code is a string of one to sixteen alphanumerical characters. It is recommended to use a pin code of at least eight characters of mixed type, e.g. “12w35tg7”. The default value is “0”.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Read_Local_Name (AT*AGLN?)

AT Command	Description
AT*AGLN?<CR>	Reads the local Bluetooth device name.

Responses	Description
<CR><LF>*AGLN:<device_name><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
device_name	string	Max 240 characters. The default name is “Bluetooth Device”.

Write_Local_Name (AT*AGLN=)

AT Command	Description
AT*AGLN=<device_name>, <store_in_startup_database><CR>	Writes the local Bluetooth device name.

Command Parameters	Type	Value
device_name	string	Max 240 characters. The default name is “Bluetooth Device”.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	The name is limited to a maximum of 31 characters.

Read_Local_COD (AT*AGLC?)

AT Command	Description
AT*AGLC?<CR>	Reads the Local Class Of Device code.

Responses	Description
<CR><LF>*AGLC:<cod><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Response Parameters	Type	Value

cod	integer	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) 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 For the minor device class field please refer to [1]. The default value is 0.

Write_Local_COD (AT*AGLC=)

AT Command	Description
AT*AGLC=<cod>, <store_in_startup_database><CR>	Writes the Local Class Of Device code.

Command Parameters	Type	Value
cod	integer	See Read_Local_COD command. The default value is 0.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Get_MasterSlaveRole (AT*AGGMSR=)

AT Command	Description
AT*AGGMSR=<bd_addr><CR>	Read the local master-slave role. Returns the role of the Serial Port Adapter, master or slave, for the connection between the Serial Port Adapter and the remote device identified by the 'bd_addr' parameter.

Command Parameters	Type	Value
bd_addr	Bd_Addr	Identifies a device that the Serial Port Adapter is currently communicating with.

Responses	Description
<CR><LF>*AGGMSR:<role><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Response Parameters	Type	Value
role	enumerator	0: Slave 1: Master

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported. The module always allows a master slave switch if requested by the remote side.

Change_MasterSlaveRole (AT*AGCMSR=)

AT Command	Description
AT*AGCMSR=<bd_addr>,<role><CR>	Changes the master-slave role. Changes the role of the Serial Port Adapter, master or slave, for the connection between the Serial Port Adapter and the remote device identified by the 'bd_addr' parameter. Note that the remote device does not have to accept the master/slave switch.

Command Parameters	Type	Value
bd_addr	Bd_Addr	Identifies a device that the Serial Port Adapter is currently communicating with. The role will be changed on the connection to this device.

role	enumerator	0: Slave 1: Master

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported. The module always allows a master slave switch if requested by the remote side.

Read_MasterSlaveRole_Policy (AT*AGMSP?)

AT Command	Description
AT*AGMSP?<CR>	Reads the role policy of the device.

Responses	Description
<CR><LF>*AGMSP:<role_policy><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

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

Write_MasterSlaveRole_Policy (AT*AGMSP=)

AT Command	Description
AT*AGMSP=<role_policy>,<store_in_startup_database><CR>	Writes the role policy of the device.

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

store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Get_RSSI (AT*AGRSS=)

AT Command	Description
AT*AGRSS=<bd_addr><CR>	This request returns the current received signal strength, RSSI, for the connection between the ECI Controller and the remote device identified by the 'bd_addr' parameter. Note that this command can only be used on an existing connection that has been established using the Connect_To_Serial_Service_Data_Mode command and only while still in AT mode.

Command Parameters	Type	Value
bd_addr	Bd_Addr	Identifies a device that the Serial Port Adapter is currently communicating with.

Responses	Description
<CR><LF>*AGRSS:<rssi><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Response Parameters	Type	Value
rssi	integer	< 128: The received signal strength is 128-RSSI dB below the optimal signal range. 128: The received signal strength is within the optimal signal range. >128: The received signal strength is RSSI-128 dB above the optimal signal range.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported.

11.3 Service Search Commands

Service_Search (AT*ARSS=)

AT Command	Description
AT*ARSS=<bd_addr>,<role_and_profile>, <max_nbr_of_results><CR>	Search for services on a remote device.

Command Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the device on which to search for services.
role_and_profile	enumerator	0: DevB role, Serial Port Profile 1: Gateway role, Dial-Up Networking Profile 2: LAN Access Point role, LAN Access Profile
max_nbr_of_results	integer	The maximum number of services to be collected.

Responses	Description
<CR><LF>*ARSS:<matching_service_records><CR><LF>OK<LR><CR>	Successful response
*ARSRSP:<bd_addr>, <rfcomm_server_chan>, < service_name_valid >, <service_name><CR><LF>	This response is the result of a device B serial port profile service search.
*ARSRDUN:<bd_addr>, <rfcomm_server_chan>, <service_name_valid >, <service_name>, <audio_feedback_support_valid>, <audio_feedback_support><CR><LF>	This response is the result of a GW dial-up networking profile service search.
*ARSRLAN:<bd_addr>, <rfcomm_server_chan>, < service_name_valid>, <service_name>, <service_description_valid>, <service_description>, <service_availability_valid> <service_availability>, <ip_subnet_valid>, <ip_subnet><CR><LF>	This response is the result of a LAP LAN access profile service search.
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the device on which to search for services.
matching_service_records	integer	The number of matching service records. Range 0 to 255.
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_valid	enumerator	0: The service_name parameter could not be retrieved from the remote device and the value is not valid. 1: The service_name parameter could be retrieved from the remote device and the value is valid.
service_name	string	Service name.

audio_feedback_support_valid	enumerator	0: The audio_feedback_support parameter could not be retrieved from the remote device and the value is not valid. 1: The audio_feedback_support parameter could be retrieved from the remote device and the value is valid.
audio_feedback_support	enumerator	0: No, device does not support audio feedback. 1: Yes, device supports audio feedback.
service_description_valid	enumerator	0: The service_description parameter could not be retrieved from the remote device and the value is not valid. 1: The service_description parameter could be retrieved from the remote device and the value is valid.
service_description	string	Manufacturer description of the services a product can provide.
service_ availability_valid	enumerator	0: The service_availability parameter could not be retrieved from the remote device and the value is not valid. 1: The service_availability parameter could be retrieved from the remote device and the value is valid.
service_availability	integer	The service availability parameter available in the LAN Access Profile service record.
Ip_subnet_valid	enumerator	0: The Ip_subnet parameter could not be retrieved from the remote device and the value is not valid. 1: The Ip_subnet parameter could be retrieved from the remote device and the value is valid.
Ip_subnet	string	IP subnet mask to reach the device on the LAN.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Only supports serial port and dial-up networking profiles and not LAN access profile.

11.4 Data Mode Commands

Data_Mode (AT*ADDM)

AT Command	Description
AT*ADDM<CR>	Request the Serial Port Adapter to move to data mode. After a successful response the Serial Port Adapter will leave AT-mode and enter data mode.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Connect_To_Serial_Service_Data_Mode (AT*ADCP=)

AT Command	Description
AT*ADCP=<bd_addr>, <role_and_profile>, <rfcomm_server_channel>, <must_be_master><CR>	Connect to a serial service enabled on a remote device. This request is used to connect to profiles based on the Serial Port Profile. The connection shall be used in data mode. When the host connects to a service on a remote device it implicitly registers to receive the Serial_Connection_Data_Mode_Closed event.

Command Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the device to connect to.
role_and_profile	enumerator	0: DevB role, Serial Port Profile 1: Gateway role, Dial-Up Networking Profile 2: LAN Access Point role, LAN Access Profile
rfcomm_server_chan	enumerator	RFCOMM server channel number on which this service can be found. 0: Service search will be performed automatically and the first available <role_and_profile> will be connected. 1-30: RFCOMM server channel number. This server channel number can be retrieved using a service search operation. 31-255: Invalid values.
must_be_master	enumerator	0: The remote device may choose to become master or slave. 1: This device must be master of the new connection.

Responses	Description
<CR><LF>*ADCP:<connection_handle><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Response Parameters	Type	Value
connection_handle	integer	The connection handle identifies the connection. The connection handle is used when closing the connection.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Only supports serial port and dial-up networking profiles and not LAN access profile.

Close_Serial_Connection_Data_Mode (AT*ADCC=)

AT Command	Description
AT*ADCC=<connection_handle><CR>	Close an existing data mode connection.

Command Parameters	Type	Value
connection_handle	integer	The connection handle identifies the connection.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Read_Default_Client_Profile (AT*ADDCP?)

AT Command	Description
AT*ADDCP?<CR>	This command reads the default client profile. The default client profile is the profile that the Serial Port Adapter uses when it establishes a connection, in data mode, to the default remote peer(s).

Responses	Description
<CR><LF>*ADDCP:<role_and_profile><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Response Parameters	Type	Value
role_and_profile	Enumerator	0: Serial Port Profile (DevA role) 1: Dial-Up Networking Profile (DT role) 2: LAN Access Profile (LAN Access Point role) 255: No profile (default value)

Write_Default_Client_Profile (AT*ADDCP=)

AT Command	Description
AT*ADDCP=<role_and_profile>, <store_in_startup_database><CR>	This command reads the default client profile. The default client profile is the profile that the Serial Port Adapter uses when it establishes a connection, in data mode, to the default remote peer(s).

Command Parameters	Type	Value

role_and_profile	Enumerator	0: Serial Port Profile (DevA role) 1: Dial-Up Networking Profile (DT role) 2: LAN Access Profile (LAN Access Point role) 255: No profile (default value)
store_in_startup_database	Enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	The LAN access profile is not supported.

Read_Default_Server_Profile (AT*ADDSP?)

AT Command	Description
AT*ADDSP?<CR>	This command reads the default server profile. The default server profile is the profile that other devices can connect to when the Serial Port Adapter is in data mode. The default server profile is activated when the Serial Port Adapter is moved to data mode if no connection exists. The default server profile is deactivated when the Serial Port Adapter is moved from data mode to AT mode.

Responses	Description
<CR><LF>*ADDSP:<role_and_profile><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Response Parameters	Type	Value
role_and_profile	Enumerator	0: Serial Port Profile (DevB role) (default value) 1: Dial-Up Networking Profile (Gateway role) 2: LAN Access Profile (LAN Access Point role) 3: Serial Port Profile (DevB role) and Dial-Up Networking (Gateway role) 255: No profile

Write_Default_Server_Profile (AT*ADDSP=)

AT Command	Description
AT*ADDSP=<role_and_profile>.	This command writes the default server profile. The

<store_in_startup_database><CR>	default server profile is the profile that other devices can connect to when the Serial Port Adapter is in data mode. The default server profile is activated when the Serial Port Adapter is moved to data mode if no connection exists. The default server profile is deactivated when the Serial Port Adapter is moved from data mode to packet mode.

Command Parameters	Type	Value
role_and_profile	enumerator	0: Serial Port Profile (DevB role) (default value) 1: Dial-Up Networking Profile (Gateway role) 2: LAN Access Profile (LAN Access Point role) 3: Serial Port Profile (DevB role) and Dial-Up Networking (Gateway role) 255: No profile
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	The LAN access profile is not supported. If the current default server profile is “255: No profile”, the “store in startup database” parameter must be 1 and the module must be restarted for the command to take affect.
cB-OEMSPA13 cB-OEMSPA33 cB-OEMSPA333	“3: Serial Port Profile (DevB) and Dial-Up Networking (Gateway)” not supported.

Read_Max_No_Of_Remote_Peers (AT*ADMRP?)

AT Command	Description
AT*ADMRP?<CR>	For some Serial Port Adapters it is possible to have more than one remote peer defined. This command reads the maximum number of allowed remote peers.

Responses	Description
<CR><LF>*ADMRP:<max_no_of_remote_peers> <CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Response Pa-	Type	Value

rameters		
max_no_of_remote_peers	integer	The maximum number of allowed remote peers.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported. The parameter always has the value of one.

Read_No_Of_Remote_Peers (AT*ADNRP?)

AT Command	Description
AT*ADNRP?<CR>	For some Serial Port Adapters it is possible to have more than one remote peer defined. This command reads the number of remote peers defined.

Responses	Description
<CR><LF>*ADNRP:<no_of_remote_peers> <CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Response Parameters	Type	Value
no_of_remote_peers	integer	The number of remote peers currently defined. The default value is 0.

Write_No_Of_Remote_Peers (AT*ADNRP=)

AT Command	Description
AT*ADNRP=<no_of_remote_peers>, <store_in_startup_database><CR>	This command writes the number of remote peers defined. The number of remote peers may not be greater than the number returned by the Read_Max_No_Of_Remote_Peers command. After writing the number of remote peers the host must use the Write_Default_Remote_Peer command to write all the remote peers to the Serial Port Adapter. For more information see Read_No_Of_Remote_Peers.

Command Parameters	Type	Value
no_of_remote_peers	integer	The number of remote peers. The default value is 0.

store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF >OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Read_Default_Remote_Peer (AT*ADRDRP=)

AT Command	Description
AT*ADRDRP=< peer_id ><CR>	This command reads the Bluetooth device address and device name of the selected default remote peer (peer id).

Command Parameters	Type	Value
peer_id	integer	The peer ID can be between 0 and the value written by the Write_No_Of_Peers command –1 or read by the Read_No_Of_Peers command –1.

Responses	Description
<CR><LF>*ADRDRP:<bd_addr>,<connect_scheme>, <update_remote_peer_on_incoming>, <device_name><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Response Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the default remote peer.

connect_scheme	integer	This parameter is a bit field. Bit 0 is the least significant bit. Each bit is defined as follows: Bit 0: Connect on data Try to connect to default remote peer on data traffic. Bit 1: Always connected Always try to be connected to the default remote peer when in data mode. Bit 2: External connect Try to connect to default remote peer on external signal. The external signal is implementation specific, e.g. some Serial Port Adapters might have a button. Bit 3: Connect to name On reset, try to connect to a device with the name given by the <device_name> parameter. The <device_name> may specify a part of, or the full name of the remote device. The SPA will at reset perform an inquiry followed by name requests on devices found during inquiry until a matching device is found. If no matching device is found the SPA will stop this procedure and operate as normal. If a matching device is found, the SPA will try to connect to this device. If no matching device is found, this is seen as an LED error indication. Bit 4: Reserved Bit 5:Connect to name permanent The functionality is the same as for " Connect to name" except that a matching device will be stored in the startup database and used as remote peer even after a reset. The <bd_addr> parameter must be set to 000000000000 for the SPA to start the "connect to name" procedure. Any other address will be interpreted as the remote peer is already found and no connect to name procedure will be initiated. Bit 6:Easy connect The SPA will search for and try to any device at close range. At reset the SPA will perform an inquiry at low output power (-36dBm). If one single device is found during the inquiry then the SPA will try to connect to it and store it as a remote peer in the startup database. Note that if several devices are found, then the SPA will not initiate a connection. The <bd_addr> parameter must be set to 000000000000 for the SPA to start the easy connect procedure. Any other address will be interpreted as the remote peer is already found and "no easy connect" procedure will be initiated. Bit 7:Connect to service name The SPA will search for and try to connect to a Serial Port Profile service with the name specified by the <device_name> parameter. Bits 3,5,6 and 7 cannot be combined. Bit 8-15: Reserved for future use. *Advanced:* Bit 16-23: Always connected period This field can be used to define the period for connection attempts for always connected (Bit 1 set). If not set or set to 0 then the default period 10s is used. Time in seconds. Bit 24-31: Page timeout The page timeout. This field defines for how long the module tries to connect to the remote device. The time is defined in units of 80ms. For example, to set the page time out to 1,040s choose the value 0x0D. If not set or set to 0 then the default page timeout 5,12s is used.

update_remote_peer_on_incoming	enumerator	1: Every time a remote device connects to the selected DefaultServerProfile, update the remote peer device address to the device address of the connecting device. The new remote peer device address will be stored in the startup database. Only one of all the remote peers can use this feature. 0: Do not update the remote peer device address on incoming connections.
device_name	string	Maximum 240 characters.

Write_Default_Remote_Peer (AT*ADWDRP=)

AT Command	Description
AT*ADWDRP=<peer_id>,<bd_addr>, <connect_scheme>, <update_remote_peer_on_incoming>, <device_name>, <store_in_startup_database><CR>	This command writes the Bluetooth device address, connect scheme and device name of the currently selected default remote peer.

Command Parameters	Type	Value
peer_id	integer	The peer ID can be between 0 and the value written by the Write_No_Of_Peers command –1 or read by the Read_No_Of_Peers command –1.
bd_addr	Bd_Addr	Bluetooth device address of the default remote peer.
connect_scheme	integer	See Read_Default_Remote_Peer.
update_remote_peer_on_incoming	enumerator	See Read_Default_Remote_Peer.
device_name	string	See Read_Default_Remote_Peer.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	The parameter <device_name> is only used when bit 3 in the connect scheme is set. The maximum length is 32 characters.
cB-OEMSPA13 cB-OEMSPA33 cB-OEMSPA333	Connect to name and easy connect functionality is not supported. This means that bits 3 - 7 in the connect scheme parameter is ignored. Setting the always connected period and the page timeout is not supported. This means that bits 16 to 31 are ignored.

Read_Inactivity_Tick (AT*ADIT?)

AT Command	Description
AT*ADIT?<CR>	This command reads the current inactivity tick setting. If there is no data activity between two consecutive ticks the Serial Port Adapter will automatically disconnect the current data mode connection(s).

Responses	Description
<CR><LF>*ADIT:<inactivity_tick><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
inactivety_tick	integer	0: no inactivity tick (default value). 1-255: the period (in minutes) of the inactivity timer.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported. Instead use the watchdog functionality (see AT*AMWS).

Write_Inactivity_Tick (AT*ADIT=)

AT Command	Description
AT*ADIT=<inactivety_tick>, <store_in_startup_database> <CR>	This command writes a new inactivity tick setting. If there is no data activity between two consecutive ticks the Serial Port Adapter will automatically disconnect the current connection(s).

Command Parameters	Type	Value
inactivity_tick	integer	0: no inactivity tick (default value). 1-255: the period (in minutes) of the inactivity timer.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported.

Read_Wireless_Multidrop_Configuration (AT*ADWM?)

AT Command	Description
AT*ADWM?<CR>	This request returns whether or not the Wireless Multidrop™ feature has been enabled. When the Wireless Multidrop™ has been enabled; all data sent to the Serial Port Adapter in data mode will be forwarded to all connected devices. Data received from a remote device will be forwarded to the host. If the Auto_Forward parameter is set to TRUE is will also forward all received data to all the other connected devices. Connections to remote devices can be established using three methods: • Let the Serial Port Adapter connect to the desired devices when it is in data mode. The host uses the request Write_No_Of_Remote_Peers and Write_Default_Remote_Peer to tell the Serial Port Adapter how many devices to connect to, which devices to connect to and when to connect to the defined devices. • A server has been enabled using the request Write_Default_Server_Profile and one or several devices connect to this server. • One or several connections are established in packet mode using the request Connect_To_Serial_Service_Data_Mode. After all desired connection have been setup by the host it moves to data mode. When the Wireless Multidrop™ has been disabled; only one connection at a time can be established. A maximum of one remote peer can be defined.

Responses	Description
<CR><LF>*ADWM:<enabled>, <auto_forward><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
enabled	enumerator	0: Wireless Multidrop™ disabled (default value). 1: Wireless Multidrop™ enabled.
auto_forward	enumerator	0: Data received from a connected device will only be forwarded to the host (default value). 1: Reserved for future use.

Model	Constraint
cB-OEMSPA310	Not supported in standard FW, FW supporting multipoint and

cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Wireless Mulitdrop is available for download at: www.connectblue.com.

Write_Wireless_Multidrop_Configuration (AT*ADWM=)

AT Command	Description
AT*ADWM=<enable>, <auto_forward>, <store_in_startup_database><CR>	See Read_Wireless_Multidrop_Configuration.

Command Parameters	Type	Value
enabled	enumerator	See Read_Wireless_Multidrop_Configuration.
auto_forward	enumerator	See Read_Wireless_Multidrop_Configuration.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported in standard FW. FW supporting multipoint and Wireless Mulitdrop is available for download at: www.connectblue.com.

11.5 Informational Commands

Read_Local_BD_ADDR (AT*AILBA?)

AT Command	Description
AT*AILBA?<CR>	Reads the Bluetooth Device Address of the local device.

Responses	Description
<CR><LF>*AILBA:<bd_addr>,<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response	Type	Value

Parameters		
bd_addr	Bd_Addr	Local Bluetooth device address.

Read_Local_Version_Information (AT*AILVI?)

AT Command	Description
AT*AILVI?<CR>	This command reads the local version information to the Serial Port Adapter.

Responses	Description
<CR><LF>*AILVI:<manufacturer>, < sw_ver>, <host_stack_sw_ver>, <link_manager_sw_ver>, <blue-tooth_hardware_manufacturer><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parame-ters	Type	Value
manufacturer	string	Serial Port Adapter manufacturer.
sw_ver	string	Serial Port Adapter software version.
host_stack sw_ver	string	Bluetooth host stack version.
link_manager_sw_ver	string	Bluetooth link manager version.
bluetooth_hardware_manufacturer	string	Bluetooth hardware manufacturer.

Read_Local_Type_Information (AT*AILTI?)

AT Command	Description
AT*AILTI?<CR>	This command reads the type information from the Serial Port Adapter.

Responses	Description
<CR><LF>*AILTI:<major_id>, <minor_id><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parame-ters	Type	Value
major_id	enumerator	1: Bluetooth SPA 2: Wireless LAN SPA 3: IEEE 802.15.4 SPA
minor_id	enumerator	The different types of Bluetooth SPAs are identified by the follow-ing numbers: 0: cB-OEMSPA310 1: cB-OEMSPA311 2: cB-OEMSPA331 3: cB-OEMSPA312 4: cB-OEMSPA332 5: cB-OEMSPA333

Model	Constraint
cB-OEMSPA333	Not supported.

11.6 Miscellaneous Commands

Read_RS232_Settings (AT*AMRS?)

AT Command	Description
AT*AMRS?<CR>	This command reads current RS232 settings from the Serial Port Adapter.

Responses	Description
<CR><LF>*AMRS:<baud_rate>, <data_bits>, <stop_bits>, <parity>, <flow_control><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
baud_rate	enumerator	Standard baud rates: 1: 300 2: 1200 3: 2400 4: 4800 5: 9600 6: 19200 7: 38400 8: 57600 (default value) 9: 115200 10: 230400 11: 460800 12: 921600 Non standard baud rates: 17: 7200 18: 31250 19: 75000 20: 93750 21: 136000 22: 187500 23: 230000 24: 125000 25: 312500 26: 625000 Special baudrates: A value above 256 will be interpreted as a baudrate in raw format. If the SPA is able to generate the baudrate with less than 2% error then the baudrate is accepted. If not, the baudrate is not accepted and error is returned.
data_bits	enumerator	1: 8 data bits (default value) 2: 7 data bits 3: 6 data bits 4: 5 data bits
stop_bits	enumerator	1: 1 stop bit (default value) 2: 2 stop bits

parity	enumerator	1: no parity (default value) 2: odd parity 3: even parity
flow_control	enumerator	1: CTS/RTS used for flow control (default value) 2: CTS/RTS not used.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	For the non-standard baud rates the 312500 and 625000 has an accuracy of 1.5% and 2.5 %. For all other baud rates the accuracy is no worse than 0.5 %.
cB-OEMSPA333 cB-OEMSPA13 cB-OEMSPA33	Special baudrates is not supported.

Write_RS232_Settings (AT*AMRS=)

AT Command	Description
AT* AMRS=<baud_rate>, <data_bits>, <stop_bits>, <parity>, <flow_control>, <change_after_confirm>, <store_in_startup_database><CR>	This command applies new RS232 settings to the Serial Port Adapter. If 5, 6 or 7 data bits are selected the Serial Port Adapter will not change its RS232 settings until the next power cycle. If the command is successful, the baud rate is changed after the response. Wait 100ms from that the response is received before sending a new command to the Serial Port Adapter.

Command Parameters	Type	Value
baud_rate	enumerator	See Read_RS232_Settings.
data_bits	enumerator	See Read_RS232_Settings.
stop_bits	enumerator	See Read_RS232_Settings.
parity	enumerator	See Read_RS232_Settings.
flow_control	enumerator	See Read_RS232_Settings.
change_after_confirm	enumerator	0: The Serial Port Adapter will not change RS232 settings until after the next power cycle. 1: The Serial Port Adapter will change RS232 settings after it has sent the OK to the ECI Host.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Read_Serial_Interface_Type (AT*AMSIT?)

AT Command	Description
AT*AMSIT?<CR>	This command reads the serial interface type currently used.

Responses	Description
<CR><LF>*AMSIT:<serial_interface_type> <CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
serial_interface_type	enumerator	1: RS232 (default value) 2: RS422 3: RS485 4-255: Reserved for future use.

Write_Serial_Interface_Type (AT*AMSIT=)

AT Command	Description
AT*AMSIT=<serial_interface_type>, <store_in_startup_database><CR>	This command writes the serial interface type currently used. Note that the Serial Port Adapter does not change serial interface type until the next time it is restarted.

Command Parameters	Type	Value
serial_interface_type	enumerator	See Read_Serial_Interface_Type.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA310	RS422/RS485 is not supported by the cB-OEMSPA310.

Read_Favorites (AT*ACF?)

AT Command	Description

AT*ACF?<CR>	Read the stored favorites.

Responses	Description
<CR><LF>*ACF:<no_of_stored_favorites> <CR><LF>OK<CR><LF>	Successful response
*ACFD:<bd_addr>,<favorite_name><CR><LF>	This response is sent for every found favorite device.
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
no_of_stored_favorites	integer	Number of stored favorite devices.
bd_addr	string	Bluetooth device address of the stored favorite.
favorite_name	string	Name of favorite.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported.

Add_Change_Favorite (AT*ACACF=)

AT Command	Description
AT*ACACF=<bd_addr>,<favorite_name><CR>	Add or change a favorite. If the favorite, identified by its Bluetooth device address does not exist, it will be created.

Command Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the favorite.
favorite_name	string	Maximum 240 characters (8-bit ASCII).

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported.

Delete_Favorite (AT*ACDF=)

AT Command	Description
AT*ACDF=<bd_addr><CR>	Deletes a stored favorite.

Command Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the stored favorite.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported.

Read_Allow_Configuration_Over_Bluetooth (AT*ACCB?)

AT Command	Description
AT*ACCB?<CR>	Determine whether or not configuration over Bluetooth is allowed. Configuration can either be performed using AT commands or using the ECI protocol.

Responses	Description
<CR><LF>*ACCB:<allow_configuration_over_bluetooth> <CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
allow_configuration_over_bluetooth	enumerator	0: Configuration over Bluetooth is not allowed (default value). 1: Configuration over Bluetooth is allowed.

Write_Allow_Configuration_Over_Bluetooth (AT*ACCB=)

AT Command	Description
AT*ACCB= <al-	See the

low_configuration_over_bluetooth>, <store_in_startup_database><CR>	Read_Allow_Configuration_Over_Bluetooth command.

Command Parameters	Type	Value
allow_configuration_over_Bluetooth	enumerator	See the Read_Allow_Configuration_Over_Bluetooth command.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Read_Controller_Power_Save_Mode (AT*AMPM?)

AT Command	Description
AT*AMPM?<CR>	This command reads the current power save mode setting.

Responses	Description
<CR><LF>*AMPM:<mode> <CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
mode	enumerator	1: Allow only online mode. The Serial Port Adapter will never enter sleep or stop mode to save power. 2: Allow sleep mode (default value). The Serial Port Adapter will enter sleep mode when possible to save power. 3: Allow sleep mode and stop mode. The Serial Port Adapter will enter sleep or stop mode when possible to save power. 4: As online mode except that the internal clock will always be 32 MHz. 5 – 255: Power modes reserved for future use.

Write_Controller_Power_Save_Mode (AT*AMPM=)

AT Command	Description
AT*AMPM=<mode>, <store_in_startup_database><CR>	This command writes a new power save mode setting to the Serial Port Adapter.

Command Parameters	Type	Value
mode	enumerator	See Read_Controller_Power_Save_Mode.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Online 32 MHz mode (4) is not supported. Stop mode cannot be configured if the DSR mode is 2 (see AT*AMDS). For the cB-OEMSPA310 stop mode is not supported at all.
cB-OEMSPA333	Stop mode (3) can be configured for compatibility reasons, but sleep mode (2) will be used. Online 32 Mhz mode (4) can be configured for compatibility reasons, but online mode (1) will be used.

Read_Max_Output_Power (AT*AMMP?)

AT Command	Description
AT*AMMP?<CR>	Read the maximum output power used by the Serial Port Adapter when communicating.

Responses	Description
<CR><LF>*AMMP:<max_output_power> <CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
max_output_power	integer	255: Use the highest output power supported by the Serial Port Adapter as the maximum output power (default value). 128-m: -m dBm (m<30) 128: 0 dBm 128+n: n dBm (n<30)

Write_Max_Output_Power (AT*AMMP=)

AT Command	Description
AT*AMMP=<max_output_power>, <store_in_startup_database><CR>	Set the maximum output power to be used by the Serial Port Adapter when communicating.

Command Parameters	Type	Value
max_output_power	integer	See Read_Max_Output_Power.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA13	Not supported.

Read_Esc_Sequence_Timing (AT*AMET?)

AT Command	Description
AT*AMET?<CR>	For an escape sequence to be valid, a period of no data activity is required before and after the escape sequence. This command reads the minimum time of no data activity required before and after the escape sequence.

Responses	Description
<CR><LF>*AMET:<min_before_time>, <min_after_time> <CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
min_before_time	integer	50-5000 ms. The default value is 1000.
min_after_time	integer	50-5000 ms. The default value is 1000.

Write_Esc_Sequence_Timing (AT*AMET=)

AT Command	Description
AT*AMET=<min_before_time>, <min_after_time>, <store_in_startup_database><CR>	For an escape sequence to be valid, a period of no data activity is required before and after the escape sequence. This command sets the minimum time of no data activity required before and after the escape sequence.

Command Parameters	Type	Value
min_before_time	integer	See Read_Esc_Sequence_Timing.
min_after_time	integer	See Read_Esc_Sequence_Timing.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Read_Button_Operation_Mode (AT*AMBOR=)

AT Command	Description
AT*AMBOR=<button_id><CR>	For some Serial Port Adapters it is possible to select the operation that shall be associated with a specific button.

Command Parameters	Type	Value
button_id	integer	Identifies the button to control.

Responses	Description
<CR><LF>*AMBOR:<operation_mode>, <general_parameter> <CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
operation_mode	integer	The button operation mode (1=default).
general_parameter	integer	The meaning of this parameter depends on the value of the operation_mode parameter.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported.

Write_Button_Operation_Mode (AT*AMBO=)

AT Command	Description
AT*AMBO=<button_id>, <operation_mode>, <general_parameter>, <store_in_startup_database><CR>	For some Serial Port Adapters it is possible to select the operation that shall be associated with a specific button.

Command Parameters	Type	Value
button_id	integer	See Read_Button_Operation_Mode.
operation_mode	integer	See Read_Button_Operation_Mode.
general_parameter	integer	See Read_Button_Operation_Mode.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported.

Read_LED_Operation_Mode (AT*AMLO?)

AT Command	Description
AT*AMLO?<CR>	For some Serial Port Adapters it is possible to select an alternate operation mode for control of LEDs.

Responses	Description
<CR><LF>*AMLO: <operation_mode>, <general_parameter><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
operation_mode	integer	The new LED operation mode (1=default).
general_parameter	integer	The meaning of this parameter depends on the value of the operation_mode parameter.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported.

Write_LED_Operation_Mode (AT*AMLO=)

AT Command	Description
AT*AMLO=<operation_mode>, <general_parameter>, <store_in_startup_database><CR>	For some Serial Port Adapters it is possible to select an alternate operation mode for control of LEDs.

Command Parameters	Type	Value
operation_mode	integer	See Read_LED_Operation_Mode.
general_parameter	integer	See Read_LED_Operation_Mode.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported.

Store_Factory_Settings (AT*AMSF)

AT Command	Description
AT*AMSF<CR>	Store all the current settings in the factory set-

	tings database. The factory settings can be restored using the AT&F command.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	Not supported. Factory settings can only be set during production.

Read_Watchdog_Settings (AT*AMWS?)

AT Command	Description
AT*AMWS?<CR>	Read current watchdog settings. Watchdog settings are only active in data mode and not AT or ECI mode.

Responses	Description
<CR><LF>*AMWS: <bt_write_timeout>, <bt_inactivity_timeout>, <bt_connect_timeout>, <bt_disconnect_reset>, <reset><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
bt_write_timeout	integer	Time in seconds before SPA disconnects if out of credits. 0: Disabled (default value) > 0: Timeout in seconds
bt_inactivity_timeout	integer	Time in seconds before SPA disconnects if no activity. 0: Disabled (default value) > 0: Timeout in seconds
bt_connect_timeout	integer	Max connection time in seconds before a connection is terminated. 0: Disabled (default value) > 0: Timeout in seconds
bt_disconnect_reset	integer	0: Disabled (default value) 1: An SPA enabled, as a server will reset on a terminated connection.
reset	integer	Will always read a value of 0. If written, 1 means reset of module. Other parameters are then ignored.

Write_Watchdog_Settings (AT*AMWS=)

AT Command	Description

AT*AMWS=<bt_write_timeout>, <bt_inactivity_timeout>, <bt_connect_timeout>, <bt_disconnect_reset>, <reset>, <store_in_startup_database><CR>	Write watchdog parameters. The watchdog functionality is only active in data mode and not AT or ECI mode. Furthermore, the power mode must also be set to online (see AT*AMPM).

Command Parameters	Type	Value
bt_write_timeout	integer	Time in seconds before SPA disconnects if out of credits. 0: Disabled (default value) > 0: Timeout in seconds
bt_inactivity_timeout	integer	Time in seconds before SPA disconnects if no activity. 0: Disabled (default value) > 0: Timeout in seconds
bt_connect_timeout	integer	Max connection time in seconds before a connection is terminated. 0: Disabled (default value) > 0: Timeout in seconds
bt_disconnect_reset	integer	0: Disabled (default value) 1: An SPA enabled, as a server will reset on a terminated connection.
reset	integer	If set to 1 the SPA will reset immediately. All other parameters will be ignored.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Read_DTR_DSR_Settings (AT*AMDS?)

AT Command	Description
AT*AMDS?<CR>	Read current DTR/DSR configuration.

Responses	Description
<CR><LF>*AMDS: <dtr_cfg>, <dsr_cfg><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value

dtr_cfg	integer	Configuration of module behavior on the UART DTR pin. 1: DTR is activated when module is started. (default value) 2: DTR is active if there is a Bluetooth connection. If there is no connection, DTR is inactive.
dsr_cfg	integer	Configuration of module behavior on the UART DSR pin. 1: DSR is ignored. (default value) 2: If DSR goes from inactive to active, the module will try to connect to a remote peer if a remote peer is configured. If DSR goes from active to inactive, the module will disconnect. For the remote peer, the external connect scheme must be set. See Write_Default_Remote_Peer command.

Model	Constraint
cB-OEMSPA310 cB-OEMSPA311 cB-OEMSPA331 cB-OEMSPA312 cB-OEMSPA332	DSR mode 2 cannot be configured if module is configured for stop mode (see AT*AMPM).
cB-OEMSPA13 cB-OEMSPA33 cB-OEMSPA333	Not supported.

Write_DTR_DSR_Settings (AT*AMDS=)

AT Command	Description
AT*AMDS=<dtr_cfg>, <dsr_cfg>, <store_in_startup_database><CR>	Write DTR/DSR configuration.

Command Parameters	Type	Value
dtr_cfg	integer	See Read_DTR_DSR_Settings.
dsr_cfg	integer	See Read_DTR_DSR_Settings.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA13 cB-OEMSPA33 cB-OEMSPA333	Not supported.

Read_Link_Policy (AT*AMLP?)

AT Command	Description
AT*AMLP?<CR>	Read current Link Policy.

Responses	Description
<CR><LF>*AMLP: <link_policy>, <parame-ter><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parame-ters	Type	Value
link_policy	integer	See Write_Link_Policy command.
parameter	integer	See Write_Link_Policy command.

Model	Constraint
cB-OEMSPA13 cB-OEMSPA33	Not supported.

Write_Link_Policy (AT*AMLP=)

AT Command	Description
AT*AMLP=<link_policy>, <parameter>, <store_in_startup_database><CR>	Write link policy. The link policy can be chosen to optimize the link for a specific application. The link policy can be chosen to reduce power consumption, get faster response times, increase the range or to optimize the SPA as either sender or receiver. **Note!** **Using other link policies than the default may lead to interoperability problems. Verify that the chosen link policy works with other devices your application is intended to inter-operate with. If not, use the default link pol-icy.** Link policy 3,4,10,12 gives the shortest re-sponse times. Link policy 8 combined with stop mode (AMPM: 3) gives the lowest power consumption. When using a baud rate of 460 kbps or more on the serial interface, a combination of link policy 2 on the sender and link policy 1 on the receiver gives the highest throughput. When using a slower baud rate, then the default link policy gives equally high throughput.

	If the remote device rejects the link policy requested by the SPA, then the red LED gives an error indication. If the remote device rejects the link policy, then the default link policy is used.

Command Parameters	Type	Value
link_policy	integer	Link policy configurations: 0: Default, No sniff, All packet sizes. 1: Receiver, No sniff, 1 slot packets 2: Sender, No sniff, 5 slot packets 3: QoS, No sniff, All packet sizes, Short poll interval 4: Sniff, interval 10ms, 1 slot packets 5: Sniff, interval 50ms, 1 slot packets 6: Sniff, interval 100ms, 1 slot packets 7: Sniff, interval 200ms, 1 slot packets 8: Sniff, interval 500ms, 1 slot packets The link policies with sniff may be used to get a link with a specific response time or to decrease the power consumption. 9: Long range, DM1 packets 10: Long range, DM1 packets and QoS 11. Long range, all DM packets 12. Long range, all DM packets and QoS The link policies using only DM1 packets extend the range of the SPA on the cost of a decreased data throughput.
parameter	integer	This parameter has different meaning for different link policies. *Link policies with sniff (4-8):* Bit 0: Exit sniff on data activity. Only used when link policy supports sniff. If set the SPA will try to temporarily exit sniff when receiving data on the serial interface. When no data has been received on the serial interface for 1s, then the link will be put back into sniff mode. If not set, then the link will always be in sniff. Using exit sniff on data activity may be useful when using longer sniff intervals since these links have a low throughput. *Link policies with QoS (3,10,12):* If set to 0 then the shortest pollinterval possible is used. If different from 0 then the value defines the pollinterval. If multidrop is enabled, the pollinterval will not change until the max numbers of clients are connected. *For the other link policies this parameter has no meaning and shall be set to 0.* **Only OEMSPA333* *Link policies with All packet sizes (0, 2, 3):* If set to 1, then the device is optimized for throughput. Note, for link policy 3 a value of 1 will also set the shortest possible pollinterval.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA13 cB-OEMSPA33	Not supported.
cB-OEMSPA333	No support for link policies with sniff (4-8).

Read_Feature_Mask (AT*AMRFM=)

AT Command	Description
AT*AMRFM=<feature_mask_id><CR>	Read current feature mask.

Command Parameters	Type	Value
feature_mask_id	integer	Feature mask to read. Currently only feature mask 1 is used.

Responses	Description
<CR><LF>*AMRFM: <feature_mask_id>, <mask_value><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
feature_mask_id	integer	See Write_Feature_Mask command.
mask_value	integer	See Write_Feature_Mask command.

Model	Constraint
cB-OEMSPA13 cB-OEMSPA33	Not supported.
cB-OEMSPA333	Limited support. Only *Enable fast connection.*

Write_Feature_Mask (AT*AMWFM=)

AT Command	Description
AT*AMWFM=<feature_mask_id>, <mask_value>, <store_in_startup_database><CR>	Write feature mask. A set of special features can be enabled/disabled using this command. The Serial Port Adapter must be reset for a new feature

	mask to take affect.

Command Parameters	Type	Value
feature_mask_id	integer	Feature mask to write. Currently only feature mask 1 is used.
mask_value	integer	Feature mask 1: *Bit 0: Disable LEDs in stop mode* This feature disables the LEDs when the Serial Port Adapter is in stop mode. If the Serial Port Adapter has an active connection, then the Blue LED will be enabled. *Bit 1: Enable fast connection*. Increased page scan activity for faster response to incoming connections. *Bit 2: Enable fast discovery*. Increased inquiry scan activity for faster detection of the device during inquiry or device discovery. *Bit 3: Reserved* *Bit 4: Optimized buffer handling* Increased throughput at high baudrates. Timing dependent protocols such as Modbus may be affected when this bit is set. By default all bits are set to 0.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA13 cB-OEMSPA33	Not supported.
cB-OEMSPA333	Limited support. Only *Enable fast connection.*

Read_Channel_Map (AT*AMCM?)

AT Command	Description
AT*AMCM? <CR>	Read channel map.

Responses	Description
<CR><LF>*AMCM: <channel0to15>, <channel16to31>,<channel32to47>,	Successful response

<channel48to63>,<channel64to78> <CR><LF>OK<CR><LF>	
<CR><LF>ERROR<CR><LF>	Error message.

Response Parameters	Type	Value
channel0to15	Integer	See Write_Channel_Map command.
channel16to31	Integer	See Write_Channel_Map command.
channel32to47	Integer	See Write_Channel_Map command.
channel48to63	Integer	See Write_Channel_Map command.
channel64to78	Integer	See Write_Channel_Map command.

Model	Constraint
cB-OEMSPA13 cB-OEMSPA33 cB-OEMSPA333	Not supported.

Write_Channel_Map (AT*AMCM=)

AT Command	Description
AT*AMCM= <channel0to15>, <channel16to31>, <channel32to47>, <channel48to63>, <channel64to78>, <store_in_startup_database><CR>	Write channel map. This command disables the Advanced Frequency Hopping (AHF) and lets the user classify which channels to use. This can be useful to avoid channels that are already preoccupied by other technologies. **The AHF works very well and it is recommended not to use this command.** Each channel in the spectrum is represented by a bit in the bit masks passed as parameters to this command. Set the bit to enable the channel and clear the bit to disable the channel. If any channel is disabled, then AFH is disabled. If all channels are enabled, then AFH is enabled. The channel map only has effect when the Serial Port Adapter acts as master.

Command Parameters	Type	Value
channel0to15	Integer	Bit mask used to enable or disable channels 0 to 15 (Bit 0 = Channel 0). Default value is 0xFFFF.
channel16to31	Integer	Bit mask used to enable or disable channels 16 to 31. Default value is 0xFFFF. (Bit 0 = Channel 16)
channel32to47	Integer	Bit mask used to enable or disable channels 32 to 47 (Bit 0 – Channel 32). Default value is 0xFFFF.
channel48to63	Integer	Bit mask used to enable or disable channels 48 to 63 (Bit 0 = Channel 48). Default value is 0xFFFF.

channel64to78	Integer	Bit mask used to enable or disable channels 64 to 78 (Bit 0 = Channel 64). Default value is 0x7FFF.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA13 cB-OEMSPA33 cB-OEMSPA333	Not supported.

11.7 Events

Serial_Connection_Data_Mode_Closed (*ADCCO)

Event	Description
*ADCCO:<connection_handle>,<reason><CR><LF>	A connection to a remote device has been disconnected.

Event Parameters	Type	Value
connection_handle	integer	Identifies the connection.
reason	enumerator	0: Disconnected by command 1: Disconnected by link loss 255: Reason unknown

Chapter 12

Model Compatibility

The following table describes what AT commands different serial port adapter models supports.

AT Command	OEMSPA310 OEMSPA311 OEMSPA331 OEMSPA312 OEMSPA332	OEMSPA13	OEMSPA33	OEMSPA333
AT	Yes	Yes	Yes	Yes
AT*	Yes	Yes	Yes	Yes
ATZ	No	Yes	Yes	Yes
AT&F	Yes	Yes	Yes	Yes
ATS2	Yes	Yes	Yes	Yes
ATE	Yes	Yes	Yes	Yes
AT*AGDM	Yes[1]	Yes	Yes	Yes
AT*AGCM	Yes	Yes	Yes	Yes
AT*AGPM	Yes	Yes	Yes	Yes
AT*AGSM	Yes	Yes	Yes	Yes
AT*AGND	Yes[1]	Yes	Yes	Yes
AT*AGDD	Yes	Yes	Yes	Yes
AT*AGI	Yes	Yes	Yes	Yes
AT*AGB	No	Yes	Yes	Yes
AT*AGUB	Yes	Yes	Yes	Yes
AT*AGBD	Yes	Yes	Yes	Yes
AT*AGFP	Yes	Yes	Yes	Yes
AT*AGLN	Yes[1]	Yes	Yes	Yes
AT*AGLC	Yes	Yes	Yes	Yes
AT*AGGMSR	No	Yes	Yes	Yes
AT*AGCMSR	No	Yes	Yes	Yes
AT*AGMSP	Yes	Yes	Yes	Yes
AT*AGRSS	No	Yes	Yes	Yes

AT Com-mand	OEMSPA310 OEMSPA311 OEMSPA331 OEMSPA312 OEMSPA332	OEMSPA13	OEMSPA33	OEMSPA333
AT*ARSS	Yes[1]	Yes	Yes	Yes
AT*ADDM	Yes	Yes	Yes	Yes
AT*ADCP	Yes[1]	Yes	Yes	Yes
AT*ADCC	Yes	Yes	Yes	Yes
AT*ADDCP	Yes	Yes	Yes	Yes
AT*ADDCP	Yes[1]	Yes	Yes	Yes
AT*ADDSP	Yes[1]	Yes	Yes	Yes
AT*ADMRP	No	Yes	Yes	Yes
AT*ADNRP	Yes	Yes	Yes	Yes
AT*ADRDRP	Yes	Yes	Yes	Yes
AT*ADWDRP	Yes[1]	Yes[1]	Yes[1]	Yes[1]
AT*ADIT	No	Yes	Yes	Yes
AT*ADWM	No	Yes	Yes	Yes
AT*AILBA	Yes	Yes	Yes	Yes
AT*AILTI	Yes	No	No	No
AT*AILVI	Yes	Yes	Yes	Yes
AT*AMRS	Yes[3]	Yes	Yes	Yes
AT*AMSIT	Yes	Yes	Yes	Yes
AT*ACF	No	Yes	Yes	Yes
AT*ACACF	No	Yes	Yes	Yes
AT*ACDF	No	Yes	Yes	Yes
AT*ACCB	Yes	Yes	Yes	Yes
AT*AMPM	Yes[1,2]	Yes	Yes	Yes
AT*AMMP	Yes	No	Yes	Yes
AT*AMET	Yes	Yes	Yes	Yes
AT*AMBOR	No	Yes	Yes	Yes
AT*AMBO	No	Yes	Yes	Yes
AT*AMLO	No	Yes	Yes	Yes
AT*AMSF	No[1]	Yes	Yes	Yes
AT*AMWS	Yes	Yes	Yes	Yes
AT*AMDS	Yes	No	No	No
AT*AMLP	Yes	No	No	Yes[4]

AT Command	OEMSPA310 OEMSPA311 OEMSPA331 OEMSPA312 OEMSPA332	OEMSPA13	OEMSPA33	OEMSPA333
AT*AMWFM	Yes	No	No	Yes[5]
AT*AMRFM	Yes	No	No	Yes[5]
*ADCCO	Yes	Yes	Yes	Yes

1) There is some constraint regarding the AT command. See details for each AT command. Typically this means that some parameter value is not permitted such as e.g. LAN profile is not supported and device names are limited to 31 characters.
2) Stop mode is not supported by the cB-OEMSPA310.
3) RS422/RS485 is not supported by the cB-OEMSPA310.
4) Link Policies with sniff mode are not supported by the cB-OEMSPA333.
5) Only the fast connect feature is supported by the cB-OEMSPA333.