AT Commands

All of the LM-130 module's settings and commands are transmitted over UART using the ASCII interface. All commands need to be terminated with <CR><LF> and any replies they generate will also be terminated by the same sequence.
After setting LM-130 module, you must use AT command (AAT1 Save) to save the settings to the flash. You would see "ok" when the settings are saved. Then use AT command (AAT1 Reset) to run the new settings.
The settings for the UART interface are 57600 bps, 8 bits, no parity, 1 stop bit, no flow control.

Save Settings	
Command	**Description**
AAT1 Save	Respond ok after parametersare saved.
Read Firmware Version	
Command	**Description**
AAT1 FwVersion	Respond firmware version
Reset and reboot LM-130 module	
Command	**Description**
AAT1 Reset	Respond ok after entering the command.
Switch to Sleep Mode	
Command	**Description**
AAT1 SLEEP	Respond ok after entering the command. Note: To leave sleep mode, enter 0xFF by UART to wake up LM-130H1.
Restore to Default Value	
Command	**Description**
AAT1 Restore	Respond ok after entering the command.
Enable/ disable Test mode	
Command	**Description**
AAT1 TestMode=[parameter1]	[parameter1]: 0: Disable 1: Enable; send report according to cycle of EVK_Tx

	Respond: **ok** if parametet1 is 0 or 1 **invalid_param** if parameter1 is 0 or 1
Readthe state of Test mode	
Command	**Description**
AAT1 TestMode=?	Respond: 0- disable 1- enable, send report according to cycle of EVK_Tx
Set Device Address	
Command	**Description**
AAT2 DevAddr=[parameter1]	[parameter1]: device address in 4-byte hexadecimal characters, from 00000001 – FFFFFFFF. Respond: **ok** if address is valid **invalid_param**if device address is not valid Device address must be unique in the current network. This must be directly set solely for activation by personalization devices (ABP mode).
Read Device Address	
Command	**Description**
AAT2 DevAddr=?	Respond: device address in 4-byte hexadecimal characters from 00000001~ FFFFFFFF.
Set Device EUI	
Command	**Description**
AAT2 DevEui=[parameter]	[parameter]: Device EUI in 8-byte hexadecimal character. Respond: **ok** if device EUI is valid **invalid_param** if device EUI is not valid This command sets the globally unique device identifier for the module.
Read Device EUI	
Command	**Description**
AAT2 DevEui=?	Response: Device EUI in 8-byte hexadecimal character.

Set Application EUI	
Command	**Description**
AAT2 AppEui=[parameter]	[parameter]: the application EUI in 8-byte hexadecimal character. Response: ***ok*** if application EUI is valid ***invalid_param*** if application EUI is not valid Default AppEUI:0000000000010203 .
Read Application EUI	
Command	**Description**
AAT2 AppEui=?	Response: the application EUI in 8-byte hexadecimal character. To perform a hard reset, press and hold the power button for 8 to 10 seconds.
Set Network Session Key	
Command	**Description**
AAT2 NwkSKey=[parameter]	[parameter]: the network session key in 16-byte hexadecimal character Response: ***ok*** if network session key is valid ***invalid_param*** if network session keyis not valid Default network session key:28AED22B7E1516A609CFABF715884F3C
Read Network Session Key	
Command	**Description**
AAT2 NwkSKey=?	Response:the network session key in 16-byte hexadecimal character
Set Application Session Key	
Command	**Description**
AAT2 AppSKey=[parameter]	[parameter]: the application session key in 16-byte hexadecimal character Response: ***ok*** if application session key is valid ***invalid_param*** if application session key is not valid Default network session key:

	1628AE2B7E15D2A6ABF7CF4F3C15880 9

Command	Description
AAT2 AppSKey=?	Response: the application session key in 16-byte hexadecimal character

Set Application Key

Command	Description
AAT2 AppKey=[parameter]	[parameter]: application key in 16-byte hexadecimal character. Response: *ok* if application key is valid *invalid_param* if application key is not valid Default application key: 0123456789ABCDEFEFCDAB896745230 1

Read Application Key

Command	Description
AAT2 AppKey=?	Response: application key in 16-byte hexadecimal character.

Enable/ disable ADR (Adaptive Data Rate)

Command	Description
AAT2 ADR=[parameter]	[parameter]: 0: disable ADR function 1: enable ADR function Response: *ok* if parameter is 0 or 1 *invalid_param* if parameter1 is not 0 or 1

Read State of ADR (Adaptive Data Rate)

Command	Description
AAT2 ADR=?	Response: 0: disable ADR function 1: enable ADR function

Set Cycle of EVK's transmission

Command	Description
AAT1 EVK_TxCycle=[parameter]	[parameter]: report interval in seconds from 1 to 254.

	This command will only take effect when "TestMode"=1. Response: **ok** if parameter1 is from 1~254 **invalid_param**if parameter1 is not from 1~254
Read Cycle of EVK's transmission	
Command	**Description**
AAT1 EVK_TxCycle=?	Response: report interval in seconds from 1 to 254. .
Set Activation Type of Module	
Command	**Description**
AAT2 JoinMode=[parameter]	[parameter]: 0: ABP mode 1: OTAA mode Response: **ok** if parameter1 is 0 or 1 **invalid_param** if parameter1 is not 0 or 1
Read Activation Type of Module	
Command	**Description**
AAT2 JoinMode=?	Response: 0- ABP mode 1- OTAA mode
Set Retries Number of Uplink	
Command	**Description**
AAT2 reTx=[parameter1]	[parameter1]: the retries number of an uplink confirmed packet from 0 to 8 while not getting acknowledgement from server downlink Response: **ok** if parameter 1 is from 0 to 8 **invalid_param** if parameter1 is not from 0 to 8
Read Retrial Times of Uplink	
Command	**Description**
AAT2 reTx=?	Response: the retries number of an uplink confirmed packet from 0 to 8 while

	not getting acknowledgement from server downlink.
Set Delay Time	
Command	**Description**
AAT2 RxDelay1=[parameter]	[parameter]:delay between the transmission window and the first reception window in microsecondsfrom 100000 to 10000000. Response: *ok* if parameter1 is from 100000 to 10000000 *invalid_param*if parameter1 is not from 100000 to 10000000.
Read Delay Time	
Command	**Description**
AAT2 RxDelay1=?	Response: delay between the transmission and the first reception window in microsecondsfrom 100000 to 10000000.
Set Payload	
Command	**Description**
AAT2 Tx=[parameter1],[parameter2],[parameter3]	**Note:** Payload content can only be set when Test Mode is disabled. (AAT1 TestMode=0) [parameter1]: the port number from 1 to 223. [parameter2]: string representing the uplink payload type, either *"cnf"* or *"uncnf".*(cnf = confirmed, uncnf = unconfirmed) [parameter3]: payload value in hexadecimal character. The length of payloadislimited to the data rate. (Please refer to the LoRaWAN^{TM} Specification for further

	details)
	Response: This command would get two responses. The first one responding if the command is valid or not.The second one responding after the end of the uplink transmission. (Please refer to theLoRaWAN^{TM} Specification for further details.) Response after entering the command: ● **ok** - if parameters and configurations are valid. ● **Invalid_param** – if parameters ([parameter1],[parameter2],[parameter3]) are not valid. ● **Tx_ok** - if "cnf" radio Tx return with ACK ● **Tx_ok** - if "uncnf" radio Tx return ● **Tx_noACK** – if "cnf" radio Tx return without ACK ● **Rx < parameter1>< parameter2>**– if transmission is successful, [parameter1] port number, from 1 to 223; [parameter2] hexadecimal character that is received from the server.

Enable/ disable Duty Cycle

Command	Description
AAT2 DutyCycle=[parameter]	[parameter]: 0- disable Duty Cycle 1- enable Duty Cycle

	Response:
	ok if parameter1 is 0 or 1
	invalid_param if parameter1 is not 0 or 1

Read the state of Duty Cycle	
Command	**Description**
AAT2 DutyCycle=?	Response:
	0-Duty Cycle is disabled.
	1-Duty Cycle is enabled.

Enable/disable to check Payload size	
Command	**Description**
AAT2 PLCheck=[parameter]	[parameter]:
	0: disable to check payload size
	1: enable to check payload size
	Response:
	ok if parameter 1 is 0 or 1
	invalid_param if parameter1 is not 0 or 1

Read if module would check Payload size	
Command	**Description**
AAT2 PLCheck=?	Response:
	0-firmware would not check payload size
	1-firmware would check payload size

Set Rx2 Frequency and data rate	
Command	**Description**
AAT2 Rx2_Freq_DR= [parameter1],[parameter2]	[parameter1]: Rx2 frequency in decimal number from 000000001 to 999999999 in Hz.
	[parameter2]: Rx2 Data Ratefrom 0 to 15.
	Response:
	ok if Rx2 frequency and data rate are valid
	invalid_param if Rx2 frequency or data rate is not valid
	Example, Set Rx2 frequency and data rate to be 866.5MHz and DR3.
	The command is AAT2 Rx2_Freq_DR=866500000,3.

Read Rx2 Frequency and data rate	
Command	**Description**
AAT2 Rx2_Freq_DR=?	Response: the frequency and Data Rate of RX2. Example, When RX2 frequency is 915MHz and Data Rate is 3, the response message is "Freq.915000000,DR3".
Set LoRaWAN^{TM} Class	
Command	**Description**
AAT2 ClassMode=[parameter]	[parameter]: 0-Class A 2-Class C Response: *ok* if parameter 1 is 0 or 2 *invalid_param* if parameter1 is not 0 or 2
Read LoRaWAN^{TM} Class	
Command	**Description**
AAT2 ClassMode=?	Response: 0: Class A 2: Class C
Set Offset of Rx1 Data Rate	
Command	**Description**
AAT2 Rx1DrOffset=[parameter]	[parameter1]: the offset of Rx1's data rate The Rx1DrOffset sets the offset between the uplink data rate and the downlink data rate used to communicate with the end-device on the first reception slot (Rx1). As a default this offset is 0. The offset is used to take into account maximum power density constraints for base stations in some regions and to balance the uplink and downlink radio link margins.
Read Offset of Rx1 Data Rate	
Command	**Description**
AAT2 Rx1DrOffset=?	Response: the offset between the uplink data rate and the downlink data

	rate.

Command	Description
AAT2 Tx_Channel=[parameter1],[parameter2][parameter3],[parameter4] [parameter5]	[parameter1]: the channel number. The range for US is from 0 to 71. The range for EU isfrom 0to15. [parameter2]:thefrequency of Tx channel from 000000001 to 999999999in Hz. [parameter3]: the operating range of Data Rate. (The left one is DR's Max, the right one is DR's Min.) The range of DR is from 0 to 15. Note: According to LoRaWAN_Regional_Parameter.pdf, Data Rate in some regions will be limited in a particular range. For example, upstream 64 channels numbered 0 to 63 utilizing LoRa$^{®}$ 125 kHz BW varying from DR0 to DR3 for US. [parameter4]: 0/1 representing the channel is close/open. [parameter5]: the number of band grouping. The range for US is 0. The range for EU isfrom 0to3. Please refer to AAT2 Tx_Band=[parameter1], [parameter2],[parameter3] for further understanding. Response: *ok* if parametersare valid *invalid_param* if one of parameters is

	not valid.
	For example:
	Set to open Channel 3 to use frequency of 977.3MHz with maximum data rate DR4, and minimum data rate DR0 and use band grouping 0's Tx power and duty cycle. The command is as following.
	AAT2 Tx_Channel=3,973300000,40,1,0

Command	Description
AAT2 Tx_Channelx=?	Fill the channel number at the variable x field Response: the specific Tx channel's information. For example: Read the Channel 15's Tx information AAT2 Tx_Channel15=? Response: channel_15,Freq.905300000,DrRange.0-3,Status0, Band0

Set the duty cycle and Tx power index for Tx band

Command	Description
AAT2 Tx_Band= [parameter1], [parameter2], [parameter3]	[parameter1]: the number of band grouping. The number of US is 0. The range of EU isfrom 0to3. [parameter2]: thevalue of duty cycle, from 1 to 9999. The real duty cycle could be calculated as (100% / duty cycle value). [parameter3]: the index of Tx power, from 0 to 15. Response: *ok* if all parameters are valid *invalid_param* if one of parameters is not valid. For example: Set band grouping 0 to use duty cycle as 2% and Tx power index 5

	AAT2 Tx_Band=0,50,5 (for US) Note : The value of duty cycle 2% in command= 100% / 2%=50
Read all Tx band's duty cycle and Tx power index	
Command	**Description**
AAT2 Tx_Band=?	Response: the list of all Tx bands' duty cycle and Tx power index.
Read specific Tx band's duty cycle and Tx power index	
Command	**Description**
AAT2 Tx_Bandx=?	Fill the band grouping at the variable **x** field Response: the specific band grouping number's duty cycle and Tx power index. For example, read band 0's duty cycle and Tx power index: AAT2 Tx_Band0=? Response: Band_0, DutyCycle.1, TxPower.5
Read the number of uplink frame counter	
Command	**Description**
AAT2 Uplink_Count=?	Response: the number of uplink frame counter.
Read the number of downlink frame counter	
Command	**Description**
AAT2 Downlink_Count=?	Response: the number of downlink frame counter.
Set the Tx power index table	
Command	**Description**
AAT2 Tx_Power= [parameter1],[parameter2]	[parameter1]: the index ofTx powerfrom 0 to 15. [parameter2]: thecorrespondingTxPower. The range for US is 0 dBmto 30dBm. The range for EU is from 0 dBmto 20dBm. Response: *ok* if the parameters arevalid

	invalid_param if one of parameters is not valid

Read the Tx power index and corresponding power

Command	Description
AAT2 Tx_Power=?	Response: the entireTx power index and the corresponding power.

Read the specific Tx index's corresponding Tx power

Command	Description
AAT2 Tx_Power*x*=?	Fill the specific Tx index in the variable x field Response: The specific Tx power index'scorresponding power. For example, read the Tx power index 2's corresponding Tx power The command is AAT2 Tx_Power2=? Response: TxPower_2, 26 dBm.

Set the maximum payload size (without repeater) of different Data Rate

Command	Description
AAT2PI_Max_Length= [parameter1],[parameter2]	[parameter1]:DataRatefrom 0 to 15. [parameter2]: maximum payload size (N) from 0 to 255. Response: *ok* if parameters are valid *invalid_param* if one of parameters is not valid

Read the maximum payload size (without repeater) of all Data Rates

Command	Description
AAT2PI_Max_Length=?	Response: maximum payload size of all Data Rate

Read the maximum payload size (without repeater) of specific Data Rate

Command	Description
AAT2 PI_Max_Lengthx=?	Fill the specific level of Data Rate in the variable x field Response: the maximum length of the specific Data Rate's payload. Example, read the maximum payload size of Data Rate 3

	The command is AAT2 PI_Max_Length3=? Response: DR_3, MaxLength.242

Set the maximum payload size (with repeater) of different Data Rate

Command	Description
AAT2 PIre_Max_Length= [parameter1],[parameter2]	[parameter1]: DataRatefrom 0 to 15. [parameter2]: maximum payload size (N) from 0 to 255. Response: *ok* if parameters are valid *invalid_param* if one of parameters is not valid

Read the maximum payload size (with repeater) of all Data Rates

Command	Description
AAT2 PIre_Max_Length=?	Response: the maximum payload size of all Data Rate.

Read the maximum payload size (with repeater) of specific Data Rate

Command	Description
AAT2 PIre_Max_Lengthx=?	Fill the specific level of Data Rate in the variable x field Response: the maximum payload size of specific Data Rate.

Set the channel number that Network Server cannot send command to change

Command	Description
AAT2 DefChannelLimit=[parameter]	[parameter]: US range:1-71, default=71 EU range:1-15, default=3 Response: *ok* if parameter is valid *invalid_param*parameter is not valid

Read the channel number that Network Server cannot send command to change

Command	Description

AAT2 DefChannelLimit=?	Response: the channel number that Network Server cannot send command to change it.

Command	Description
AAT2 LBTMode=[parameter]	[parameter]: 1/0 1: enable LBT function 0: disable LBT function LBT is the acronym of Listen Before Talk. Before sending the uplink, LM-130H1 would "listen" if the noise reaches to the threshold, LM-130H1 would not send the uplink. Response: ***ok*** if parameter is valid ***invalid_param***parameter is not valid

Read the LBT function status

Command	Description
AAT2 LBTMode=?	Response: 1-LBT function is enabled. 0-LBT function is disabled.

Set the RSSI limit for LBT function

Command	Description
AAT2 LBTRssiLimit=[parameter]	[parameter]: the threshold of noise that LM-130 would not send uplink to prevent from failure of uplink. Range:-1dBm~-150dBm, default=-80dBm Response: ***ok*** if parameter is valid ***invalid_param***parameter is not valid

Read the RSSI limit for LBT function

Command	Description

AAT2 LBTRssiLimit=?	Response:the threshold of noise that LM-130 would not send uplink

The following AT commands would only be available on EU standard firmware.

Read the ISM Band to EU standard or AS923 Specs.	
Command	**Description**
AAT2 ISM_Band=?	Response: 1-AS923 Specs. 0-EU standard

Set the ISM Band to EU standard or AS923 Specs.	
Command	**Description**
AAT2 ISM_Band=[parameter]	[parameter]: 0/1 1: AS923 Spec. 0: EU standard Response: *ok* if parameter is valid *invalid_*param parameter is not valid

Read the AS923 downlink dwell time	
Command	**Description**
AAT2 Down_Dwelltime=?	Response: 1-Transmission time must be within 400ms. 0-No limit to transmission time

Set the AS923 downlink dwell time	
Command	**Description**
AAT2 Down_Dwelltime=[parameter]	[parameter]: 1: Transmission time must be within 400ms. 0: No limit to transmission time Response: *ok* if parameter is valid *invalid_param*parameter is not valid

Read the AS923 uplink dwell time	
Command	**Description**
AAT2 Up_Dwelltime=?	Response: 1-Transmission time must be within 400ms. 0-No limit to transmission time

Set the AS923 uplink dwell time	
Command	**Description**
AAT2 Up_Dwelltime=[parameter]	[parameter]: 1: Transmission time must be within 400ms. 0: No limit to transmission time Response: ***ok*** if parameter is valid ***invalid_param***parameter is not valid.

Set the maximum payload size (without repeater) of different Data Rate when AS923 uplink/downlink dwell time=1	
Command	**Description**
AAT2PlMax_DT_Length= [parameter1],[parameter2]	[parameter1]:DataRatefrom 0 to 15. [parameter2]: maximum payload size (N) from 0 to 255. Response: ***ok*** if parameters are valid ***invalid_param*** if one of parameters is not valid Note: When AS923 uplink/downlink dwell time=0, the command for setting maximum payload size is AAT2PlMax_Length=[parameter1],[parameter2]

Read the maximum payload size (without repeater) of all Data Rates when AS923 uplink/downlink dwell time=1	
Command	**Description**
AAT2PlMax_DT_Length=?	Response: maximum payload size of all Data Rate

Read the maximum payload size (without repeater) of specific Data Rate when AS923 uplink/downlink dwell time=1	
Command	**Description**
AAT2 PlMax_DT_Lengthx=?	Fill the specific level of Data Rate in the variable x field Response: the maximum length of the specific Data Rate's payload. Example, read the maximum length of Data Rate 3's payload

	The command is AAT2 Pl_Max_Length3=?
	Response: DR_3, MaxLength.242

Set the maximum payload size (with repeater) of different Data Rate when AS923 uplink/downlink dwell time=1	
Command	**Description**
AAT2 Plre_Max_DT_Length= [parameter1],[parameter2]	[parameter1]: DataRatefrom 0 to 15. [parameter2]: maximum payload size (N) from 0 to 255. Response: *ok* if parameters are valid *invalid_param* if one of parameters is not valid

Read the maximum length (with repeater) of all Data Rates when AS923 uplink/downlink dwell time=1	
Command	**Description**
AAT2 Plre_Max_DT_Length=?	Response: the maximum payload size of all Data Rate.

Read the maximum payload size (with repeater) of specific Data Rate	
Command	**Description**
AAT2 Plre_Max_DT_Lengthx=?	Fill the specific level of Data Rate in the variable x field Response: the maximum payload size of specific Data Rate.

Read the Rx1 frequency for specific Tx channel	
Command	**Description**
AAT2 Rx1_Freqx=?	Fill the specific Tx channel in the variable x field Response: the Rx1 frequency for specific Tx channel.