ProLink LoRaWAN EndNode Modem HCI Specification (AS923)

Specification Version 2.0

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Document Information

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Revision History

Version	Note
0.1	Created, Initial Version Reference: WiMOD LoRaWAN EndNode Modem HCI Spec V1.22
0.2	Reference: WiMOD LoRaWAN EndNode Modem HCI Spec V1.26 Chapter 2.1.2.1 updated
0.3	Update for RP002-1.0.1
1.0	Document renamed Reference: WiMOD LoRaWAN EndNode Modem HCI Spec V2.2 Reference: RP002-1.0.1 LoRaWAN® Regional Parameters document (LoRa Alliance).
2.0	Valid from firmware V3.0, Build Count 196 Document renamed to support the ProLink LoRaWAN FW Reference: ProLink LoRaWAN EndNode Modem HCI Spec Reference: RP002-1.0.1 LoRaWAN® Regional Parameters document (LoRa Alliance).

Aim of this Document

This document describes the ProLink LoRaWAN®[1] EndNode Modem Host Controller Interface (HCI) protocol which is part of the ProLink LoRaWAN® EndNode Modem firmware. This firmware can be used in combination with the WiMOD LoRa radio module family.

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[1] LoRa® is a registered trademark of Semtech Corporation. LoRaWAN® is a registered trademark of the LoRa Alliance®.

Table of Contents

1. Introduction

1.1 Overview

This document is an extension to the ProLink LoRaWAN EndNode Modem HCI document [1], covering the changes included in the ProLink LoRaWAN EndNode Modem firmware for AS 923 MHz ISM Band.

2. Appendix

2.1 LoRaWAN® Multi Band Support

2.1.1 Radio Band Indices

Index	Band Description	Comments
10	AS923 – 1 (915 - 928 MHz) - Asia	Default setting
11	AS923 – 2 (920 - 923 MHz) - Asia	
12	AS923 – 3 (915 - 921 MHz) - Asia	

2.1.2   Asia 923 – 1 Band

2.1.2.1   Data Rate Indices

Index	Data Rate / Spreading Factor	Bandwidth	Indicative physical bit rate [bit/s]	Comments
0	LoRa / SF12	125 kHz	250	Only available if DwellTime set to 0 by the LoRaWAN server
1	LoRa / SF11	125 kHz	440	
2	LoRa / SF10	125 kHz	980	Default setting
3	LoRa / SF9	125 kHz	1760	
4	LoRa / SF8	125 kHz	3125	
5	LoRa / SF7	125 kHz	5470	
6	LoRa / SF7	250 kHz	11000	
7	FSK / 50kbps		50000	

2.1.2.2   Channel Indices

Index	Frequency Channel	Comments
0	923 200 000 Hz	Data Rates 0 - 5
1	923 400 000 Hz	Data Rates 0 - 5
128	923 200 000 Hz	Default Frequency for Rx2 Default Data Rate: 2

2.1.3   Asia 923 – 2 Band

2.1.3.1   Data Rate Indices

Index	Data Rate / Spreading Factor	Bandwidth	Indicative physical bit rate [bit/s]	Comments
0	LoRa / SF12	125 kHz	250	Only available if DwellTime set to 0 by the LoRaWAN server
1	LoRa / SF11	125 kHz	440	
2	LoRa / SF10	125 kHz	980	Default setting
3	LoRa / SF9	125 kHz	1760	
4	LoRa / SF8	125 kHz	3125	
5	LoRa / SF7	125 kHz	5470	
6	LoRa / SF7	250 kHz	11000	
7	FSK / 50kbps		50000	

2.1.3.2   Channel Indices

Index	Frequency Channel	Comments
0	921 400 000 Hz	Data Rates 0 - 5
1	921 600 000 Hz	Data Rates 0 - 5
128	921 400 000 Hz	Default Frequency for Rx2 Default Data Rate: 2

2.1.4   Asia 923 – 3 Band

2.1.4.1   Data Rate Indices

Index	Data Rate / Spreading Factor	Bandwidth	Indicative physical bit rate [bit/s]	Comments
0	LoRa / SF12	125 kHz	250	Only available if DwellTime set to 0 by the LoRaWAN server
1	LoRa / SF11	125 kHz	440	
2	LoRa / SF10	125 kHz	980	Default setting
3	LoRa / SF9	125 kHz	1760	
4	LoRa / SF8	125 kHz	3125	
5	LoRa / SF7	125 kHz	5470	
6	LoRa / SF7	250 kHz	11000	
7	FSK / 50kbps		50000	

2.1.4.2   Channel Indices

Index	Frequency Channel	Comments
0	916 600 000 Hz	Data Rates 0 - 5
1	916 800 000 Hz	Data Rates 0 - 5
128	916 600 000 Hz	Default Frequency for Rx2 Default Data Rate: 2

2.2   Proprietary LoRa® Communication Support

The ProLink LoRaWAN® EndNode Modem firmware for AS 923 MHz ISM Band does not support the proprietary LoRa® communication and therefore those services are not available.

2.3 List of Abbreviations

FW   Firmware

HCI   Host Controller Interface

LR   Long Range

LoRa   Long Range

RAM   Random Access Memory

RF   Radio Frequency

RSSI   Received Signal Strength Indicator

RTC   Real Time Clock

SLIP   Serial Line Internet Protocol

SNR   Signal to Noise Ratio

UART   Universal Asynchronous Receiver/Transmitter

WiMOD   Wireless Module by IMST

2.4 List of References

[1] ProLink_LoRaWAN_EndNode_Modem_HCI_Spec.pdf.

3. Regulatory Compliance Information

The use of radio frequencies is limited by national regulations. The radio module has been designed to comply with the European Union's R&TTE (Radio & Telecommunications Terminal Equipment) directive 1999/5/EC and can be used free of charge within the European Union. Nevertheless, restrictions in terms of maximum allowed RF power or duty cycle may apply.

The radio module has been designed to be embedded into other products (referred as "final products"). According to the R&TTE directive, the declaration of compliance with essential requirements of the R&TTE directive is within the responsibility of the manufacturer of the final product. A declaration of conformity for the radio module is available from IMST GmbH on request.

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