

Geoscan-Edelveis TLM AX.25 Beacon Protocol

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1. Protocol Version

1.5

2. Parameters of Transmission

UHF band parameters:

- speed – 9600 bit/s;
- frequency – 436,2 MHz;
- modulation – GFSK.

3. Structure of Radiopacket

The threshold of syncword must be set to 16 bit.

Table 1: Structure of Radiopacket with CRC16 (X16+X15+X2+1). Initialized to 0x0000

Size, byte	Name	Description	Offset	Value
4	Preamble	Bit synchronisation of modem	0	0xAAAAAAAA
4	Syncword		4	0x930B51DE
64 (40 used)	AX.25 telemetry	Telemetry data in AX.25 format	8	
2	CRC	Control sum CRC16	72	

4. AX.25 Telemetry

Table 2: AX.25 Structure

Size, byte	Description	Value	Offset, byte
6	Destination Address	0x84 0x8A 0x82 0x86 0x9E 0x9C (BEACON)	0
1	Destination SSID	0x60	6
6	Source Address	0xA4 0xA6 0x64 0x60 0xA6 0x40 (RS20S)	7
1	Source SSID	0xE1	13
1	Control Field (UI)	0x03	14
1	Protocol ID (without 3rd level)	0xF0	15
24	Telemetry		16

Table 3: Telemetry

Description	Unit	Type
Time	unix format	uint32
Current of consumption	A (*0.0000766)	uint16
Current from solar panels	A (*0.00003076)	uint16
Battery voltage, half	V (*0.0176)	uint8
Battery voltage, full	V (*0.0352)	uint8
Solar Panel +X Temperature	°C	uint8
Solar Panel -X Temperature	°C	uint8
Solar Panel +Y Temperature	°C	uint8
Solar Panel -Y Temperature	°C	uint8
Solar Panel +Z Temperature	null	uint8
Solar Panel -Z Temperature	°C	uint8
Cell One Temperature	°C	uint8
Cell Two Temperature	°C	uint8
OBC CPU Load	%	uint8
OBC Number of Reloads	Value -7476 pcs.	uint16
CommU Number of Reloads	Value -1505 pcs.	uint16
RSSI	Value -99 dBm	uint8

5. Documentation

[1] AX.25 Reference: <http://www.tapr.org/pdf/AX25.2.2.pdf>

[2] More Information about HDLC + AX.25: <https://notblackmagic.com/bitsnpieces/ax.25>