

LoRaWAN frame protocol V1

E-PREDICT Spectre LoRaWAN emits several types of frames in LoRaWAN following the frame protocol presented below.

For each frame, bit 7 of byte 1 is used to identify the version of E-PREDICT. If this is Spectre V1, please contact HDSN support.

Periodic measure frame

The E-PREDICT Spectre LoRaWAN emits a measurement frame every 15 minutes containing the following elements:

Octet	Bits de l'octet	Description
0	Temperature	Temperature in °C with the following formula : $Temperature (^{\circ}C) = Byte0 / 2 - 40$
1	Bits 0-6 : Humidity	Relative humidity in %
	Bit 7 : Version	If 1 = Spectre V2 If 0 = Spectre V1 (contact the HDSN support)
3	Bits 5-7 : Frame identification	Measure frame = value 64 : <ul style="list-style-type: none"> • Bit 5 = 0 • Bit 6 = 1 • Bit 7 = 0
10	Bits 0-1 : Mode	<p>Bit 0 = 0 and Bit 1 = 0 :</p> <ul style="list-style-type: none"> • STEP1 : 30 first minutes after the power on <p>Bit 0 = 1 and Bit 1 = 0 :</p> <ul style="list-style-type: none"> • STEP2 : Learning (during 8 hours after the STEP1) <p>Bit 0 = 0 and Bit 1 = 1 :</p> <ul style="list-style-type: none"> • STEP3 : Nominal operation <p>Bit 0 = 1 and Bit 1 = 1 :</p> <ul style="list-style-type: none"> • Autotest or autodiagnostic KO
11	Bits 0-6 : Criticality of emissions	Criticality of emissions
	Bit 7 : Alarm during the last hour	If this bit = 1, alarm triggered during the last hour. Else, no alarm during the last hour.



Alarm frame

When E-PREDICT Spectre LoRaWAN detects a malfunction in the protected equipment, an alarm frame is instantly sent in LoRaWAN. It contains the following elements:

Byte	Bits of the byte	Description
0	Temperature	Temperature in °C with the following formula : $Temperature (^{\circ}C) = Byte0 / 2 - 40$
1	Bits 0-6 : Humidity	Relative humidity in %
	Bit 7 : Version	If 1 = Spectre V2 If 0 = Spectre V1 (contact the HDSN support)
3	Bits 5-7 : Frame identification	Alarm frame = value 128: <ul style="list-style-type: none"> • Bit 5 = 0 • Bit 6 = 0 • Bit 7 = 1
10	Bits 0-1 : Mode	<u>Bit 0 = 0 and Bit 1 = 0 :</u> <ul style="list-style-type: none"> • STEP1 : 30 first minutes after the power on <u>Bit 0 = 1 and Bit 1 = 0 :</u> <ul style="list-style-type: none"> • STEP2 : Learning (during 8 hours after the STEP1) <u>Bit 0 = 0 and Bit 1 = 1 :</u> <ul style="list-style-type: none"> • STEP3 : Nominal operation <u>Bit 0 = 1 and Bit 1 = 1 :</u> <ul style="list-style-type: none"> • Autotest or autodiagnostic KO
11	Alarm	<u>Alarm code :</u> <ul style="list-style-type: none"> • Urgent : codes 1 to 93. • Very urgent : codes 94 to 98 & codes 100 to 190. • Test : code 99 possible only during the STEP1 (30 first minutes after the power on)



Self-diagnosis frame

E-PREDICT Spectre LoRaWAN is capable of self-diagnosis. In the case of the detection of a defect internal to E-PREDICT, it then emits a self-diagnosis frame instantly.

Byte	Bits of the byte	Description
0	Temperature	Temperature in °C with the following formula : $Temperature (^{\circ}C) = Byte0 / 2 - 40$
1	Bits 0-6 : Humidity	Relative humidity in %
	Bit 7 : Version	If 1 = Spectre V2 If 0 = Spectre V1 (contact the HDSN support)
3	Bit 5 to bit 7 : Frame identification	Autodiagnostic frame = value 192: <ul style="list-style-type: none"> • Bit 5 = 0 • Bit 6 = 1 • Bit 7 = 1
10	Bit 0 and bit 1 : Mode	<u>Bit 0 = 0 and Bit 1 = 0 :</u> <ul style="list-style-type: none"> • STEP1 : 30 first minutes after the power on <u>Bit 0 = 1 and Bit 1 = 0 :</u> <ul style="list-style-type: none"> • STEP2 : Learning (during 8 hours after the STEP1) <u>Bit 0 = 0 and Bit 1 = 1 :</u> <ul style="list-style-type: none"> • STEP3 : Nominal operation <u>Bit 0 = 1 and Bit 1 = 1 :</u> <ul style="list-style-type: none"> • Autotest or autodiagnostic KO
11	Autodiagnostic	<u>Autodiagnostic :</u> <ul style="list-style-type: none"> • If the byte = value 0 so no issue. • Else, contact the HDSN support.

