Calibrate LSE01 to use other soil

For Soil Moisture:
If there are three calibrate points (A,B,C and we got reading from these three points) and get below table:

LSE01 reading	A1	B1	C1
Actually reading by 3rd method (such as WET-2)	A2	B2	C2

After we got the above table. We can get calibrated reading from any measured point.
Assume X is the reading from LSE01. If we want to get a calibrated reading, Y, we can use below formula,

Y = X * A2 / A1 ; (while X<A1)
Y = (X-A1) * (B2-A2) / (B1-A1) + A2 ;   (while   A1<=X<B1)
Y = (X-B1) * (C2-B2) / (C1-B1) + B2 ;   (while   B1<=X<C1)
Y = X+C2-C1 ;   (while   X>=C1)
IF(Y>100) Y=100;
Where：Y: Value after calibrated, unit: %, X: LSE01 reading, Unit %

For Soil EC:
If there are three calibrate points (D,E,F and we got reading from these three points) and get below table:

LSE01 reading	D1	E1	F1
Actually reading by 3rd method (such as WET-2)	D2	E2	F2

After we got the above table. We can get calibrated readings from any measured point.
Assume X is the reading from LSE01. If we want to get a calibrated reading, Y, we can use below formula,

Formula:
If (X<D1)   **Then**   Y = X * D2 / D1 ;
If (D1<=X<E1)   **Then**   Y = (X-D1) * (E2-D2) / (E1-D1) + D2 ;
If (E1<=X<F1)   **Then**   Y = (X-E1) * (F2-E2) / (F1-E1) + E2 ;
If (X>=F1)   **Then**   Y = X+F2-F1 ;   (X>=F1)
Where：Y: Value after calibrated, , X: LSE01 reading

Example: Calculate to coco soil.

Below is the moisture reading before calibration.

Moisture	Reading in LSE01	Correct Reading in 3rd device (Bluelab Pulse)
0%	0 (D1)	0 (D2)
50%	25,05 (E1)	50 (E2)
80%	62,55 (F1)	80 (F2)

If we got a reading for LSE01, assume the reading is 40.25

Because 40.25 is between 25.05 and 62.55.
The value after calibration is
Y = (X-E1) * (F2-E2) / (F1-E1) + E2
Y = (40.25-25.05) * (80-50) / (62.55-25.05) + 50 = 62.16

Moisture/Hidrated with solution with 2,1 EC	EC Reading in LSE01	EC Correct Reading in 3rd device
0 %	0 D1	0 D2
50%	261 us/cm E1	2,5EC E2
80%	1150 us/cm F1	3,2 EC F2

If we got a reading for LSE01 , which is 230 us/cm.

Because 230us/cm is lower then 261us/cm.
The value after calibration is:
Y = (X-D1) * (E2-D2) / (E1-D1) + D2
= (230 – 0) * (2.5-0) / (261 – 0) + 0
= 2.2 EC

We have a decoder file for TTN for calibration as example, Download the file LSE01 Calibration Decoder_TTN.txt from this URL:
https://github.com/dragino/dragino-end-node-decoder/tree/main/LSE01

Input the calibrated point value from above:

```
var Moisture_A1=0;
var Moisture_B1=25.05;
var Moisture_C1=62.55;
var Moisture_A2=0;
var Moisture_B2=50;
var Moisture_C2=80;
var EC_D1=0;
var EC_E1=261;
var EC_F1=1150;
var EC_D2=0;
var EC_E2=2.5;
var EC_F2=3.2;
```

When there is an Uplink from LSE01, The result will output the calibrated data
Example: