LILLEBAKK

PROJECT NAME: LE_NB_IOT_CONTROLLER

CUSTOMER: KJELLER VINDTEKNIKK

FEATURES

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Contents

1. Module Interface

Table 1: Pin description

Pin name	Type	Domain (V)	Description	Comments

2. Electrical Characteristics

Verification levels:
- I. Specification concept 2 (final product)
   - a. Specification concept 1 (pilot)
- II. Measurements concept 0 (bench setup)
- III. Measurements concept 1 (pilot in field)
- IV. Measurements concept 2 (final product in field)

Table 2: Electrical characteristics

Parameter	Test #	Parameter name	Condition	Ver. level	Min	Typical	Max	Unit
Operating Conditions								
Ambient temperature		temp		I	-20	25	50	°C
Battery voltage		Vbat		I	2,0	3,6	3,7	V
Battery capacity			10 years life time	I	9		17	Ah
Ground		Gnd		I		0		V
Supply voltage Load cell[1]		Vlc		I		3,4		V
Supply voltage IA[2]		Via		I	4		16	V
Supply voltage OPAMP		Vopa		I	2,3		5,5	V
Supply voltage RF		Vrf		I	3,1	3,8	4,2	V
Supply voltage MCU		Vmcu		I	1,6		3,6	V
Supply voltage ext MEM		Vmem		I	1,8		5,5	V
Supply voltage REG		Vreg		I	1,8		5,5	V
Sampled data size		Ms		I		16		B
Internal data storage		Mint	Program memory	I		16		kB
External storage		Mext	Non-volatile EEPROM	I		256		kB
Sampling rate	1	Ts		I	1[3]	5[4]	3600	s
Data transmission rate	2	ttx		I	60	600	3600	s
DC Characteristics								
Regulator output voltage				I	3,3	3,7	4,0	V
Battery lifetime	3	Tbat	NB-IoT	I	2	10		years
				Ia		1[5]		
			GPRS	I	0,2	2		
				Ia		1[6]		
Internal storage span			16B/second	I		900		s
External storage span	4		16B/60 seconds	I		10		days
Transient Characteristics								
Supply IR drop			Including Tx burst.	I			200	mV
Transmission time				I		10		ms
Wake-up time from sleep				I		100		ms
Start-up time from power down				I		5		s
Transmission burst time				I		1		ms
AC Characteristics								
Transfer error rate	5	TER		I			5	%
				Ia			20	
PSRR			During sampling	I	40[7]			dB
Sensor Characteristics								
Tension range	6	Ffsr		I	0		150	kN
Total tension error	7	Ferr		I	-500		+500	N
				Ia	-900		+900	
Tension step size	8	Flsb		I		73		N
				Ia		300		
Output voltage		Vfout		I	1,000		2,000	V

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[1] Information labelled on the load cell.
[2] 5V is explicitly written, but there is a figure of common mode range where the supply is +-2V.
[3] 1 second for wave/resonance detection. Is this the same measurements that the accelerometer should measure?
[4] Current iokeys minimum setting, with 18 hours at max.
[5] Adding more battery capacity for safety.
[6] Adding more battery capacity for safety.
[7] <1mV for a 100mV noise @ vref=1V and 10 bits ADC.

2.1.1. Measurement resolution in current system

The information given by the current system states:
- Supply = 3,4V into the load cell
- Measurement range = [1,000, 2,000]V.
- Measurement resolution = 0,5mV.
- Total error of +-500N (100kN version).
⇨ Assuming the total non-linearity is 0,5mV. It's not stated whether this is the total peak to peak, or any direction. In the best case scenario it is total peak to peak giving +-0,25mV/1V. The resolution of the system would be ~12 bits, hence ~11bits if it is +-0,5mV.
⇨ In the web page it's stated a resolution of 1/2222 => ~11 bits (100kN version).
⇨ The microcontroller's ADC is 10 bits only (or even 8), single ended. And the range is from 1-2V, hence it must have 11 bits resolution in that limited area.

2.1.2. Measurement resolution in the new system
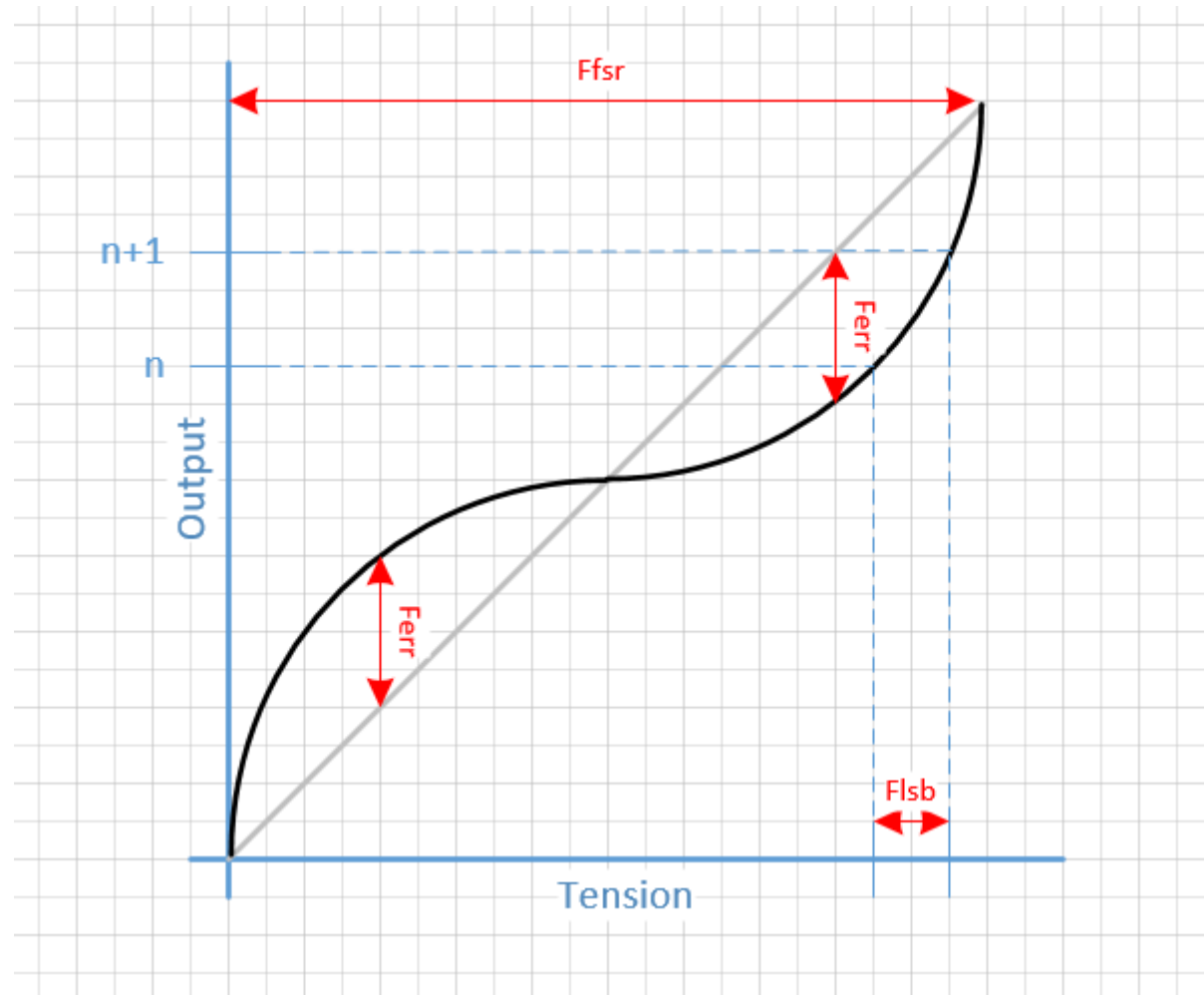
3. Data format and storage capacity

4. Cost

See: le_nb_iot_controller_current_consumption.xlsx.
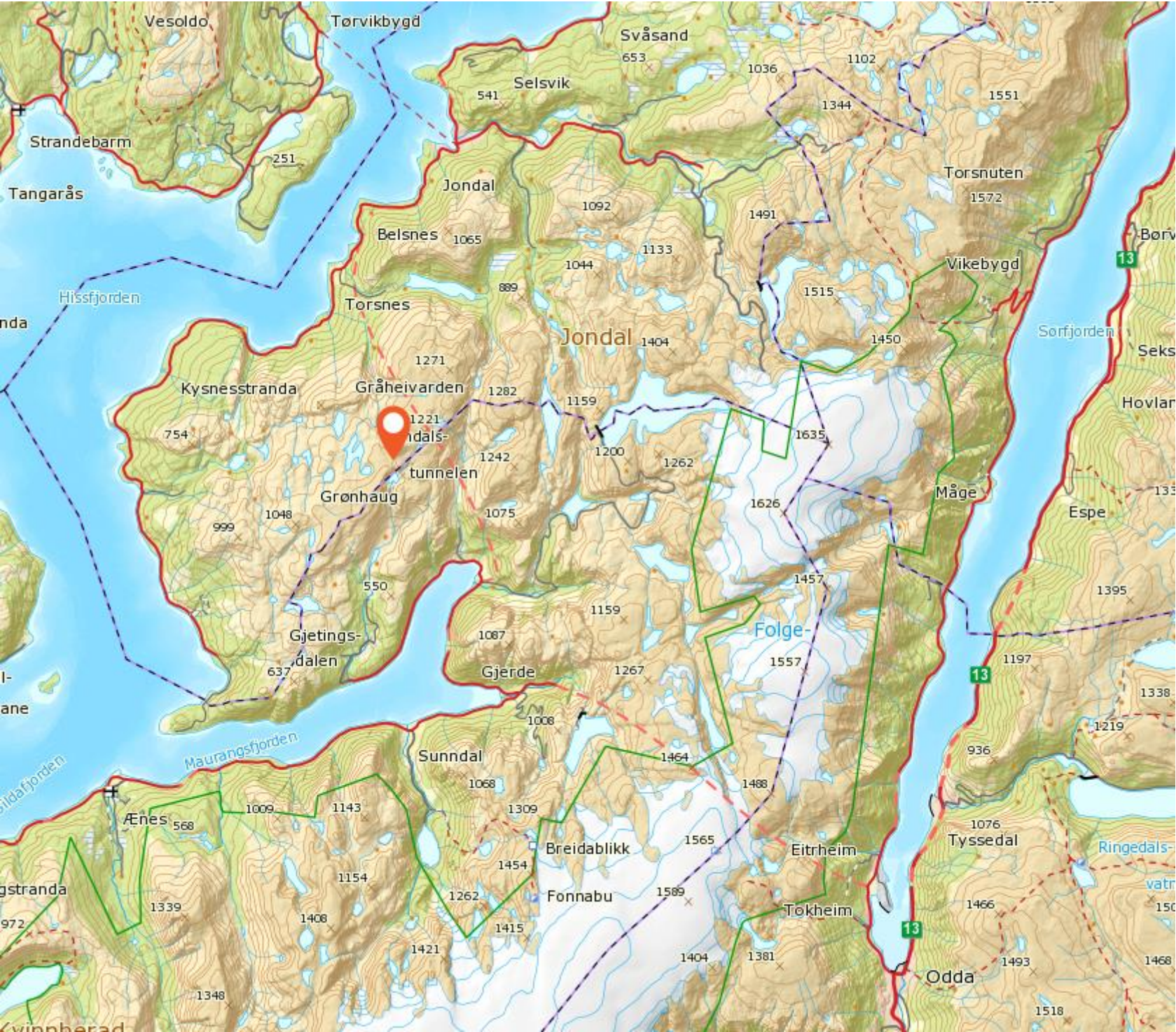
5. Deliverables

6. Module Background

This module is based upon the LPWAN SRD: ..\LE_LPWAN_SYSTEM\doc\lpwan_system_requirement.docx

6.1. Initial coverage
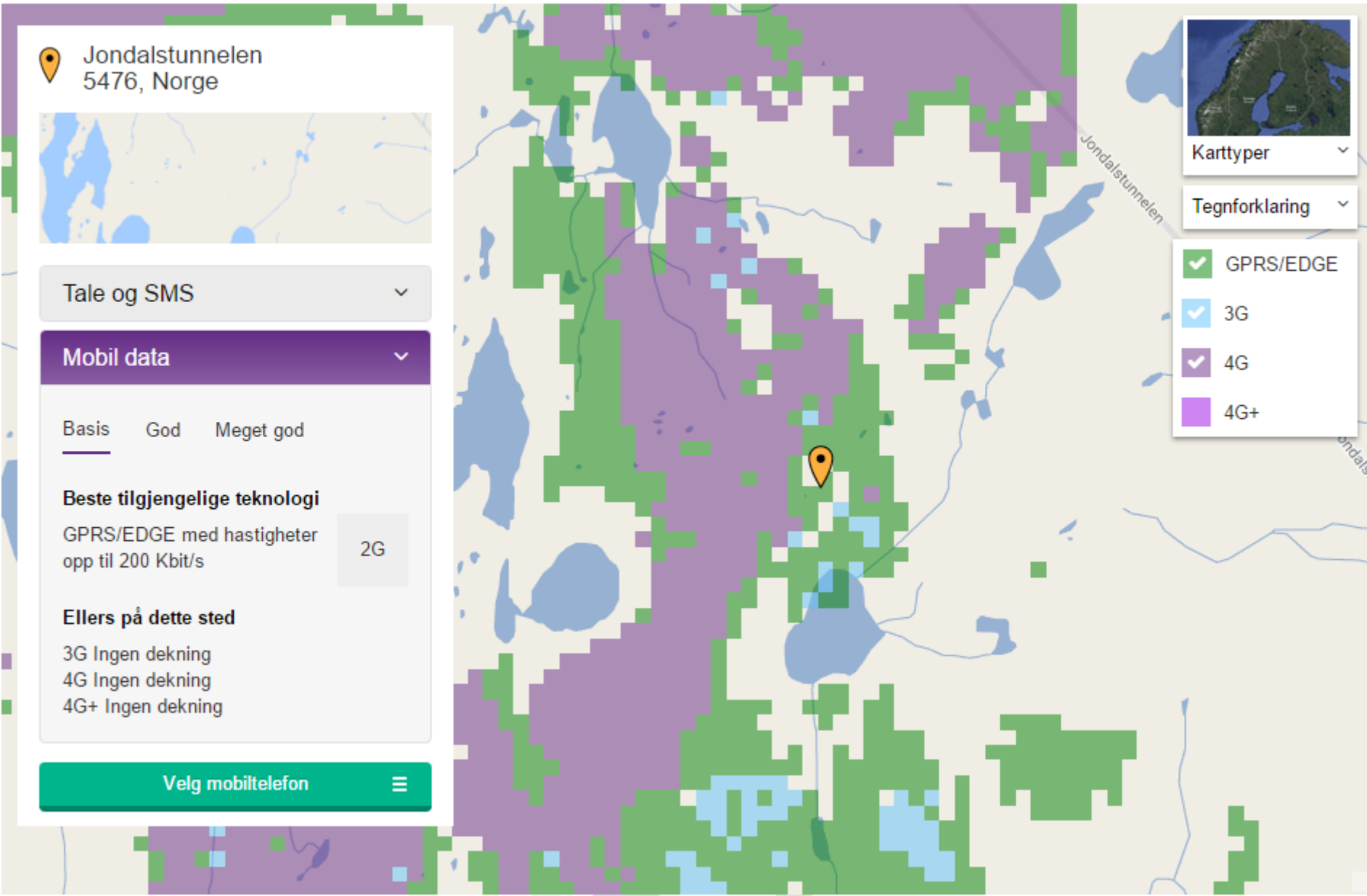
Wish from KJELLER VINDTEKNIKK:

Lastcelle i høyspentmast :

NORD	60.1889461
	60° 11.3367684'
	60° 11' 20.2061''
ØST	6.2401207
	6° 14.4072426'
	6° 14' 24.43455''

Mulig prøvespenn:

NORD	60.1616694
	60° 9.7001652'
	60° 9' 42.00991''
ØST	6.1779481
	6° 10.6768846'
	6° 10' 40.61308''

Fylkesvei 107 40
5626, Norge

Tale og SMS

Mobil data

Basis   God   Meget god

Beste tilgjengelige teknologi

4G med hastigheter opp til 55 Mbit/s   4G

Ellers på dette sted

GPRS/EDGE Ingen dekning
3G Ingen dekning
4G+ Ingen dekning

Velg mobiltelefon

Karttyper

Tegnforklaring

GPRS/EDGE
3G
4G
4G+