LCIE
Laboratoire de Moirans
Z.I. Centr'Alp
170, Rue de Chatagnon
38430 MOIRANS-FRANCE

GENERAL INFORMATION

FCCID: **YWW-BLNR**

1.1. Product description

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BL-NR Hose End Controller

BATTERY SUPPLIED ELECTRONIC MODULE DRIVEN FROM A SMARTPHONE OR A TABLET THANKS TO THE SOLEM "APP" AND BLUETOOTH LOW ENERGY

Applications :

Automatic irrigation of terraces (potted plants) and gardens (grass, clamps, garden, hedgerows).

Tap and hose connector

- 3/4" BSP thread type for European model
- 3/4" GHT thread type for US model
- Works with a pressure of 1 to 6 bar and a maximum of 38 l/mn water flow

Features :

- Bluetooth Low Energy Communication
- Standalone: works with a 9V alkaline battery types 6AM6 (international standards)or 6LR61 (European standards) not included
- Start/Stop programmable function
- Non volatile memory will save programming in case of power failure

Specifications :

- Bluetooth range : about 10 meters
- Tested on :
  - iPhone 4S, 5, 5s, 5c, iPad 3, 4, Mini, Air (with iOS 7.0 minimum)
  - Samsung Galaxy S3, S4, S5, Note 2 (with Android 4.3 minimum)
  - Sony Xperia Z, Z1 Compact (with Android 4.3 minimum)

Operating Temperature :

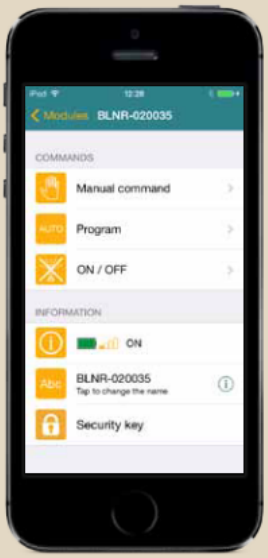
- Up to 50°C and must be protected from freezing in winter

Dimensions :

- Width : 11,5 cm
- Heigth : 14,5 cm
- Depth : 6 cm

Models :

- BL-NR-EU
- BL-NR-US



SOLEM ELECTRONIQUE

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1.2. Tested System Details

2. SYSTEM TEST CONFIGURATION

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):
BL-NR
Serial Number: BLNR-0203C6 and BLNR-0203A5

Photography of EUT

Power supply:
During all the tests, EUT is supplied by V_{nom}: 9VDC
For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply1	☐ AC ☐ DC ☑ Battery	-	6LR61-6AM6 9V / None	Alkaline Battery

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Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply1	DC	0.05	☑	☐	☑	-
Access 1	USB	1	☐	☐	☐	Temporary USB installed for the reception of different orders (power, choice of channel, modulation etc.)

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	ThinkPad Tseries	L3-B746308/01	-

Equipment information:

Type:	**Bluetooth Low Energy v4.0**			
Frequency band:	[2400 – 2483.5] MHz			
Sub-band REC7003:	Annex 3 (a)			
Spectrum Modulation:	☑ DSSS (Tested like it)			
Number of Channel:	40			
Spacing channel:	2MHz			
Channel bandwidth:	1MHz			
Transmit chains:	☑ 1	☐ 2	☐ 3	☐ 4
	☑ Single antenna	☐ Symmetrical	☐ Asymmetrical	
	Gain 1: 3dBi	Gain 2: dBi	Gain 3: dBi	Gain 4: dBi
Beam forming gain:	☐ Yes: dB		☑ No	
Receiver chains	☑ 1	☐ 2	☐ 3	☐ 4
Type of equipment:	☑ Stand-alone	☐ Plug-in	☐ Combined	
Ad-Hoc mode:	☐ Yes		☑ No	
Adaptivity mode:	☐ Yes (Load Based)	☐ Off mode	☑ No	
	Clear Channel Assessment Time:		None	
	q value for Load Based Equipment:		None	
Duty cycle used for all the tests:	☑ Continuous duty (95%)	☐ Intermittent duty	☐ Continuous operation	
Real Duty cycle:	2%			
Equipment type:	☑ Production model	☐ Prototype		
Chip Reference:	nRF51822 By Nordic Semiconductor			

Temperature range:	Tmin:	☑ -20°C	☐ 0°C	☐ °C
	Tnom:	20°C		
	Tmax:	☐ 35°C	☑ 55°C	☐ °C
Test source voltage:	☐ AC:	☐ DC:	☑ Battery: 9VDC / Alkaline	

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CHANNEL PLAN			
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
Cmin: 0	2402	Cmid: 20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	Cmax: 39	2480

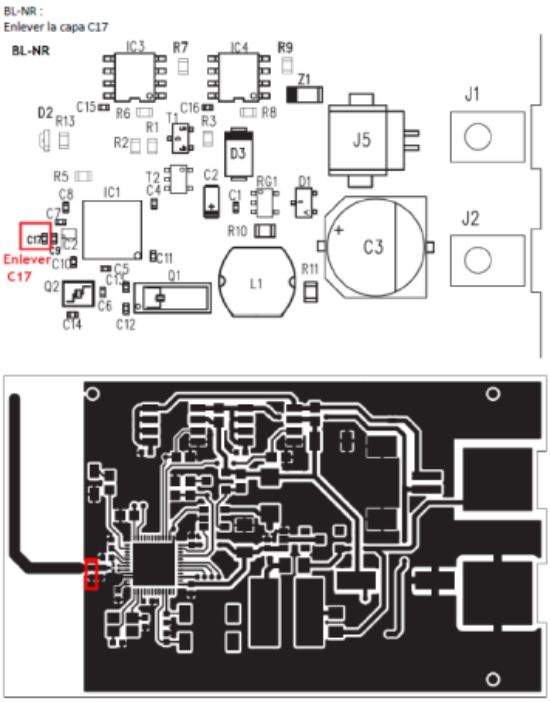
DATA RATE		
Data Rate (Mbps)	**Modulation Type**	**Worst Case Modulation**
1	GFSK	☑

2.2. *EUT CONFIGURATION*

The EUT is set in the following modes during tests with simulator / software (v1.93b): "Terminal"
- Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
- Permanent reception
- The Power order sent for the Module is set at 0dBm.

2.3. EQUIPMENT MODIFICATIONS

☐ None ☑ Modification:
The capacity C17 (1pF) between antenna and C9 (capacity) is removed, see following map:



2.4. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

FS = RA + AF + CF – AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5dBµV is obtained. The antenna factor of 7.4 and a cable factor of 1.1 are added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dBµV/m.
FS = 52.5 + 7.4 + 1.1 – 29 = 32 dBµV/m
The 32 dBµV/m value can be mathematically converted to its corresponding level in µV/m.
Level in µV/m = Common Antilogarithm [(32dBµV/m)/20] = 39.8 µV/m.

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1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-2003, FCC Part 15 Subpart C.
Radiated testing was performed at an antenna to EUT distance of 10 meters. During testing, all equipment's and cables were moved relative to each other in order to identify the worst case set-up.

1.4. Test facility

Tests have been performed on from November 17th to 26th, 2014.

This test facility has been fully described in a report and accepted by FCC as compliant with the radiated and AC line conducted test site criteria in ANSI C63.4-2003 in a letter dated March 25th, 2008 (registration number 94821).
This test facility has also been accredited by COFRAC (French accreditation authority for European Union test lab accreditation organization) according to NF EN ISO/IEC 17025, accreditation number 1-1633 as compliant with test site criteria and competence in 47 CFR Part 15/ANSI C63.4 and EN55022/CISPR22 norms for 89/336/EEC European EMC Directive application. All pertinent data for this test facility remains unchanged.