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

GENERAL INFORMATION

FCCID: **2AHP8-097742**

1.1. Product description

Schneider Electric

Connected Products –5–

Wireless thermal monitoring sensor Easergy TH110 for electrical power distribution

1. General

1.1 Scope

This document describes wireless thermal Easergy TH110 sensor for any high voltage connection, electrically not insulated, within metal enclosed switchgear for alternating current of rated voltages above 1 kV and up to and including 40 kV for indoor installation, and for service frequencies up to and including 60 Hz.

Main connections are as follows

1) Cable connections
2) CB arms
3) Busbars

1.2 Wireless and battery free thermal sensor

The main components of the sensor are as follows:

Thermistor;

Coil;

Electronic

Soft-ferromagnetic core ribbon

Transceiver;

Clamp;

1.3 Functional description of the wireless and battery free thermal sensor

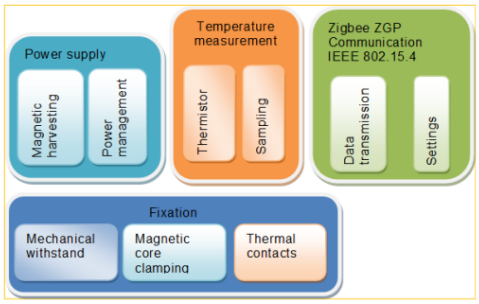

Figure 1: Functional schema

Description of the thermal monitoring sensor:

The E-MAG thermal sensor is a self-powered sensor using stray magnetic fields. The energy harvester is made with a ferromagnetic core (ribbon) installed around the electrical conductor to monitor passing through a solenoid coil. The stray 50-60Hz magnetic field surrounding electrical conductor induces a voltage (Vind) on coil terminals (See Fig 2).

Wireless sensor transmits data by means of radio frequency protocol Zigbee Green Power (2,4GHz).

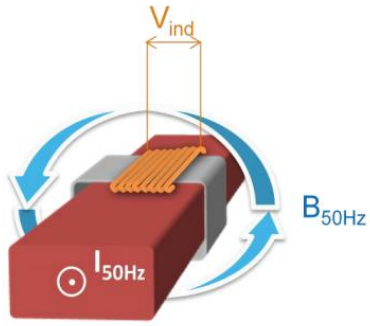

Figure 2: Magnetic energy harvester

1.4 Temperature measurement and electrical requirement

The thermistor will measure the conductor surface temperature.

1.5 Energy harvesting

The ferromagnetic core (ribbon) shall be installed around the electrical conductor to monitor without any mechanical intervention, without any opening of the power circuit. This means the ferromagnetic core shall be opened before installation and shall be closed during the installation with about 10mm as a minimum of overlapping between both extremities.

The ferromagnetic core is assumed as the mechanical fixing of the sensor

_Electrical insulation:	No (Naked conductor)
_Contact type:	Flat 30mm minimum required or round 40-80mm
_Geometric:	any shapes, any angles, any directions.

1.6 Mechanical enclosure and attachement of the sensor

The enclosure of the sensor protects the electronic components from the surrounding service conditions. A covering tape will secure the attachement of the sensor on the active part, to get a redundant function with the ferromagnetic ribbon.

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1.7 Radio frequency communication

The RF communication is based on Zigbee Green Power (ZGP) protocol and will be according to the IEEE 802.15.4 standard. The ZGP protocol is dedicated to very low power consumption end devices.

Data sheet of equipment

1.2. Tested System Details

Power supply:

During all the tests, EUT is supplied by V_{nom}: 3VDC
For measurement with different voltage, it will be presented in test method.

Power supply :

Name	Type	Rating	Reference	Comments
Supply1	Magnetic field	3vdc	/	/
Supply1_bis	☐ AC ☐ DC ☑ Battery	3Vdc	2 x AA battery	Set only for test

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply1_bis	Power supply from two AA battery "set only for emulate power provide by magnetic field	/	/	/	/	Set only For test

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Atmel ATMEGA 256RFR2 Xplaned	A091784/03	MAC 0004251918010594	FW: fcc_test_rfr2-1-0-0.hex
Laptop	ProBook 6470b	/	/

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Equipment information:

Type:	☑ **ZIGBEE**		☐ **RF4CE**
Frequency band:	[2400 – 2483.5] MHz		
Spectrum Modulation:	☑ DSSS		
Number of Channel:	16		
Spacing channel:	5MHz		
Channel bandwidth:	2MHz		
Antenna Type:	☑ Integral	☐ External	☐ Dedicated
Antenna connector:	☐ Yes	☑ No	☐ Temporary for test
Transmit chains:	☑ 1		
	Single antenna		
	Gain 1: 0		Gain 2: XdBi
Beam forming gain:	No		
Receiver chains	1		
Type of equipment:	☐ Stand-alone	☑ Plug-in	☐ Combined
Ad-Hoc mode:	☐ Yes		☑ No
Duty cycle:	☑ Continuous duty	☐ Intermittent duty	☐ 100% duty
Equipment type:	☐ Production model		☑ Pre-production model
Operating temperature range:	Tmin:	☐ -20°C	☐ 0°C	☑ -30°C
	Tnom:	20°C		
	Tmax:	☐ 35°C	☐ 55°C	☑ 100°C
Type of power source:	☐ AC power supply	☐ DC power supply	☑ Battery	

CHANNEL PLAN	
Channel	**Frequency (MHz)**
Cmin: 11	2405
12	2410
13	2415
14	2420
15	2425
16	2430
17	2435
Cmid: 18	2440
19	2445
20	2450
21	2455
22	2460
23	2465
24	2470
25	2475
Cmax: 26	2480

DATA RATE		
Data Rate (Mbps)	**Modulation Type**	**Worst Case Modulation**
0.25	O-QPSK	☑

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1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 or ANSI C63.10, 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 **from February 15, 2016 to February 16, 2016**.

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 and ANSI C63.10 (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.