

RRA-EMIESS23G186SCH-01Av0

Radio test report

According to the standard:

CFR 47 FCC PART 15

RSS GEN – Issue 5

RSS 247 – Issue 2

Equipment under test:

WIRELESS / BATTERYLESS LIMIT SWITCH

FCC ID: ***Y7HXC MW***

IC NUMBER: ***7002C-XCMW***

Company:

SCHNEIDER ELECTRIC INDUSTRIES

Distribution: Mr CORAZZA

(Company: SCHNEIDER ELECTRIC INDUSTRIES)

Number of pages: 11 with 2 annexes

Ed.	Date	Modified Page(s)	Technical Verification and Quality Approval	
			Name and Function	Visa
0	4-Oct-23	Creation	M. DUMESNIL, Radio Laboratory Manager	

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This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of the whole manufactured products of the tested sample.

Information in italics are declared by the manufacturer/customer and are under his responsibility

DESIGNATION OF PRODUCT: ***WIRELESS / BATTERYLESS LIMIT SWITCH***

Serial number (S/N): Conducted Sample: FF700D87
Radiated Sample: FF700D89

Reference / model (P/N): XCMW110

Software version: XCMW_V1.0.HEX

Firmware version: 1.0

MANUFACTURER: SCHNEIDER ELECTRIC INDUSTRIES FRANCE L'ISLE D'ESPAGNAC

COMPANY SUBMITTING THE PRODUCT:

Company: SCHNEIDER ELECTRIC INDUSTRIES FRANCE L'ISLE D'ESPAGNAC

Address: BP 660 –Zone Industrielle L'ISLE D'ESPAGNAC
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Responsible: Mr LAIDET

DATES OF TEST: 4-Oct-23

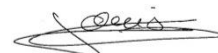
TESTING LOCATION: EMITECH ANGERS laboratory at JUIGNE SUR LOIRE (49) FRANCE

FCC Accredited under US-EU MRA Designation Number: FR0009
Test Firm Registration Number: 873677

ISED Accredited under CANADA-EU MRA Designation Number: FR0001
Industry Canada Registration Number: 4452A

TESTED BY: S. LOUIS

VISA:

A handwritten signature in black ink, appearing to read "Louis", with a stylized flourish underneath.

WRITTEN BY: S. LOUIS

CONTENTS

TITLE	PAGE
1. INTRODUCTION	4
2. PRODUCT DESCRIPTION	4
3. NORMATIVE REFERENCE	5
4. TEST METHODOLOGY	6
5. TEST EQUIPMENT CALIBRATION DATES	6
6. TESTS RESULTS SUMMARY	7
7. MEASUREMENT UNCERTAINTY	8
8. ANTENNA GAIN CALCULATION	9
APPENDIX 1: TEST EQUIPMENT LIST	11
APPENDIX 2: CONDUCTED MEASUREMENT – TEST SET UP	11

REVISIONS HISTORY

Revision	Date	Modified pages	Modifications
0	4-Oct-23	/	Creation

1. INTRODUCTION

This report presents the results of radio test carried out on the following radio equipment: **Wireless / Batteryless limit switch**, in accordance with normative reference.

The device under test integrates a monofrequency zigbee radio emitter (2405MHz).

This report is a justification statement for antenna as stated in 'Timco' newsletter for Part 15 applications with equipment classes DTS, DSS, NII, 6ID, etc. which require the antenna gain for compliance with EIRP limits.

2. PRODUCT DESCRIPTION

Class:	B
Utilization:	Residential
Antenna type and gain:	Whip antenna (3.17dBi)
Operating frequency band:	From 2400 MHz to 2483.5 MHz
Number of channels:	1
Frequencies tested:	2405 MHz
Channel spacing:	Not concerned
Modulation:	Zigbee
Power source:	3Vdc

Power level, frequency range and channels characteristics are not user adjustable.
The details pictures of the product and the circuit boards are joined with this file.

3. NORMATIVE REFERENCE

The standards and testing methods related throughout this report are those listed below.

They are applied on the whole test report even though the extensions (version, date and amendment) are not repeated.

CFR 47 FCC Part 15 (2021) Radio Frequency Devices

ANSI C63.10 2013
Procedures for Compliance Testing of Unlicensed Wireless Devices.

558074 D01 15.247 Meas Guidance v05r02
Guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules.

RSP-100 Issue 12, August 2019
Certification of Radio Apparatus

RSS-Gen Issue 5, April 2018
General Requirements for Compliance of Radio Apparatus

RSS-247 Issue 2, February 2017
Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

4. TEST METHODOLOGY

Justification statement:

For antenna as stated in 'Timco' newsletter for Part 15 applications with equipment classes DTS, which require the antenna gain for compliance with EIRP limits.

Radio performance tests procedures given in CFR 47 part 15:

Subpart C – Intentional Radiators

Paragraph 247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz

5. TEST EQUIPMENT CALIBRATION DATES

Emitech Number	Model	Type	Last calibration	Calibration interval (years)	Next calibration due
0	BAT-EMC V3.18.0.26	Software	/	/	/
7566	Testo 608-H1	Meteo station	12/12/2022	2	12/12/2024
8549	Midwest Microwave 20dB	Attenuator	07/03/2022	3	06/03/2025
8775	Fontaine FTN 2515B	Power source	(1)	(1)	(1)
8896	ACQUISYS GPS8	Satellite synchronized frequency standard	/	/	/
10759	COMTEST Cage 3	Anechoic chamber	/	/	/
10771	EMCO 3117	Antenna	30/11/2022	3	30/11/2025
10789	MATURO	Turntable and mat controller NCD	/	/	/
14303	SUCOFLEX N-2m	cable	01/12/2022	2	30/11/2024
14831	Fluke 177	Multimeter	01/02/2022	2	01/02/2024
15666	R&S FSV40	Spectrum Analyzer	27/09/2022	2	26/09/2024
15883	SUCOFLEX	cable N 5m	08/02/2023	2	07/02/2025
15913	SUCOFLEX SF104 N 2.5m	Cable	01/12/2022	2	30/11/2024

6. TESTS RESULTS SUMMARY

6.1 CFR 47 part 15 requirements

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.247	OPERATION WITHIN THE BANDS 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz					
	(b) Maximum peak output power	X				Note 1
	(c) Operation with directional antenna gains > 6 dBi			X		

NAp: Not Applicable

NAs: Not Asked

Note 1: First, a measurement was performed using the radiated method, then a conducted measurement was performed with the conducted sample replacing the integral antenna by a reverse SMA connector.

Gain antenna is calculated by subtracting conducted power measurement from radiated power measurement.

7. MEASUREMENT UNCERTAINTY

To declare, or not, the compliance with the specifications, it was not explicitly taken into account of uncertainty associated with the result(s)

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for normal distribution corresponds to a coverage probability of approximately 95%.

Parameter	Emitech Uncertainty
RF power, conducted	$\pm 0.8\text{dB}$
Radiated emission valid to 26 GHz	
9kHz – 30MHz	$\pm 2.7. \text{ dB}$
30MHz – 1GHz	$\pm 5.0 \text{ dB}$
1GHz – 18GHz	$\pm 5.3 \text{ dB}$
18GHz – 40GHz	$\pm 6.1 \text{ dB}$
AC Power Lines conducted emissions	$\pm 3.4 \text{ dB}$
Temperature	$\pm 1 \text{ }^{\circ}\text{C}$
Humidity	$\pm 5 \%$

8. ANTENNA GAIN CALCULATION

Temperature (°C) : 21.8

Humidity (%HR): 45

Date : October 4, 2023

Technician : S. LOUIS

Standard: FCC Part 15
RSS-247

Test procedure:

For FCC Part 15: paragraph 15.247 (b)

For RSS-247: paragraph 5.4

RBW≥DTS bandwidth method of paragraph 11.9.1.1 of ANSI C63.10

Radiated Method Measurement:

First an exploratory radiated measurement was performed. During this phase the product is oriented in these two normal positions.

Then the final measurement is realized with the product on the most critical orientation.

The system is tested in anechoic chamber, the EUT is placed on a rotating table, 1.5 m from a ground plane.

Zero degree azimuths correspond to the front of the device under test.

Distance of antenna: 3 meters

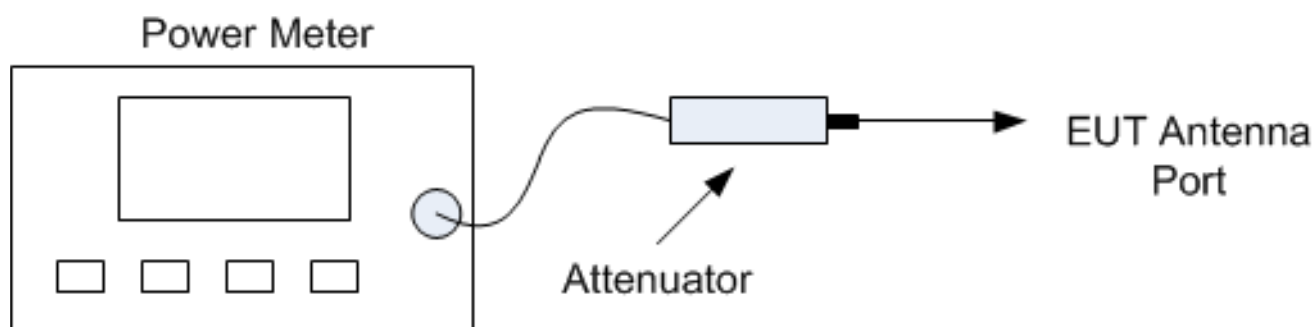
Antenna height: 1.5 meter

Antenna polarization: vertical and horizontal (only the highest level is recorded)

The measurement of the radiated electro-magnetic field is realized with an analyser and peak detector. The resolution bandwidth is adjusted at 10 MHz and video bandwidth at 10 MHz. (11.9.1.1 of ANSI C63.10)

Conducted Method Measurement:

Conducted test



The measure is realized in conducted mode with an analyser and peak detector. The resolution bandwidth is adjusted at 10 MHz and video bandwidth at 10 MHz. (11.9.1.1 of ANSI C63.10)

Equipment under test operating condition:

The equipment under test is blocked in continuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Tests are performed with internal antenna

Power source: 3 Vdc by an external power supply

Percentage of voltage variation during the test (%): ± 1

Results:

Sample N° 1 Low Channel (F = 2405 MHz)

	Radiated Output power measured at 3 meters (dBμV/m):	Conducted Output Power computed (1) (dBm)	Conducted Output Power measured (dBm)	Antenna Gain calculation (dBi)
Nominal supply voltage: 3Vdc	100.8	5.57	2.40	3.17

Polarization of test antenna: Horizontal (height: 150 cm)

Position of equipment: Stand Position - (azimuth: 65 degrees)

(1) Conducted output power:

$EIRP(dBm) = E (dBμV/m) + 20\log(D) - 104.8$; where D is the measurement distance in meters and antenna

Gain = 0dBi (considered)

□□□ End of report, 2appendixes to be forwarded □□□

APPENDIX 1: Test equipment list

Antenna Gain Calculation

TYPE	MANUFACTURER	EMITECH NUMBER
Full anechoic chamber	EMITECH	10759
Turntable and mat controller NCD	MATURO	10789
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSV40	Rohde & Schwarz	15666
Antenna 3117	ETS-Lindgren	10771
N-2M Cable	SUCOFLEX	14303
N-5M Cable	SUCOFLEX	15883
N-2.5M Cable	H & S	15913
Attenuator 20dB	Midwest Microwave	8549
Power source FTN 2515B	Fontaine	8775
Multimeter 177	Fluke	14831
Meteo station 608-H1	TESTO	7566
Software	BAT-EMC V3.18.0.26	0000

APPENDIX 2: Conducted measurement – Test set up

