



R041-12-106607-3A - DM / CHB

# EVALUATION OF HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS

According to the standard(s):

EN 50364:2010

Equipment under test:

**RAL STAINER**

Company:

**RAL DIAGNOSTICS**

Diffusion: Mr WALLART

(Company: ILSA FRANCE)

Number of pages: 11 including 1 annex

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## Conseils & Ingénierie - Tests & Mesures - Formation

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*NAME OF THE EQUIPMENT  
UNDER TEST (E.U.T.)* : RAL STAINER

*Serial number* : 6877 0580

*P/N* : 405 000 / 414 195

*Software version* : /

*MANUFACTURER'S NAME* : RAL DIAGNOSTICS

*APPLICANT'S ADDRESS (PRODUCTION SITE):*

*Company* : ILSA FRANCE

*Address* : Rue de la Comtesse  
25640 MARCHAUX  
FRANCE

*Person(s) present during the  
tests* : Nobody

*Responsible* : Mr WALLART

*DATE(S) OF TESTS* : December, the 19<sup>th</sup> of 2012

*TESTS LOCATION(S)* : Emitech Grand Sud Laboratory in VENDARGUES (34)  
FRANCE

*TESTS SUPERVISOR(S)* : None

*TESTS OPERATOR(S)* : David MONTAULON

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**1. INTRODUCTION**

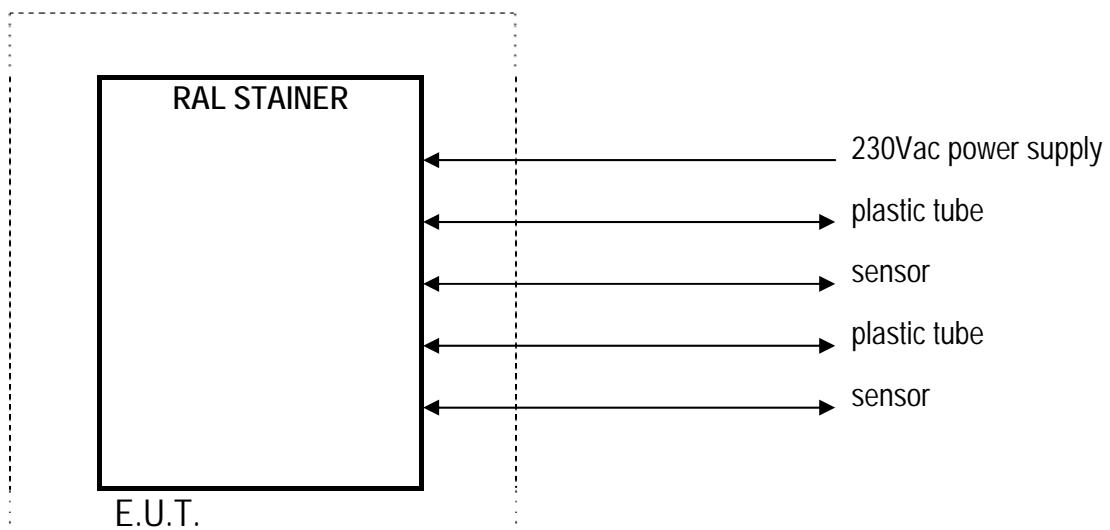
This report presents the results of the measurements performed on **System radio RFID à 13.56 MHz RAL STAINER** in order to verify the compliance of this product with the European standard EN 50364:2001 which requirements are derived from the European recommendation 99/519/EC

**2. REFERENCE DOCUMENT(S)**

EN 50364:2010	Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 10 GHz, used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications.
EN 62369-1:2009	Evaluation of human exposure to electromagnetic fields from devices used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications.
Recommendation 99/519/EC of 12 July 1999	Limitation of exposure of the general public to electromagnetic fields.

**3. EQUIPMENT UNDER TEST CONFIGURATION**

Cycle and operating mode during emission tests: Permanent emission mode with modulation.

**4. EQUIPMENT UNDER TEST CONFIGURATION SCHEME**

**5. SUMMARY OF TEST RESULTS**

Tests designation	Results satisfying?	Comments
Spacially average measurement	YES	
Measurement of limb and contact currents	YES	

N.P.: Not Performed.

N.A.: Not Applicable.

▪ **In emission:**

Sample subject to the test complies with prescriptions of the standard(s) EN 50364:2010 according to limits, specified in this test report.

**6. SPACIALLY AVERAGE MEASUREMENT***Temperature (°C): 22**Humidity (%HR): 29**Pressure (hPa): 1015***Standard:** EN 50364:2010**Test method:** EN 62369-1:2009

The Derived Reference Levels are based on spatially averaged values over the entire body of the exposed individual. The measurement was performed to verify the compliance of the EUT with the derived reference levels in the frequencies of interest.

The fundamental frequency of emission of EUT is 13.56MHz. The compliance with radio standard EN 300 330 imposes that harmonics are low and spurious much lower, in consequence all the records are performed at fundamental frequency.

Moreover the type of tested equipment emits a near field inductive field and electric component of the electro-magnetic field is lower than in plane wave.

So only H field is taken into account in the measurements and the SAR (\*) calculated with this value will be an overvaluation of the actual SAR (\*) (see § 4.2.2 of the EN 50357).

The limit defined for H field is 73mA/m at 13.56MHz.

(\*) *Specific Absorption Rate*

**Test configuration according to table 1 of the standard:** Figure 9

**Test equipment list:**

CATEGORY	BRAND	TYPE	N° EMITECH
Antenna	boucle	7.5 cm	2464
Cable		N-1m	2706
Spectrum analyzer	Agilent	E4440A	5824

**Results:** See Board in annex: H = 0.16mA/m

**7. MEASUREMENT OF LIMB AND CONTACT CURRENTS***Temperature (°C): 22**Humidity (%HR): 29**Pressure (hPa): 1015***Standard:** EN 50364:2010**Test method:** EN 62369-1:2009

Body current measurements under consideration are those defined by ICNIRP with frequencies up to 110 MHz.

Two types of current are mentioned:

- limb current
- contact current

Both limb and contact current arise from a person touching a metallic object isolated from the ground and charged by electromagnetic field or a charged person isolated from the ground and touching a grounded metallic object.

The limb current is set to prevent excessive SAR (\*) in the wrists, elbows, ankle and knees. The limit is 45mA for the relevant frequency.

The contact current is set to prevent the risk of shock, or burn from light contact of the fingers with the external object. The limit of contact current is 20mA for the relevant frequency.

The limb and contact current assume different contact impedance.

(\*) *Specific Absorption Rate*

**Test equipment list:**

CATEGORY	BRAND	TYPE	N° EMITECH
Cable		N-1m	2706
Measurement clamp	FCC	F-80	2535
Spectrum analyzer	Agilent	E4440A	5824

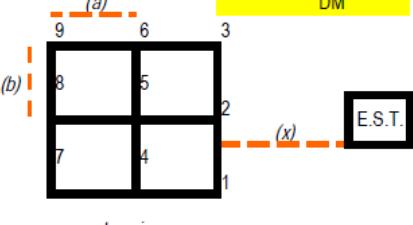
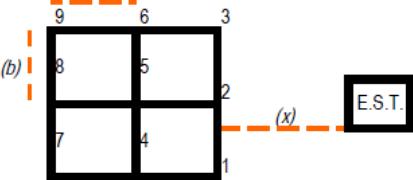
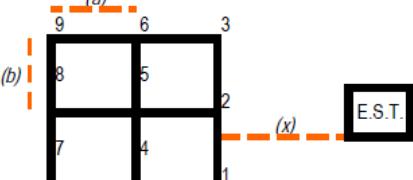
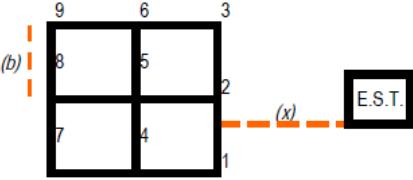
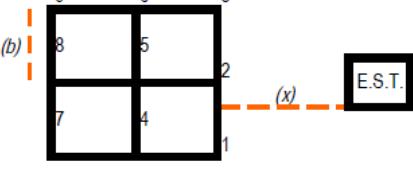
**Results:** See Board in annex 1: $H \text{ (limbs)} = 0.04$ 

□□□ *End of report – 1 annex to be forwarded* □□□

# **ANNEX:**

# **RESULTS BOARD(S)**

# **AND PHOTOGRAPH(S)**

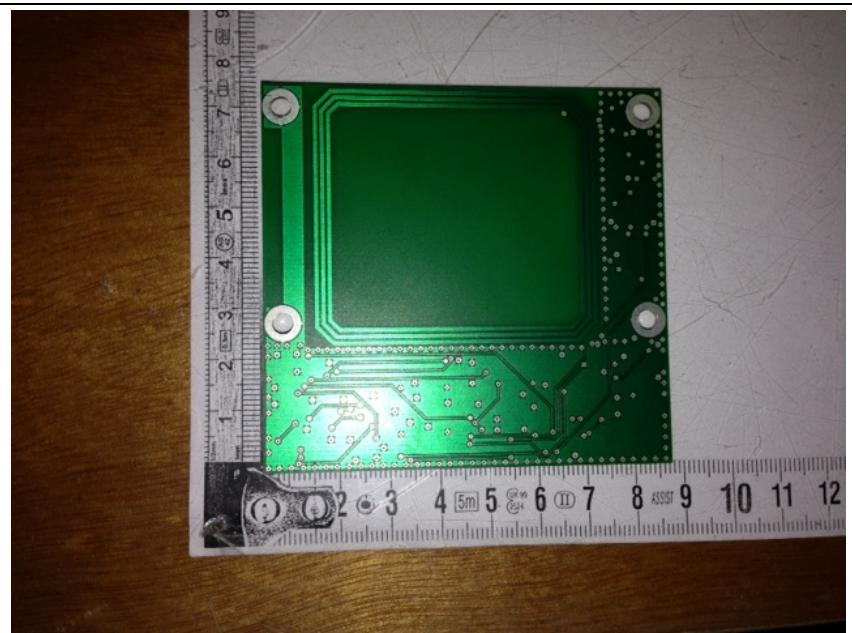
ISLA		RAL STAINER		041-12-106607	19/12/2012
Test configuration : 9		Equipment height (m) : 0.8		distance ( $x$ ) : 0.2m	( $a$ )=( $b$ )=0.15m
point	measure (dBuV)	point	measure (dBuV)	field (mA/m)	
1	45			0.462	
2	48			0.653	
3	41			0.292	
4	35			0.146	
5	37			0.184	
6	33			0.116	
7	28			0.065	
8	25			0.046	
9	27			0.058	
Measurement height (m): 0.85		field (mA/m)			
point	measure (dBuV)	point	measure (dBuV)	field (mA/m)	
1	40			0.260	
2	43			0.367	
3	38			0.207	
4	33			0.116	
5	34			0.130	
6	32			0.104	
7	26			0.052	
8	27			0.058	
9	25			0.046	
Measurement height (m): 1		field (mA/m)			
point	measure (dBuV)	point	measure (dBuV)	field (mA/m)	
1	33			0.116	
2	33			0.116	
3	32			0.104	
4	26			0.052	
5	28			0.065	
6	27			0.058	
7	20			0.026	
8	23			0.037	
9	23			0.037	
Measurement height (m): 1.15		field (mA/m)			
point	measure (dBuV)	point	measure (dBuV)	field (mA/m)	
1	33			0.116	
2	33			0.116	
3	32			0.104	
4	26			0.052	
5	28			0.065	
6	27			0.058	
7	20			0.026	
8	23			0.037	
9	23			0.037	
Measurement height (m): 1.3		field (mA/m)			
point	measure (dBuV)	point	measure (dBuV)	field (mA/m)	
1	26			0.052	
2	27			0.058	
3	25			0.046	
4	21			0.029	
5	21			0.029	
6	23			0.037	
7	20			0.026	
8	21			0.029	
9	19			0.023	
Measurement height (m): 1.45		field (mA/m)			
point	measure (dBuV)	point	measure (dBuV)	field (mA/m)	
1	23			0.037	
2	21			0.029	
3	20			0.026	
4	20			0.026	
5	19			0.023	
6	18			0.021	
7	15			0.015	
8	19			0.023	
9	17			0.018	
Spatially averaged measure:		value (mA/m)		limit (mA/m)	
		0.16		73	
Measure in arm:		measure (dBuV)		current (mA)	
Measure in ankle:		45		0.04	
		35		0.01	
Field measure at 1cm (middle of the reader) :		measure (dBuV)		limit (mA/m)	
				0.00	
				none : for information	

## EQUIPMENT UNDER TEST (E.U.T.) PHOTOGRAPH(S)

## System radio RFID à 13.56 MHz RAL STAINER

E.U.T. Photograph(s)	 <p><b>RAL Stainer</b> REF 405 000 SN 6877 0580 100-230 V~ 50-60 Hz 150 VA T3.15A RAL INSTRUMENTS Site Montesquieu 33 650 MARTILLAC FRANCE 03 / 2012 Intended use CE R0 Fabriqué en FRANCE</p>
RFID board	 <p>A green printed circuit board (PCB) with an integrated circuit and a metal clip, placed next to a metric ruler for scale. The board has handwritten markings: '2804' and '2804'.</p>

RFID board



Spatial average measurement

