

## R051-24-11-104471-4/A Ed. 2

“This report cancels and replaces test report R051-24-11-104471-4/A Ed.1”

### **RADIO test report**

**according to standard:  
CFR 47 FCC Part 15**

**Equipment under test:  
REMOTE TELEMETRY UNIT  
Lx**

**FCC ID: RCJLX**

**Company:  
LACROIX SOFREL**

**DISTRIBUTION: Mr HOUDANT**

**Company: LACROIX SOFREL**

**Number of pages: 12 including 1 annex**

Ed.	Date	Modified pages	Written by		Technical Verification Quality Approval	
			Name	Visa	Name	Visa
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Duplication of this document is only permitted for an integral photographic facsimile. It includes the number of pages referenced here above.  
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.



**PRODUCT:** REMOTE TELEMETRY UNIT

**Reference / model:** Lx

**Serial number:** not communicated

**MANUFACTURER:** LACROIX SOFREL

**COMPANY SUBMITTING THE PRODUCT:**

**Company:** LACROIX SOFREL

**Address:** 2 rue du Plessis  
35770 VERN SUR SEICHE  
FRANCE

**Responsible:** Mr HOUDANT

**DATE(S) OF TEST:** 13 February 2012

**TESTING LOCATION:** EMITECH ATLANTIQUE laboratory at ANGERS (49) FRANCE  
EMITECH ATLANTIQUE open area test site in LA POUEZE (49)  
FRANCE  
FCC Registration Number: 101696 / FRN: 0006649008

**TESTED BY:** J. L. JAMET

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### **1. INTRODUCTION**

This report presents the results of radio test carried out on the following equipment: REMOTE TELEMETRY UNIT-Lx, in accordance with normative reference.

This device contains RF modules already certified (Bluetooth Modular Approval - FCC ID: QOQWT11IA ; PCS Modular Approval – FCC ID: N7NSL6087)

### **2. PRODUCT DESCRIPTION**

Class:	B (residential environment)
Utilization:	GSM and Bluetooth link
Antenna type and gain:	incorporated GSM antenna, 2.5 dBi max at 1900 MHz
Operating frequency range:	from 824.2 MHz to 849.2 MHz (GSM-850) From 1850.2 MHz to 1909.8 MHz (PCS-1900) From 2400 MHz to 2483.5 MHz (Bluetooth)
Channel spacing:	200 kHz (GSM-850 and PCS-1900) 1 MHz (Bluetooth)
Power source:	internal battery 3.6 Vd.c.

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.

FCC Part 15 (2012)	Radio Frequency Devices
ANSI C63.4 (2003)	Methods of Measurement of Radio-Noise Emissions from Low-voltage Electrical and Electronics Equipment in the range of 9 kHz to 40 GHz.

#### **4. TEST METHODOLOGY**

Radio performance tests procedures given in part 15:

Subpart B –Unintentional Radiators

Paragraph 107: conducted limits

Paragraph 109: radiated emission limits

Paragraph 111: antenna power conduction limits for receivers

Subpart C – Intentional Radiators

Paragraph 203: antenna requirement

Paragraph 207: conducted limits

Paragraph 209: radiated emission limits; general requirements

## 5. TESTS RESULTS SUMMARY

### 5.1 unintentional radiator (subpart B)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.107	CONDUCTED LIMITS			X		<i>Note 1</i>
FCC Part 15.109	RADIATED EMISSION LIMITS	X				
FCC Part 15.111	ANTENNA POWER CONDUCTED LIMITS FOR RECEIVER			X		

NAp: Not Applicable

NAs: Not Asked

### 5.2 intentional radiator (subpart C)

Test procedure	Description of test	Criteria respected ?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.203	ANTENNA REQUIREMENTS	X				<i>Note 2</i>
FCC Part 15.207	CONDUCTED LIMITS			X		<i>Note 1</i>
FCC Part 15.209	RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS	X				<i>Note 3</i>

NAp: Not Applicable

NAs: Not Asked

*Note 1: equipment powered by a 3.6 Vd.c. battery.*

*Note 2: Integral antenna*

*Note3: Unwanted emissions levels are all below the fundamental emission field strength level.*

## Conclusion:

The sample of REMOTE TELEMETRY UNIT-Lx submitted to the tests complies with the regulations of the standard FCC Part 15 in accordance with the limits or criteria defined in this report.

## **6. RADIATED EMISSION LIMITS**

**Standard:** FCC Part 15

**Test procedure:** paragraph 109

**Limit class:** Class B

**Test equipments:**

TYPE	BRAND	EMITECH NUMBER
Test receiver ESVS10	Rohde & Schwarz	1219
Spectrum analyzer FSP40	Rohde & Schwarz	4088
Biconical antenna 11966 C	Hewlett Packard	0728
Log periodic antenna HL 223	Rohde & Schwarz	1999
Double ridged guide antenna EM 6961	Electrometrics	1204
Preamplifier 1 to 18 GHz DB97-1852	DBS Microwave	2648
High pass filter HPM11630	Micro-tronics	6609
Open area test site	Emitech	1274
Multimeter 77-2	Fluke	0812

**Test set up:**

The system is tested in an open area test site (OATS). The test unit is placed on a rotating table, 0.8m from a ground plane. Zero degree azimuths correspond to the front of the device under test.

See photos in annex

**Frequency range:** From 30 MHz to 12 GHz, 5<sup>th</sup> harmonic of the highest frequency used (2.4 GHz).

**Detection mode:** Quasi-peak ( $F < 1$  GHz)      Average ( $F > 1$  GHz)

**Bandwidth:**      120 kHz ( $F < 1$  GHz)      1 MHz ( $F > 1$  GHz)

**Distance of antenna:** 3 meters

**Antenna height:** 1 to 4 meters

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

**Equipment under test operating condition:**

The equipment is blocked in standby / reception mode.

**Results:**

Ambient temperature (°C): 19  
Relative humidity (%): 42

Power source:

We used for power source the internal battery of the equipment and we noted:

Voltage at the beginning of test (V): 3.6  
Voltage at the end of test (V): 3.6  
Percentage of voltage drop during the test (%): 0

No significant spurious has been detected.

Applicable limits: for  $30 \text{ MHz} \leq F \leq 88 \text{ MHz}$  : 40 dB $\mu$ V/m at 3 meters  
for  $88 \text{ MHz} < F \leq 216 \text{ MHz}$  : 43.5 dB $\mu$ V/m at 3 meters  
for  $216 \text{ MHz} < F \leq 960 \text{ MHz}$  : 46 dB $\mu$ V/m at 3 meters  
Above 960 MHz : 54 dB $\mu$ V/m at 3 meters

Note: any spurious which has more than 20 dB of margin compared to the applicable limit is considered not significant and therefore not necessarily reported.

**Test conclusion:**

RESPECTED STANDARD



## **7. RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS**

**Standard:** FCC Part 15

**Test procedure:** paragraph 209

**Test equipments:**

TYPE	BRAND	EMITECH NUMBER
Test receiver ESH3	Rohde & Schwarz	1058
Test receiver ESVS10	Rohde & Schwarz	1219
Spectrum analyzer FSP40	Rohde & Schwarz	4088
Loop antenna 6502	EMCO	1406
Biconical antenna 11966 C	Hewlett Packard	0728
Log periodic antenna HL 223	Rohde & Schwarz	1999
Double ridged guide antenna EM 6961	Electrometrics	1204
Preamplifier 1 to 18 GHz DB97-1852	DBS Microwave	2648
High pass filter HPM11630	Micro-tronics	6609
Open area test site	Emitech	1274
Multimeter 77-2	Fluke	0812

**Test set up:**

The system is tested in an open area test site (OATS). The test unit is placed on a rotating table, 0.8m from a ground plane. Zero degree azimuths correspond to the front of the device under test.

See photos in annex

**Frequency range:** From 9 kHz to 24 GHz, 10<sup>th</sup> harmonic of the highest fundamental frequency (2.4 GHz).

**Detection mode:** Quasi-peak ( $F < 1$  GHz)      Average ( $F > 1$  GHz)

**Bandwidth:**      120 kHz ( $F < 1$  GHz)      1 MHz ( $F > 1$  GHz)

**Distance of antenna:** 3 meters

**Antenna height:** 1 to 4 meters

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

**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.

**Results:**

Ambient temperature (°C):	21
Relative humidity (%):	43

We used for power source the internal battery of the equipment and we noted:

Voltage at the beginning of test (V):	3.6
Voltage at the end of test (V):	3.6
Percentage of voltage drop during the test (%):	0

The collocation measurement has been done with all transmitters switched on, no significant spurious has been detected.

Applicable limits: for  $9 \text{ kHz} \leq F \leq 490 \text{ kHz}$ :  $2400/F(\text{kHz})$  at 300 meters  
for  $490 \text{ kHz} < F \leq 1.705 \text{ MHz}$  :  $24000/F(\text{kHz})$  at 30 meters  
for  $1.705 \text{ MHz} < F \leq 30 \text{ MHz}$  :  $29.5 \text{ dB}\mu\text{V/m}$  at 30 meters  
for  $30 \text{ MHz} < F \leq 88 \text{ MHz}$  :  $40 \text{ dB}\mu\text{V/m}$  at 3 meters  
for  $88 \text{ MHz} < F \leq 216 \text{ MHz}$  :  $43.5 \text{ dB}\mu\text{V/m}$  at 3 meters  
for  $216 \text{ MHz} < F \leq 960 \text{ MHz}$  :  $46 \text{ dB}\mu\text{V/m}$  at 3 meters  
Above 960 MHz:  $54 \text{ dB}\mu\text{V/m}$  at 3 meters

*Note: any spurious which has more than 20 dB of margin compared to the applicable limit is considered not significant and therefore not necessarily reported.*

**Test conclusion:**

RESPECTED STANDARD

□□□ End of report, 1 annex to be forwarded □□□

## ANNEX: PHOTOS OF THE EQUIPMENT UNDER TEST

### GENERAL VIEW



**GENERAL VIEW**



**PHOTOS OF THE TEST CONFIGURATION RADIATED AND COLLOCATION MEASUREMENT**

