



RA-24-08103771-1/A Ed. 0

RADIO Measurement Technical Report

**Standard to apply:
FCC Part 15**

**Equipment under test:
PAYMENT TERMINAL
I 3070**

FCC ID: T8D-I3070CTL

**Company:
INGENICO**

DISTRIBUTION: Mr GUINET

Company: INGENICO

Number of pages: 22 including 3 annexes

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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.



PRODUCT: PAYMENT TERMINAL

Reference / model: I 3070

Serial number: 2038814922

MANUFACTURER: FLEXTRONIX

COMPANY SUBMITTING THE PRODUCT:

Company: INGENICO

Address: AV da via Augusta 71-73
08174 SANT CUGAT DEL VALLES
BARCELONA
SPAIN

Responsible: Mr GUINET

DATE(S) OF TEST: 15 and 16 October 2008

TESTING LOCATION: EMITECH ATLANTIQUE laboratory at ANGERS (49) FRANCE
EMITECH ATLANTIQUE open area test site in LA POUZE (49) FRANCE
Registration Number by FCC: 101696/FRN: 0006 6490 08

TESTED BY: L. BERTHAUD

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1. INTRODUCTION

This report presents the results of radio test carried out on the following equipment: PAYMENT TERMINAL I 3070, in accordance with normative reference.

2. PRODUCT DESCRIPTION

Class: A (commercial, industrial or business environment)

Utilization: payment terminal

Antenna type: incorporated antenna

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 (2007) Code of Federal Regulations
Title 47 - Telecommunication
Chapter 1 - Federal Communications Commission
Part 15 - Radio frequency devices
Subpart C - Intentional Radiators

ANSI C63.4 (03) American National Standard for Methods of measurement of Radio-Noise from low-voltage. Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

4. TEST METHODOLOGY

Radio performance tests procedures given in part 15:

- Paragraph 33: frequency range of radiated measurements
- Paragraph 35: measurement detector functions and bandwidths
- Paragraph 107: conducted limits
- Paragraph 203: antenna requirement
- Paragraph 209: radiated emission limits; general requirements

5. TESTS RESULTS SUMMARY

Test procedure	Description of test	Criteria respected?				Comment
		Yes	No	NAP	NAs	
FCC Part 15.203	ANTENNA REQUIREMENT	X				
FCC Part 15.207	CONDUCTED LIMITS	X				
FCC Part 15.209	RADIATED EMISSION LIMITS	X				
FCC Part 15.225	OPERATION WITHIN THE BAND 13.110-14.010 MHZ					
	a) field strength of any emission within the band 13.553-13.567 MHz	X				Note 2
	b) field strength of any emission within the band 13.410-13.563 MHz and 13.567-13.710 MHz	X				Note 1 Note 2
	c) field strength of any emission within the band 13.110-13.410 MHz and 13.710-14.010 MHz	X				Note 1
	d) field strength of any emission outside the band 13.110 MHz-14.010 MHz	X				See § 15.209
	e) frequency tolerance	X				
	f) powered tags			X		

NAP: Not Applicable NAs: Not Asked

Note 1: no radiated emission has been detected in these frequency bands.

Note 2: see radiated emission plot in annex 3

Conclusion:

The sample of PAYMENT TERMINAL I 3070 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. CONDUCTED LIMITS**Standard:** FCC Part 15**Test procedure:** Paragraph 15.207**Limits:** Class B**Test equipment:**

TYPE	BRAND	EMITECH NUMBER
Test receiver ESH3	Rohde & Schwarz	1058
Pulse limiter ESH3-Z2	Rohde & Schwarz	976
Artificial main network L3-25	PMM	834
Spectrum analyzer FSBS	Rohde & Schwarz	3133
Power source ALT 2000	K. SERRAS	2441

Software used: BAT-EMC V3.1.7.1**Test set up:**

The test unit is placed on a wooden table, 0.8 m over an horizontal reference plane and 0.4 m from a vertical reference plane. It is powered by an artificial main network placed on the ground reference plane (see photos in annex 2).

Equipment under test operating condition:

The equipment is powered with the AC power operating voltage of 115 V / 60 Hz.

Frequency range: 150 kHz - 30 MHz**Detection mode:** Peak / Average**Bandwidth:** 9 kHz

Results:**Measurement on the mains power supply:**

The measurement is made with peak detector.

Curve N° 1: measurement on the Neutral with peak detector

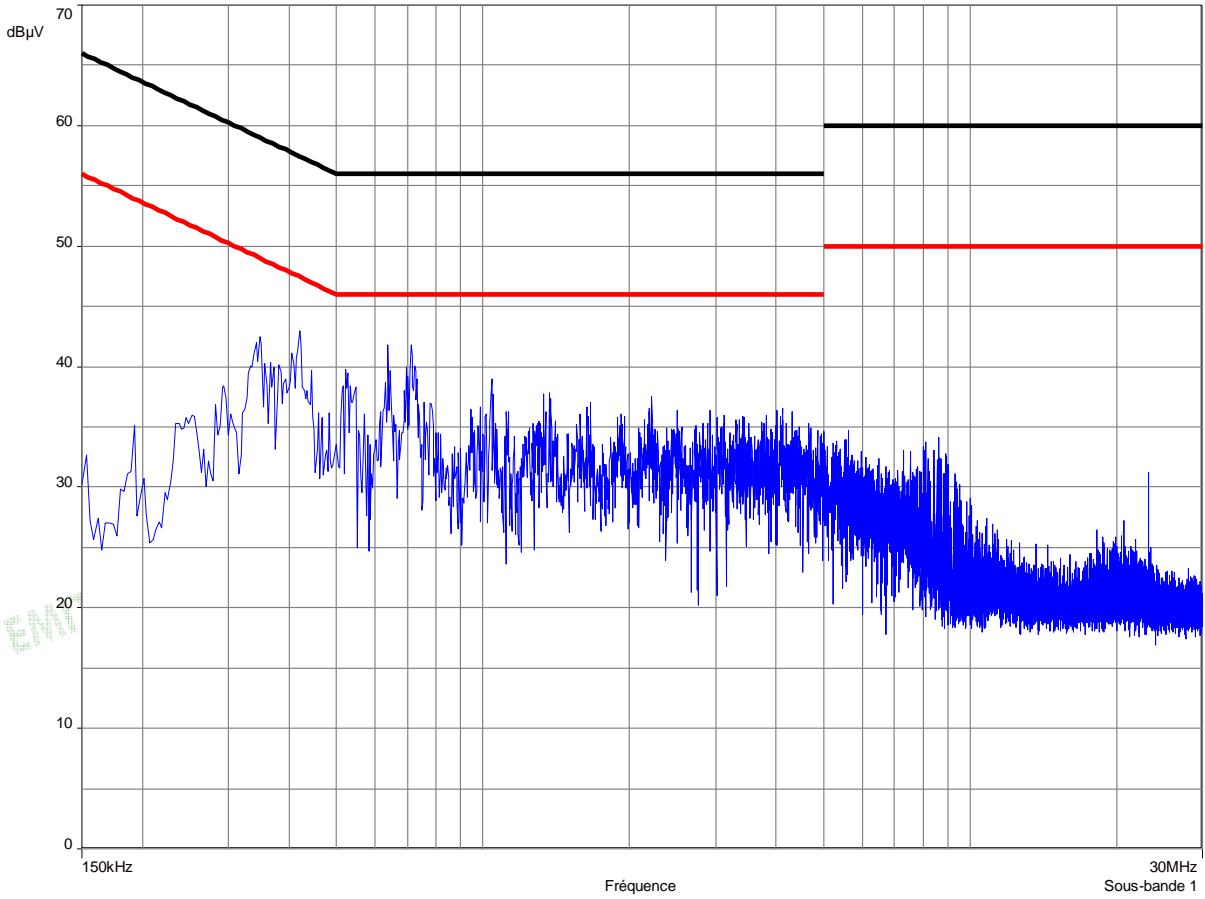
Curve N° 2: measurement on the Line with peak detector

The spectrum line which are less than 6 dB of the limit are analyzed with Quasi-Peak detector and average detector.

Curve N° 3: measurement on the Neutral with average detector (from 300 kHz to 1 MHz)

CURVE N°1.:

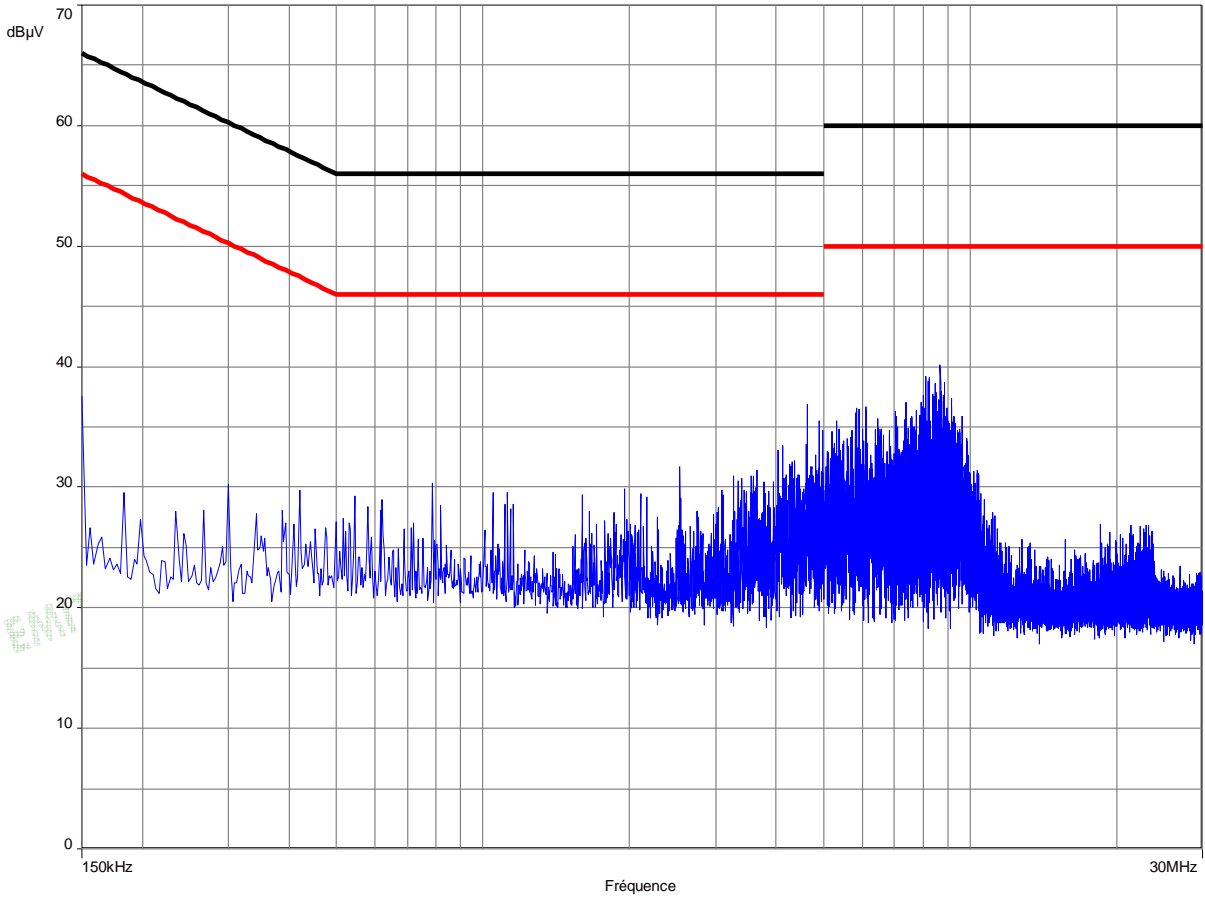
Measurement on the neutral with peak detector



RBW filter: 10 kHz
VBW filter: 10 kHz
Sweep time: 500 ms/MHz

CURVE N°2.:

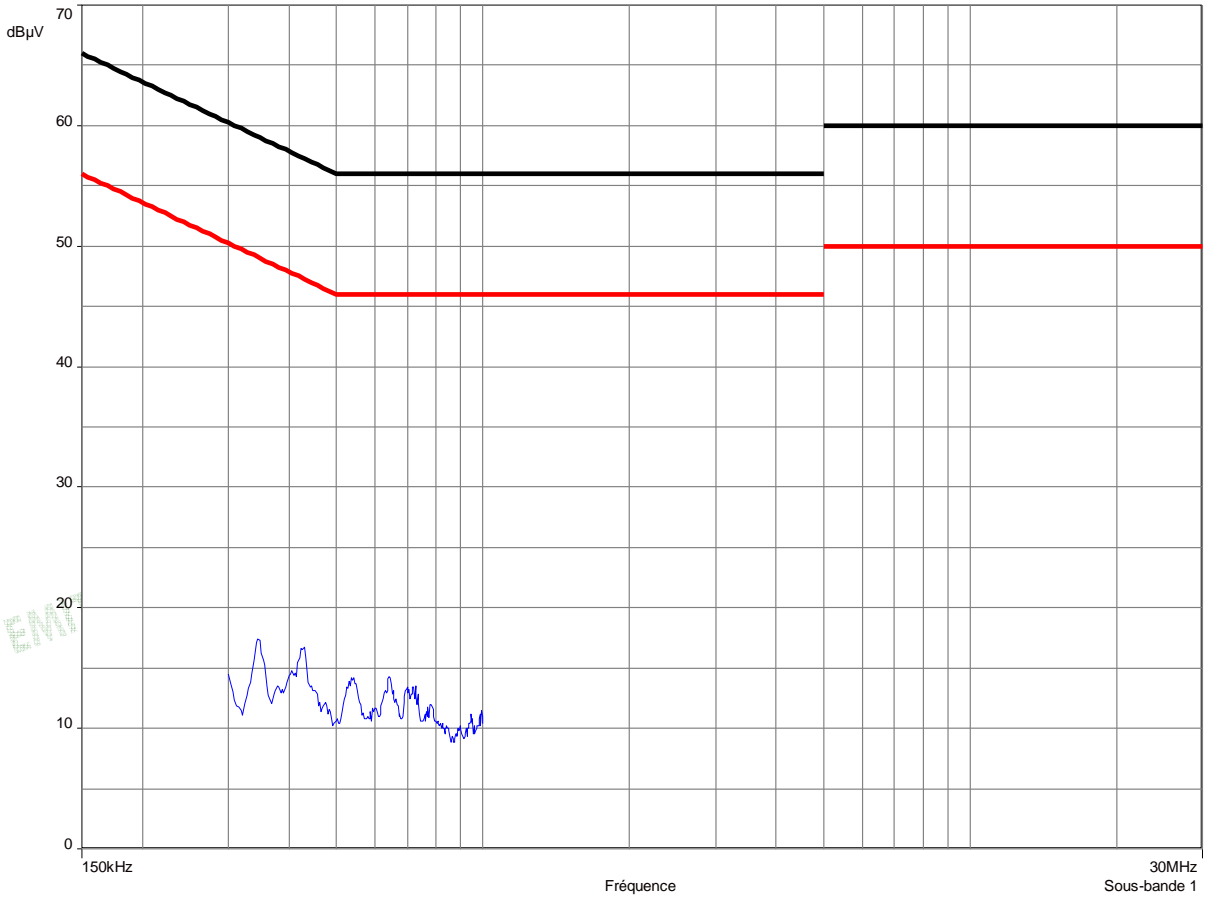
Measurement on the line with peak detector



RBW filter: 10 kHz
VBW filter: 10 kHz
Sweep time: 500 ms/MHz

CURVE N°3.:

Measurement on the Neutral with average detection from 300 kHz to 1 MHz



RBW filter: 9 kHz
Sweep time: 500 ms/MHz

Test conclusion: RESPECTED STANDARD

7. RADIATED EMISSION LIMITS

Standard: FCC Part 15

Test procedure: paragraph 209

Test equipment:

TYPE	BRAND	EMITECH NUMBER
Test receiver	Rohde & Schwarz ESVS 10	1219
Biconical antenna	Hewlet Packard 11966 C	728
Log periodic antenna	Rohde & Schwarz HL 223	1999
Spectrum analyzer	Rohde & Schwarz FSP40	4088
Open area test site	EMITECH	1274
Test receiver	Rohde & Schwarz ESH3	4112
Active loop antenna	EMCO 6502	1406
Variac	Dereix R213	1419

Test set up:

The system is tested in an open area test site (OATS).

The test unit is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuths correspond to the front of the equipment under test.

Frequency range: from 30 MHz to harmonic 10 ($F_{\text{carrier}} \leq 1 \text{ GHz}$)

Detection mode: Quasi-peak or average ($F < 1 \text{ GHz}$)
Peak ($F > 1 \text{ GHz}$)

Bandwidth: 120 kHz ($F < 1 \text{ GHz}$)
1 MHz ($F > 1 \text{ GHz}$)

Distance of antenna: 3 meters above 30 MHz
10 meters below 30 MHz

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 continuous modulated transmission mode, at the highest output power which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 22

Relative humidity (%): 64

Power source: 115 Va.c through a variac

Not any radiated emission has been detected.

Any radiated emission which has more than 20 dB margin compared to the limit is not necessarily reported.

TEST CONCLUSION: RESPECTED STANDARD



8. OPERATION WITHIN THE BAND 13.110-14.010 MHZ

Standard: FCC Part 15

Test procedure: paragraph 225

Test equipment:

TYPE	BRAND	EMITECH NUMBER
Test receiver	Rohde & Schwarz ESH3	4112
Active loop antenna	EMCO 6502	1406
Open area test site	EMITECH	1274
Modulation analyzer	Hewlett Packard HP8901B	1211
Variac	Dereix R213	1419
Climatic chamber	MPC	2593
Modulation analyzer	Hewlett Packard HP8901B	1211

Test set up:

The system is tested in an open area test site (OATS).

The test unit is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuths correspond to the front of the equipment under test.

The frequency tolerance measure is realized in near-field.

Distance of antenna: 10 meters

Antenna height: 1 meter

Antenna polarization: vertical

Equipment under test operating condition:

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

Results:
Carrier field strength

Ambient temperature (°C): 22

Relative humidity (%): 64

Power supply: 115 Va.c through a variac

Sample n° 1

	Measured level (dBµV/m) at frequency: 13.56 MHz
Normal test conditions	47.2
Limits	103.08*

Polarization of test antenna: vertical (height: 100 cm)

Position of equipment: flat position (azimuth: 90 degrees)

* the applicable limit at 30 m is extrapolated at 10 m by using the square of an inverse linear distance (40 dB/decade).

Frequency stability
Sample N° 1

Normal test conditions	Temperature (°C): 21.5 Humidity (%): 55	Nominal power source (V): 115	Measured differences (ppm) at frequency: 13.560053 MHz	Limits (ppm)
Extreme test conditions	Minimal temperature (°C): -20	Minimal power source (V): 97.7	+10.6	±100
		Maximal power source (V): 132.3	+11.4	
	Maximal temperature (°C): +50	Minimal power source (V): 97.7	-1.8	
		Maximal power source (V): 132.3	-3.1	

Measurement uncertainty: $\pm 1 \times 10^{-7}$
Test conclusion: RESPECTED STANDARD

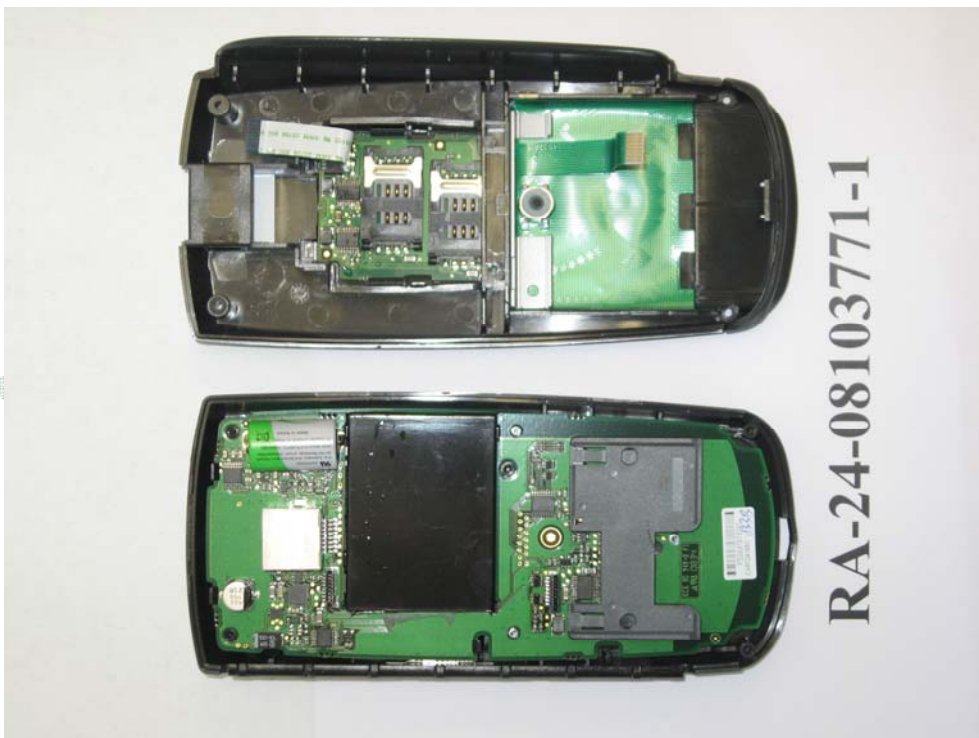
□□□ End of report, 3 annexes to be forwarded □□□

ANNEX 1: PHOTOS OF THE EQUIPMENT UNDER TEST

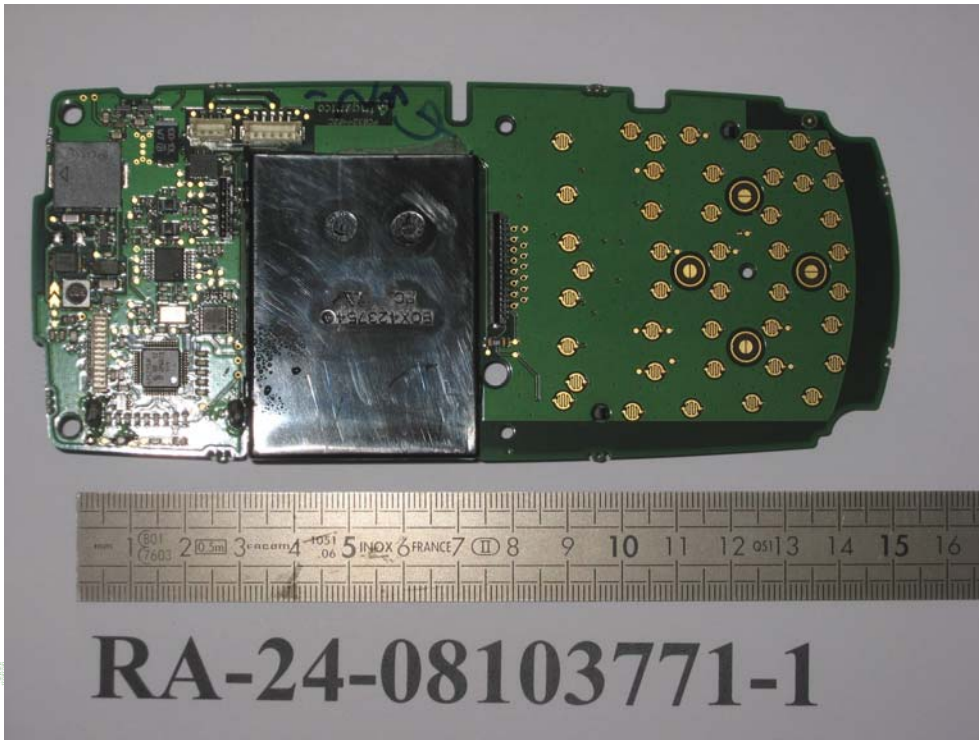
GENERAL VIEW



INTERNAL VIEW



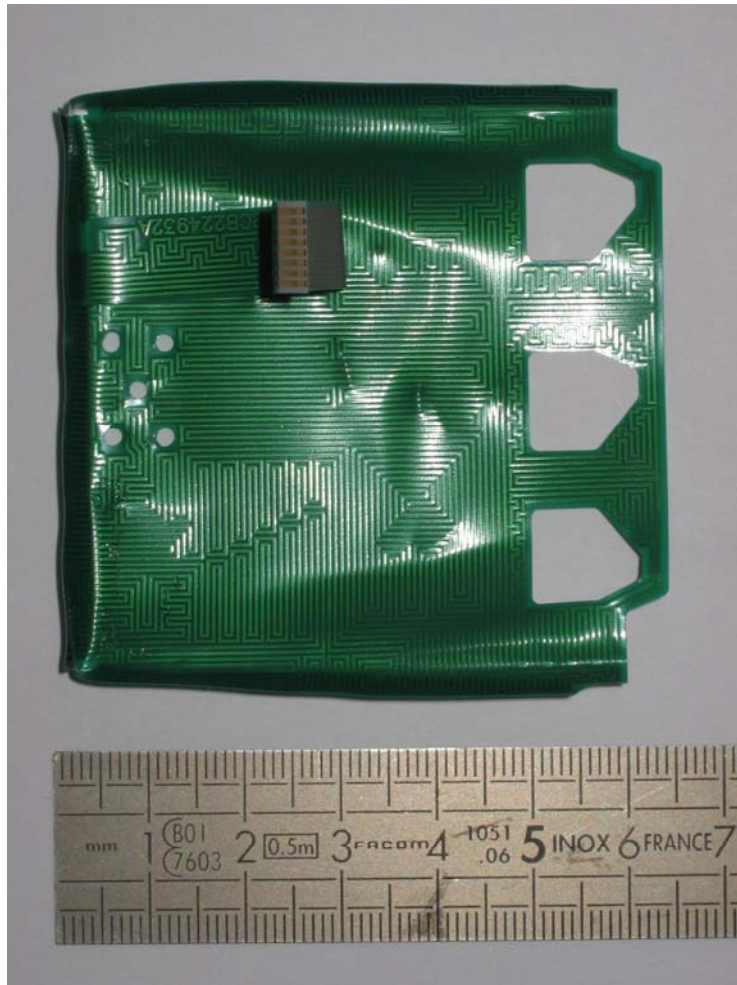
Printed circuit board: face 1



Printed circuit board: face 2



ANTENNA



EMITECH

EMITECH

EMITECH

EMITECH

EMITECH

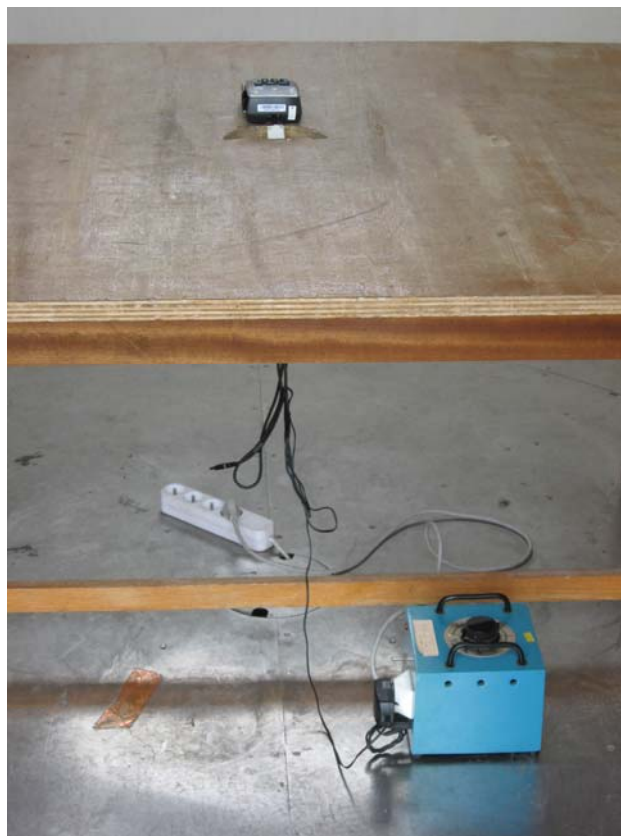
EMITECH

EQUIPMENT LABEL



ANNEX 2: OPEN AREA TEST SITE, TEST SET UP

TEST SET UP RADIATED MEASUREMENT





EMITECH

EMITECH



EMITECH

EMITECH

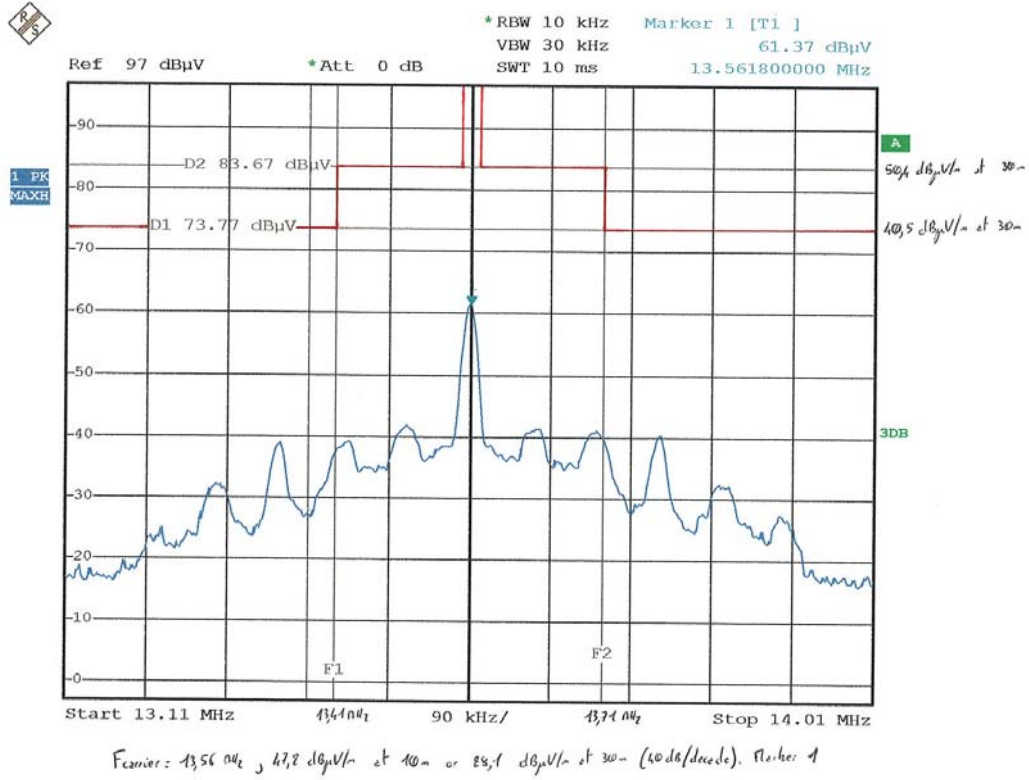
OPEN AREA TEST SITE



TEST SET UP CONDUCTED MEASUREMENT



ANNEX 3: RADIATED EMISSION PLOT



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