

CHAPTER 8

A8.0 – DROP TESTS

A 8.1 - DROP TEST ON HARD SURFACE

8.1.1. DEFINITION OF TEST

Following Section A8.1 of RTCM Recommended Standards for 406 MHz Satellite EPIRBs
(Version 2.0 Feb 5,1997) :

- The EUT is soaked at minimum stowage temperature (-30°C) for 2 hours .
- Before five minutes after removal from a temperature the EUT is dropped above the test surface :
 - height : 1 meter ($\pm$ 10 mm)
 - orientation : normal floating position
 - hard surface : piece of oak (600 x 500 x 200 mm / weight : 50 Kg)
- At the conclusion of the drop, the EUT is controlled by an aliveness test.

8.1.2. EQUIPMENT UNDER TEST

Beacon Unit : 2/2
Name : JOTRON
Type : TRON 40GPS
Number : 7001

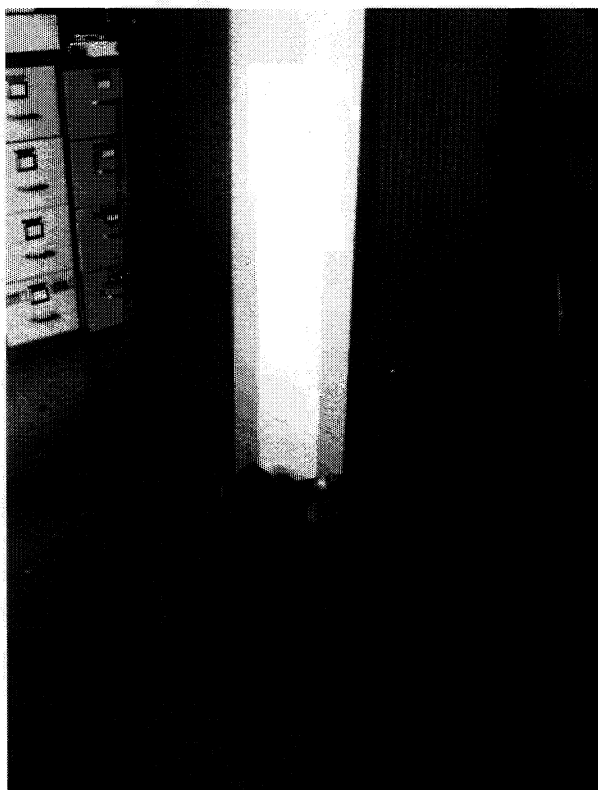
8.1.3. TEST SITE

Toulouse Space Center (C.S.T.) - INTESPACE Metrological Laboratory.

8.1.4. TEST EQUIPMENT

- Oven,
- Drop bench (see photo § 8.1.5 page 8.4),
- Argos-Cospas/Sarsat Certification test bench

8.1.5. PHOTOGRAPH



8.1.6. TEST RESULTS

8.1.6.1 Test implementation

Place : INTESPACE Laboratory

Date	Hour	Events - Observations
20 June 2000	8:00	Cooling the beacon to - 30° C in temperature controlled oven
	10:30	Beacon removed of oven.
	10:33	Beacon dropped on hard surface
	10:55	Visual inspection : OK.
	10:58	Electrical checks : OK See result of aliveness test next page

COMMENTS

Five additionnal Drops (5 orientations) have been conducted at ambient temperature after the first RTCM drop following

8.1.6.2 ALIVENESS TEST RESULTS AFTER DROP TEST ON HARD SURFACE

EUT : 2/2
 Name : JOTRON
 Type : TRON 40GPS
 Number : 7001
 Date : 20 June 2000

406 MHZ MEASUREMENTS

1 - Environmental Temperature (° C)			+ 22° C
2 – POWER OUTPUT			
- Transmission power	dBm	37 ± 2	37.4
- Power risetime	ms	< 5	0.60
- Power falltime	ms	< 5	-
3 – SPURIOUS OUTPUT			
- In band	*		OK
- Carrier harmonics			
4 –DIGITAL MESSAGE GENERATOR			
- Repetition rate			OK
- Bit rate	bits/S	400 ± 4	398.86
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	520.99
- CW preamble	ms	160 ± 1.6	159.92
5 – DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	1
- Protocol flag	bit	26	0
- Country code	bits	27-36	0257
- Protocol	bits	37-40	1110
- Encoded Position Data Source	bits	111	1
- Homing	bits	112	1
- BCH 1 code read / calculated	bits	86-106 / 25-85	1D3226 / 1D3226
- BCH 2 code read / calculated	bits	133-144 / 107-132	9E3 / 9E3
6 – FREQUENCY			
- Nominal value	KHz	406 025 ± 2	↗ 0.09429
- Short term stability		< 2x10 ⁻⁹ /100 ms	2.2 x 10 ⁻¹⁰

* See data and graphs next pages .

L'Intelligence des Environnements

Constructeur

JOTRON

Modele

TRON 40GPS

Numero de serie

OCA07001

Reference

M2393

Type

SARSAT

Date de l'essai 20 Jun 2000 10:58:54

Message balise

Message recu (1-144): FFFE2F901E1E24002B80374C89B78E0159E3
 Format flag (25): 1
 Protocole flag (26): 0
 Code pays (27-36): 0257
 Pays : NORWAY
 Code protocole (37-40): 1110
 Protocole utilise : Standard - Test
 Identification :
 Numero :
 BCH 1 lu/calculé (86-106/25-85): 1D3226/1D3226
 BCH 2 lu/calculé (133-144/107-132): 9E3/9E3
 Pos. Data Source (111): Internal
 121.5 MHz Homing (112): Yes
 Position GPS de reference : N 43°33'34'' E 1°28'48
 Position GPS : Yes
 Position GPS par defaut : No
 Latitude position : 43.5°3'32'' Nord
 Longitude position : .5°58'40'' Est
 Delta position : .254984532731 km

Controle message

Duree de la porteuse pure 159.92ms +- 0.
 Duree de l'emission 520.99 ms
 Frequence de modulation 398.86Hz +- 0.

Stabilite de frequence

Frequence moyenne F2 406025094.29 Hz
 SIGMA2 F2-F1 1.261E-09
 SIGMA3 F3-F2 2.229E-10

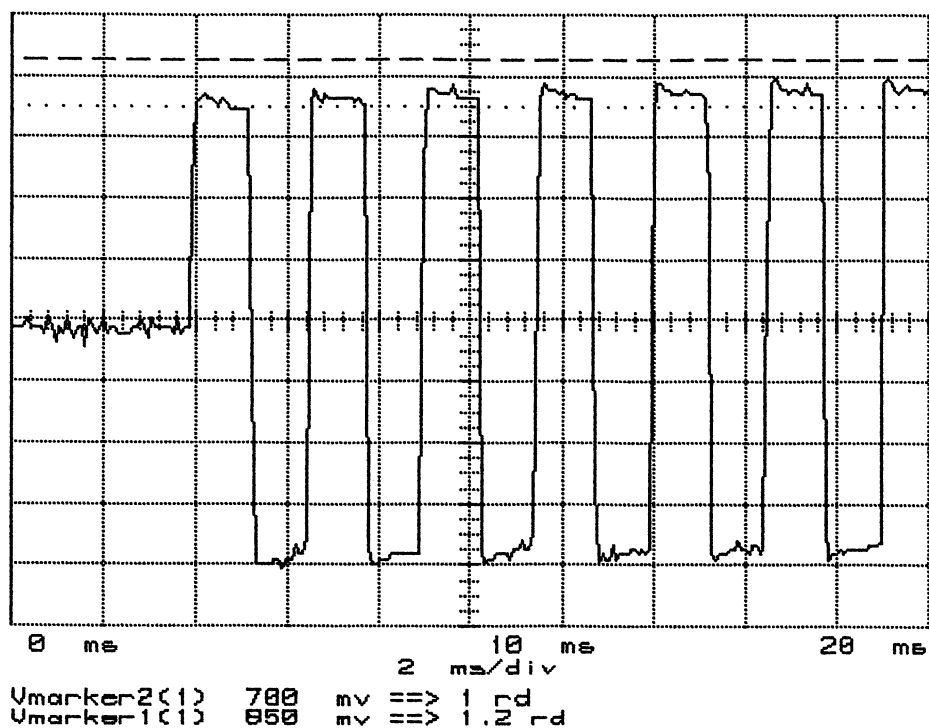
Mesures d'indice

F	F1	G1
50094.88	209	63
50094.77	241	62

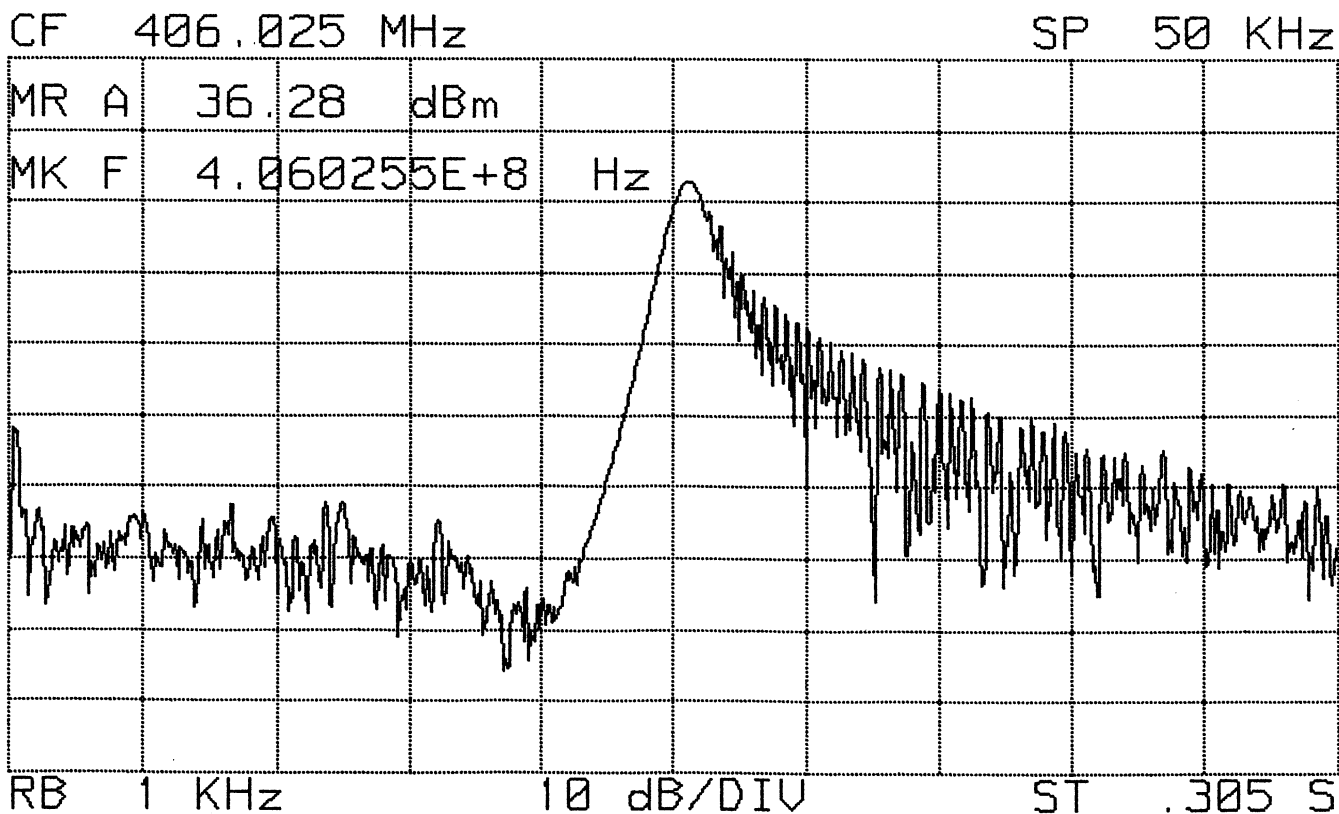
Excursion de phase totale	rd	<= 2.48	2.24
Excursion de phase positive	rd	0.96< <1.24	1.03
Excursion de phase negative	rd	-1.24< <-0.96	-1.21
Symetrie de l'excursion	%		8.12

Mesures de puissance

Puissance dBm 37.41



Spectre de frequence



A8.2 – DROP TEST INTO WATER

8.2.1 DEFINITION OF TEST

This procedure describes the test conditions and the operations to be carried out during the Drop Test into Water .

It respect the definition drescribed in Section A8.2 of RTCM Recommended Standards for 406 MHz Satellite EPIRBs (Version 2.0 Feb 5,1997) .

8.2.2. GENERAL DEFINITION OF TESTS

8.2.2.1. PURPOSE

a) Ensure that beacons are switched off, and drop them into the water from a height of 20 m in three configurations :

- Antenna vertical up
- Antenna vertical down
- Antenna horizontal

b) Physically inspect beacons

c) Do electrical tests of beacons

8.2.2.2. TEST SITE

The tests are conducted in a river lock-gate.

8.2.2.3. TEST EQUIPMENT

Beacon without stowage bracket.

The test is carried out using a hydrolic horst skiff able to reach 20 m height. The height is controlled by a calibrated halyard.

The beacon is held by the operator in the right position and released above the water area. An operator takes photographs of the test sequence in real time .

8.2.2.4. TEST SEQUENCE

The test sequence is as follows :

- 1 - Test A8.2 - Drop Test - Antenna vertical (up)
- 2 - Test A8.2 - Drop Test - Antenna vertical (down)
- 3 - Test A8.2 - Drop Test - Antenna horizontal

8.2.2.5. ORGANIZATION

- | | |
|-------------------------------------|---|
| • Conducting of the test : | ITS |
| • Crane operation : | ITS |
| • Operation and control of beacon : | ITS / CNES + manufacturer |
| • Recovery of beacons : | ITS |
| • Operation of camera : | ITS |
| • Height and depth checks : | ITS |
| • Signal for start of test : | ITS (subject to agreement of CNES + manufacturer) |

8.2.3. IMPLEMENTATION OF TEST

8.2.3.1. TIMING

- Preparation phase

- Obtain agreement of lock-gate staff,
- Record beacon identification,
- Lift up the operator and beacon in the hoisting skiff control the height (20 m),
- Set up camera,
- Make sure diver is ready.

- Test phase

- Obtain the ITS / CNES agreement for start of the test,
- Drop the beacon
- Take pictures before, during and at the end of the drop

- Control phase

- Diver recovers beacon,
- Mechanical and electrical checkout.

8.2.3.2. ENVIRONMENT

The tests conducted outside may therefore be subject to inclement weather such as wind, fog, icing and so on...

Decisions to postpone testing shall be taken jointly by ITS and CNES, in accordance with the manufacturer (if he is present).

8.2.3.3. SAFETY - QUALITY

All tests are to be conducted in the presence of ITS coordinator .

- Ensure that all personnel around the lock-gate is suitably dressed in view of the risk of slipping.

8.2.3.4. LOGISTICS

All tests are photographed in real time.

8.2.4. TEST RESULTS

8.2.4.1 Test implementation

Beacon Unit : 2/2
Name : JOTRON
Type : TRON 40GPS
Number : 7001

Place : Port Sud – Ramonville Saint Agne

	DATE/HOURS	MECHANICAL CONTROLS	ELECTRICAL CONTROLS
CONFIGURATION 1 Antenna vertical up	20 June 2000 14 :50	OK	OK
CONFIGURATION 2 Antenna vertical down	20 June 2000 15 :00	OK	OK
CONFIGURATION 3 Antenna horizontal	20 June 2000 15 :15	OK	OK

Observations :

Nothing.abnormal to note

Electrical checks after a drop test : OK

See result of alivness test next page

G. PEYROU


ITS Representative

8.2.4.2 Aliveness Test Results after Drop Test into the water

EUT : 2/2
 Name : JOTRON
 Type : TRON 40GPS
 Number : 7001
 Date : 20 June 2000 16:13:00

406 MHZ MEASUREMENTS

1 - Environmental Temperature (° C)			+ 22° C
2 – POWER OUTPUT			
- Transmission power	dBm	37 ± 2	37.6
- Power risetime	ms	< 5	0.55
- Power falltime	ms	< 5	-
3 – SPURIOUS OUTPUT			
- In band	*		OK
- Carrier harmonics			
4 –DIGITAL MESSAGE GENERATOR			
- Repetition rate			OK
- Bit rate	bits/S	400 ± 4	398.87
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	520.67
- CW preamble	ms	160 ± 1.6	160.07
5 – DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	1
- Protocol flag	bit	26	0
- Country code	bits	27-36	0257
- Protocol	bits	37-40	1110
- Encoded Position Data Source	bits	111	1
- Homing	bits	112	1
- BCH 1 code read / calculated	bits	86-106 / 25-85	1D3226 / 1D3226
- BCH 2 code read / calculated	bits	133-144 / 107-132	CDA / CDA
6 – FREQUENCY			
- Nominal value	KHz	406 025 ± 2	→ 0.08647
- Short term stability		< 2x10 ⁻⁹ /100 ms	2.2 x 10 ⁻¹⁰

* See graphs next pages

**intespace**

L'Intelligence de l'Environnement

ITS : M2393-RTCM & CNES : DSO/RC//AS 2000-224

Constructeur

Modele

Numero de serie

Reference

Type

JOTRON

TRON 40GPS

OCA07001

M2393

SARSAT

Date de l'essai 20 Jun 2000 16:13:34Message balise

Message reçu	(1-144):	FFFE2F901E1E24002B80374C89B78E014CD7
Format flag	(25):	1
Protocole flag	(26):	0
Code pays	(27-36):	0257
Pays	:	NORWAY
Code protocole	(37-40):	1110
Protocole utilise	:	Standard - Test
Identification	:	
Numero	:	
BCH 1 lu/calculé	(86-106/25-85):	1D3226/1D3226
BCH 2 lu/calculé	(133-144/107-132):	CDA/CDA
Pos. Data Source	(111):	Internal
121.5 MHz Homing	(112):	Yes
Position GPS de reference	:	N 43°33'34'' E 1°28'48
Position GPS	:	Yes
Position GPS par default	:	No
Latitude position	:	43.5°3'32'' Nord
Longitude position	:	.5°58'44'' Est
Delta position	:	.138284782391 km

Controle message

Duree de la porteuse pure	160.07ms +- 520.67 ms
Duree de l'emission	
Frequence de modulation	398.87Hz +- 398.87Hz +-

Stabilite de frequence

Frequence moyenne	F2	406025086.47 Hz
SIGMA2	F2-F1	1.052E-09
SIGMA3	F3-F2	2.194E-10

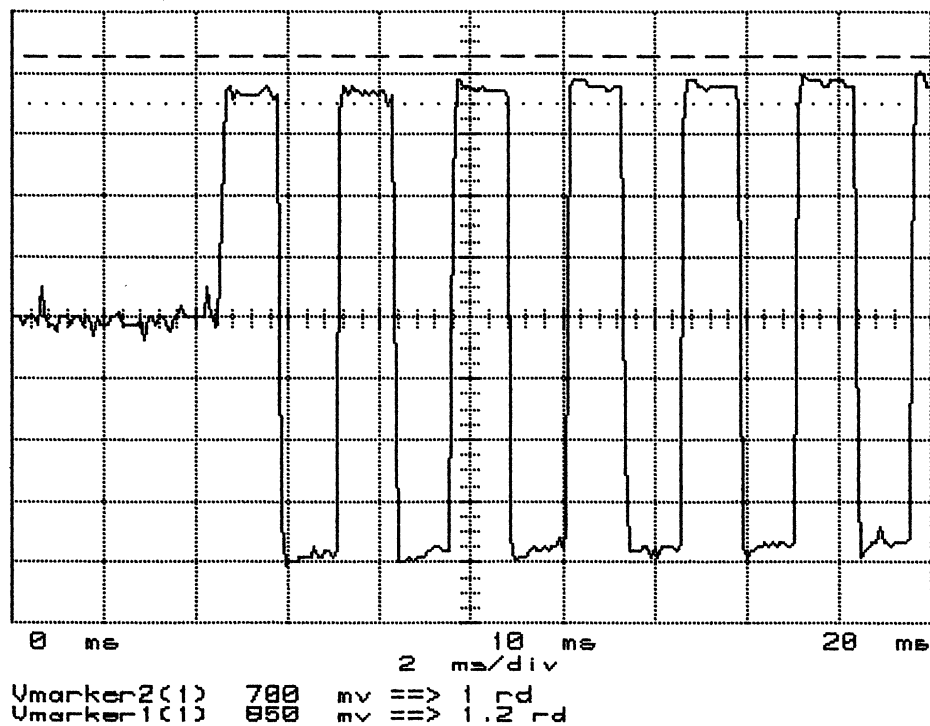
Mesures d'indice

F	F1	G1
50087.09	220	63
50087.03	218	63

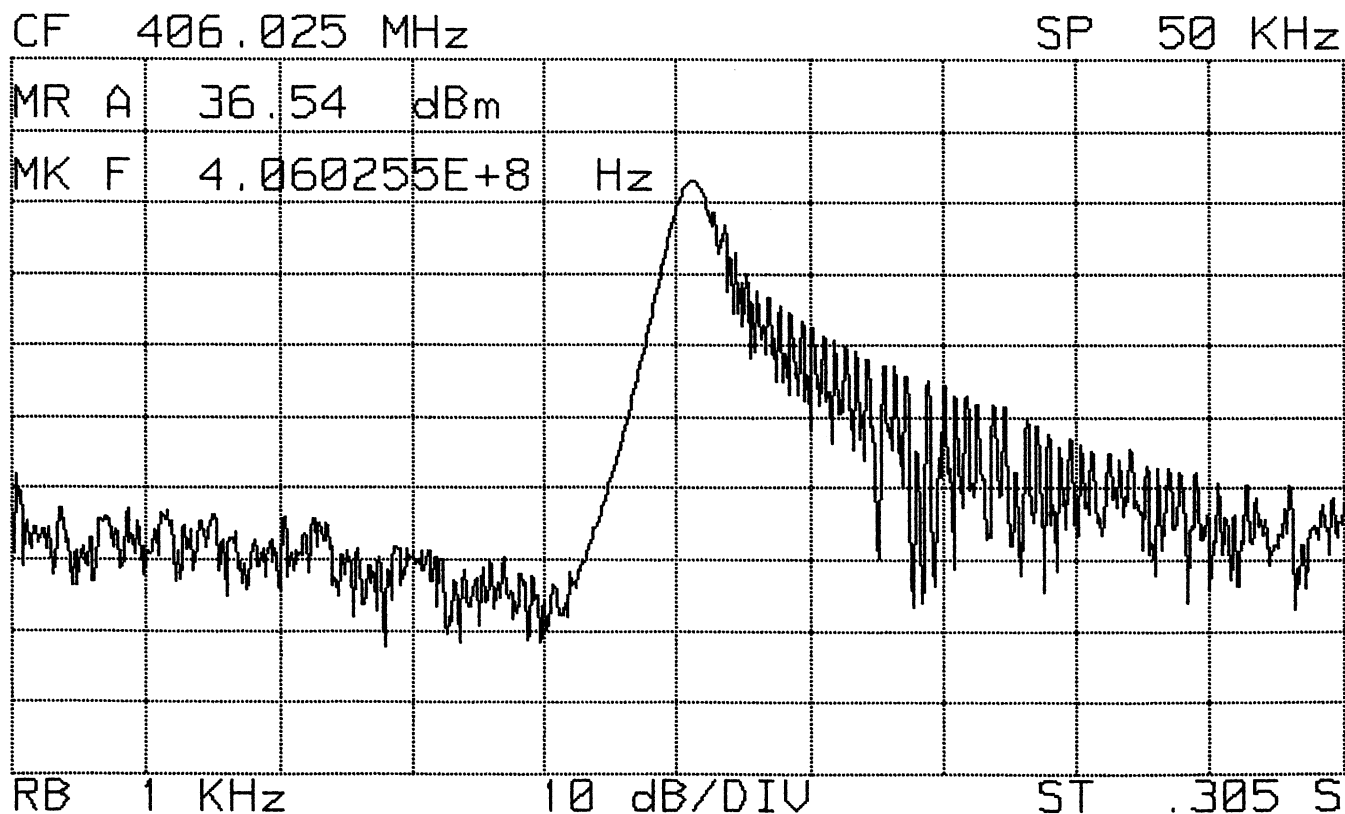
Excursion de phase totale	rd	<= 2.48	2.26
Excursion de phase positive	rd	0.96< <1.24	1.04
Excursion de phase negative	rd	-1.24< <-0.96	-1.23
Symetrie de l'excursion	%		8.23

Mesures de puissance

Puissance	dBm	37.60	8.15
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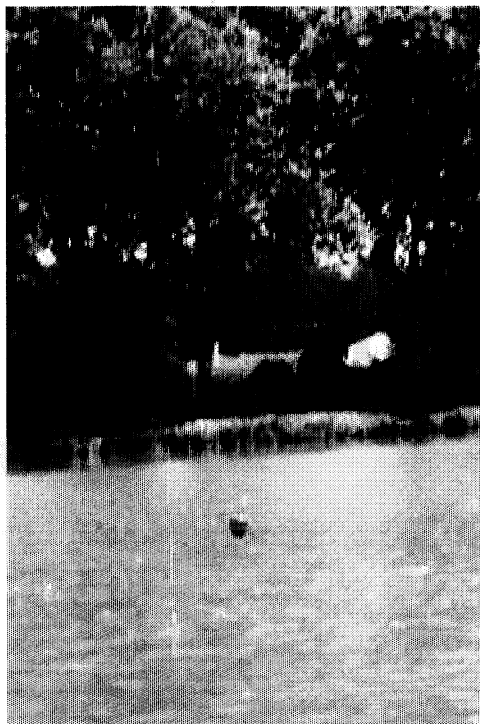
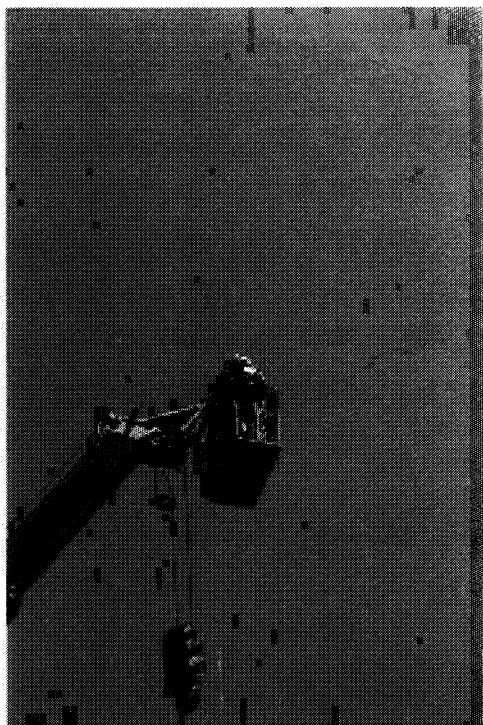
Spectre de fréquence



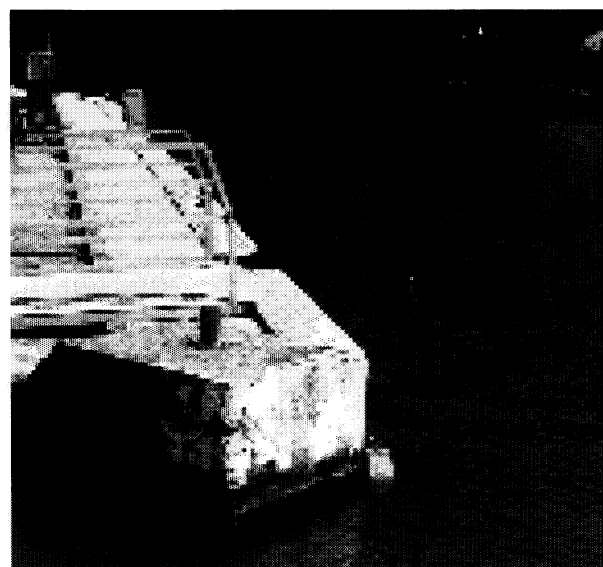
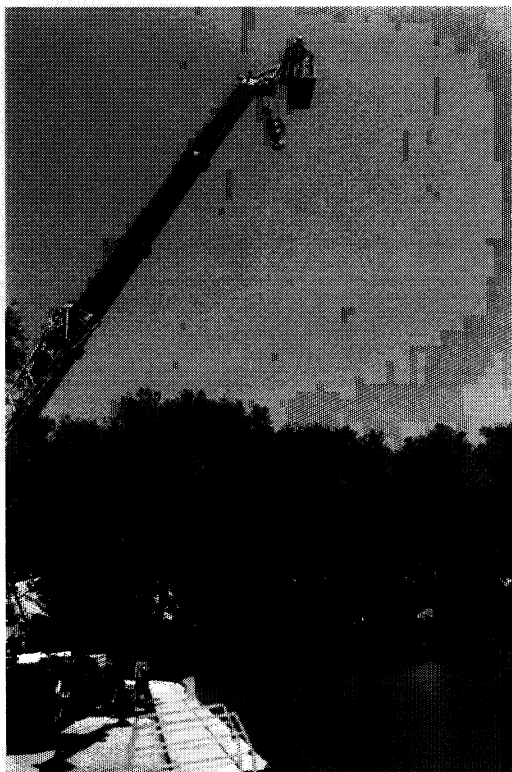
8.2.5. PHOTOGRAPHS

A8.2 – FIRST DROP INTO WATER

Antenna vertical up



A8.2 – SECOND DROP INTO WATER
Antenna vertical down



A8.2 – THIRD DROP INTO WATER Antenna horizontal

