

R051-24-10-104204-2/A Ed. 0

RADIO technical report

**according to standard:
FCC Part 15**

**Equipment under test:
PORTABLE IN-TRANSIT TRACKING UNIT
PITU I - 123 kHz part**

**FCC ID:
VJV-PITUV1**

**Company:
TES ELECTRONIC SOLUTIONS**

DISTRIBUTION: Mr LE CORRE

Company: TES ELECTRONIC SOLUTIONS

Number of pages: 10 including 2 annexes

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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: PORTABLE IN-TRANSIT TRACKING UNIT

Reference / model: PITU I

Serial number: not communicated

Trade mark: VARI-TRAC

MANUFACTURER: TES ELECTRONIC SOLUTIONS

COMPANY SUBMITTING THE PRODUCT:

Company: VARI-TRAC

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TECHNICAL SUPPORT:

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Responsible: Mr LE CORRE

DATE(S) OF TEST: 19 August 2010

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: 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:

PORTABLE IN-TRANSIT TRACKING UNIT – PITU 1 - 123 kHz part, in accordance with normative reference.

2. PRODUCT DESCRIPTION

Class: A (commercial, industrial and business environment)

Utilization: mobile tracking unit

Antenna type and gain: integral antenna, unknown gain

Operating frequency range: 123 kHz

Number of channels: 1

Channel spacing: not concerned

Frequency generation: synthesiser

Modulation: frequency

Power source: 12 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 (2009) 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		
FCC Part 15.109	RADIATED EMISSION LIMITS	X				Note
FCC Part 15.111	ANTENNA POWER CONDUCTED LIMITS FOR RECEIVER			X		

NAp: Not Applicable

NAs: Not Asked

Note: See test results in EMITECH radio technical report N°R051-24-10-101741-5/A Ed. 0

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				Note 1
FCC Part 15.207	CONDUCTED LIMITS			X		
FCC Part 15.209	RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS	X				Note 2

NAp: Not Applicable

NAs: Not Asked

Note 1: Integral antenna. Professionally installed equipment.

Note2: Unwanted emissions levels are all below the fundamental emission field strength level.

Conclusion:

The sample of PORTABLE IN-TRANSIT TRACKING UNIT – PITU I-123 kHz part 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; GENERAL REQUIREMENTS

Standard: FCC Part 15

Test procedure: paragraph 209

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Test receiver	Rohde & Schwarz ESH3	1058
Test receiver	Rohde & Schwarz ESVS10	1219
Spectrum analyzer	Rohde & Schwarz FSP40	4088
Loop antenna	EMCO 6502	1406
Biconical antenna	Hewlett Packard 11966 C	0728
Log periodic antenna	Rohde & Schwarz HL 223	1999
Double ridged guide antenna	Electrometrics EM 6961	1204
Preamplifier 1 to 18 GHz	DBS Microwave DB97-1852	2648
High pass filter	Micro-tronics HPM11630	6609
Open area test site	EMITECH	1274
Power source	Hewlett Packard E3610A	4195
Multimeter	Fluke 77-2	0812

Test set up:

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

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

Frequency range: From 9 kHz to 10th harmonic of the highest fundamental frequency.

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

Bandwidth: 200 Hz ($9 \text{ kHz} \leq F < 150 \text{ kHz}$)
9 kHz ($150 \text{ kHz} \leq F < 30 \text{ MHz}$)

Distance of antenna: 10 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 transmission mode, modulated by internal data signal, at the highest output power level which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 22.5
Relative humidity (%): 64

Power source: 12 Vd.c

FREQUENCIES (kHz)	Detector P: Peak QP: Quasi-Peak	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBμV/m)	Limits (dBμV/m)	Margin (dB)
122.86 ①	QP	100	0	200	V	51.9	78.6 ②	26.7

① Fundamental frequency

② The applicable limit given in section (a) of § 15.209 has been extrapolated using an inverse linear distance extrapolation factor of 40 dB / decade according to section (f) (2) of § 15.31.

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

Test conclusion:

RESPECTED STANDARD

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

ANNEX 1: PHOTOS OF THE EQUIPMENT UNDER TEST

GENERAL VIEW



INTERNAL VIEW



ANNEX 2: TEST SET UP

RADIATED MEASUREMENTS

