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FCC CERTIFICATION RADIO Measurement Technical Report

**standard to apply:
FCC Part 15.249**

**Equipment under test:
RACE MASTER**

**FCC ID :
RX9-T070-916**

**Company:
TACKTICK SARL**

DISTRIBUTION: M. VALENS

Company: TACKTICK SARL

Number of pages: 15 including 2 annexes

Ed.	Date	Modified pages	Editing		Verification Approval	
			Name	Visa	Name	Visa
0	14-Feb-07	creation	L. BERTHAUD	<i>LB</i>		

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: RACE MASTER

Reference / model: T070

Serial number: Not communicated

MANUFACTURER: Not communicated

COMPANY SUBMITTING THE PRODUCT:

Company: TACKTICK SARL

Address: 27, rue Anita Conti
Parc d'activité de Laroiseau
56000 Vannes
FRANCE

Responsible: M. VALENS

DATES OF TEST: 17, 19 and 26 January 2007

TESTING LOCATION: EMITECH ATLANTIQUE laboratory at ANGERS (49) FRANCE
EMITECH ATLANTIQUE open area test site in LA POUEZE (49)
FRANCE

Registration Number by FCC: 101696/FRN: 0006 6490 08

TESTED BY: L. BERTHAUD

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1. INTRODUCTION

This document presents the result of RADIO test carried out on the following equipment: RACE MASTER in accordance with normative reference.

2. PRODUCT DESCRIPTION

Class: B (residential environment)

Utilization: Tactical race compass and wind shift indicator.

Antenna type: Incorporated antenna

Operating frequency: 916 MHz

Number of channels: 1

Channel spacing: not concerned

Frequency generation: ☐ SAW Resonator ☐ Crystal ☒ Synthetiser

Modulation: ☐ Amplitude ☒ Digital ☐ Frequency ☐ Phase

Power source: 3 Vd.c. (Lithium battery)

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 (2006)	Code of Federal Regulations Title 47 - Telecommunication Chapter 1 - Federal Communications Commission Part 15 - Radio frequency devices Subpart C - Intentional Radiators
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:

- Paragraph 33: frequency range of radiated measurements
- Paragraph 35: measurement detector functions and bandwidths
- Paragraph 203: antenna requirement
- Paragraph 205: restricted bands of operation
- Paragraph 209: radiated emission limits; general requirements
- Paragraph 249: operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz and 24.0-24.25 GHz

5. ADD ATTACHMENTS FILES

“Synoptic “
“Block diagram “
“External photos and Product labeling “
“Assembly of components “
“Internal photos “
“Layout pcb “
“Bil of materials “
“Schematics “
“Product description “
“User guide “

6. TESTS AND CONCLUSIONS

Test procedure	Description of test	Criteria respected ?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.203	ANTENNA REQUIREMENT	X				<i>Note 1</i>
FCC Part 15.205	RESTRICTED BANDS OF OPERATION	X				
FCC Part 15.207	CONDUCTED LIMITS			X		
FCC Part 15.209	RADIATED EMISSION LIMITS; general requirements	X				<i>Note 2</i>
FCC Part 15.249	OPERATION WITHIN THE BANDS 902-928 MHZ, 2400-2483.5 MHZ, 5725-5875 MHZ AND 24.0-24.25 GHZ					
	(a) field strength fundamental and harmonics	X				
	(b) fixed point-to-point operation			X		
	(c) field strength distance	X				
	(d) radiated emissions outside specified frequency bands	X				
	(e) peak measurements	X				
	(f) requirement note of section 15.37 (d)			X		

NAp: Not Applicable

NAs: Not Asked

Note 1: internal PCB antenna (see photos in annex 1).

Note 2: see FCC part 15.249 (d).

Conclusion:

The sample of RACE MASTER 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.

7. FIELD STRENGTH OF FUNDAMENTAL

Standard: FCC Part 15

Test procedure: paragraph 15.249

Test equipment:

TYPE	BRAND	EMITECH NUMBER
Test receiver ESVS10	Rohde & Schwarz	1219
Log periodic antenna HL223	Rohde & Schwarz	1999
Open 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, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

Detection mode: Quasi-Peak

Bandwidth: 120 kHz

Distance of antenna: 3 meters

Antenna height: 1 to 4 meters

Antenna polarization: vertical and horizontal

Equipment under test operating condition:

The equipment is blocked in continuous transmission mode, modulated by internal data signal.

Results:

Ambient temperature (°C): 19.5
Relative humidity (%): 72

Voltage at the beginning of the test (V): 3

Voltage at the end of the test: 2.94

Percentage of voltage drop during the test (%): 2

FREQUENCIES (MHz)	E.U.T. orientation	Antenna height (cm)	Polarization H: Horizontal V: Vertical	Azimuth (degree)	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
915.94	z	108	V	206	90.9	93.98	3.08

E.U.T: Equipment under test.
x: to put flat
y: on the edge
z: up right

Test conclusion:

RESPECTED STANDARD

8. RADIATED EMISSION OF TRANSMITTER

Standard: FCC Part 15

Test procedure: paragraph 15.205
paragraph 15.209
paragraph 15.249

Test equipment:

TYPE	BRAND	EMITECH NUMBER
Test receiver ESH3	Rohde & Schwarz	1058
Test receiver ESVS 10	Rohde & Schwarz	1219
Spectrum analyzer FSP 40	Rohde & Schwarz	4088
Loop antenna	EMCO	1406
Biconical antenna HP 11966C	Hewlett Packard	0728
Log periodic antenna HL 223	Rohde & Schwarz	1999
Open site	Emitech	1274
Antenna RGA-60	Electrometrics	1204
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, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

Frequency range: from 9 kHz to harmonic 10 ($F_{\text{carrier}} \leq 10 \text{ GHz}$)

Bandwidth: 120 kHz ($F < 1 \text{ GHz}$) or 100 kHz, following 15.205 or 15.249
1 MHz ($F > 1 \text{ GHz}$)

Distance of antenna: between 30 m and 3 m according the frequencies and the limits.

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 transmission mode, modulated by internal data signal.

Results:

Ambient temperature (°C): 19.5

Relative humidity (%): 72

Voltage at the beginning of the test (V): 3

Voltage at the end of the test (V): 2.9

Percentage of voltage drop during the test (%): 3.3

The polarity column refers to the antenna polarity at which the maximum emissions level is measured.

FREQUENCIES (MHz)	Detector	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBμV/m)	Limits (dBμV/m)	Margin (dB)
1831.85	Avg	172	232	1000	H	50.87	53.98	3.11
1831.85	Peak	172	232	1000	H	52.56	73.98	21.42
2747.74	Avg	358	199	1000	H	39.08	53.98	14.9
2747.74	Peak	358	199	1000	H	45.75	73.98	28.23
3664.04	Avg	225	123	1000	H	42.42	53.98	11.56
3664.04	Peak	225	123	1000	H	49.87	73.98	24.11
4579.64	Avg	100	252	1000	V	40.8	53.98	13.18
4579.64	Peak	100	252	1000	V	49.86	73.98	24.12

TEST CONCLUSION:

RESPECTED STANDARD

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

ANNEX 1: PHOTOS OF THE EQUIPMENT UNDER TEST

GENERAL VIEW



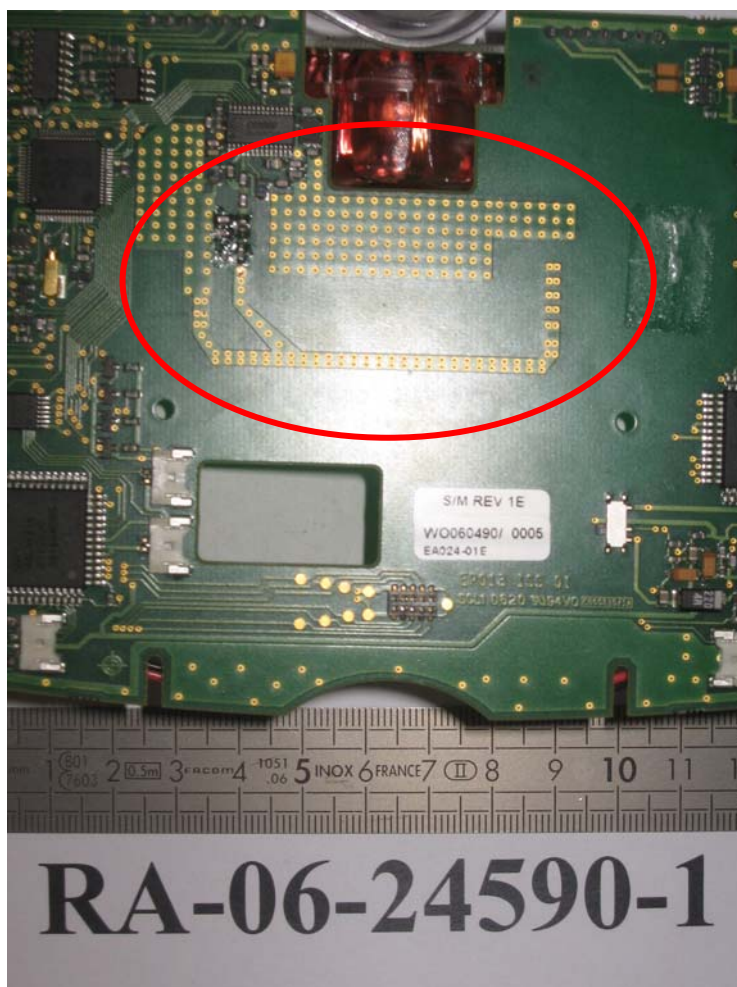
PRINTED CIRCUIT BOARD: FACE 1



PRINTED CIRCUIT BOARD: FACE 2



PCB ANTENNA



ANNEX 2: OPEN AREA TEST SITE, TEST SET UP

OPEN AREA SITE



TEST SET UP